HAZELTON WASTE MANAGEMENT FACILITY

2021 Annual Report

Prepared for:
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Environment & Climate Change Strategy
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Regional District of
Kitimat-Stikine

Executive Summary

The Hazelton Waste Management Facility (HWMF) is owned and operated by the Regional District of Kitimat-Stikine (RDKS) in accordance with the Ministry of the Environment and Climate Change Strategy (ENV) Operational Certificate (OC) MR-17226. The HWMF services commercial and residential homes in the greater Hazelton area, which includes the community of South Hazelton, east to Witset, and north up the Kispiox Valley. Waste collected at the Kitwanga Transfer Station is consolidated and hauled to the HWMF for landfilling. The following communities use the Kitwanga Transfer Station: Cedarvale, Kitwanga, Gitsegukla, Gitwangak, and Gitanyow.

In 2021, 4,384 tonnes of refuse were deposited into the landfill, including 1,351 tonnes of construction and demolition (C&D). Approximately 1.4 tonnes of land clearing waste were received at the facility. An estimated 40.8 tonnes of cardboard, 2 tonnes of clean wood waste, 218.2 tonnes of metal, and 250 individual tires or 3 tonnes of tires were diverted from the landfill. Septage was also diverted from landfill however, this volume was not tracked during 2021.

There were no instances of mammalian wildlife breaching the facility fence observed during 2021 at the Hazelton Waste Management Facility. There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens). In 2021 ENV visited the site on October 18 to complete a planned inspection to assess compliance with the OC which identified some compliance issues outlined in the report herein.

The OC received one amendment, which changed two sections and added an additional one. The phytoremediation orchard underwent some scheduled maintenance during September. The facility also had one authorized burn of clean wood waste and land clearing waste in October. The three facility samples as well as all five boreholes, four shallow ground wells and five surface water locations were sampled and monitored according to the requirements of the OC. The details of the Facility water quality monitoring program are discussed in the *Hazelton Waste Management Facility 2021 Annual Water Quality Monitoring Report*, prepared by WSP Golder, and contained in Appendix A of this report.

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Regional District of
Kitimat-Stikine

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Regional District of
Kitimat-Stikine

1 Introduction

This annual report covers the period from January 1 to December 31, 2021 and has been prepared to fulfill the requirements of the Hazelton Landfill Operational Certificate MR-17226. The Operational Certificate (OC) was issued by the Ministry of Environment and Climate Change Strategy (ENV) on May 30, 2013, and most recently amended in October 2021.

The OC authorizes the discharge of municipal solid and liquid wastes and outlines the criteria for environmental and human protection at the landfill. This report meets the requirements outlined in Section 12.2 of the Operational Certificate by providing the following information:

Objectives of the 2021 Annual Report are summarized in Table 1.

Table 1 Report Objectives

Waste Tracking
Quantity of MSW Received and Recycled
Quantity of Liquid Waste Received
Wildlife Observations
Facility Updates and Maintenance
Non-Compliances
Operational Certificate Amendments
Phytoremediation
Maintenance
Treated Leachate Discharge
Authorized Burn
Environmental Monitoring

2 Background

The Hazelton Waste Management Facility (HWMF) is owned and operated by the Regional District of Kitimat-Stikine (RDKS). It is located approximately 4 km east of New Hazelton at 82 Birch Road; access is from Highway 16 as seen in Figure 1.

The HWMF is responsible for the management of municipal solid and liquid waste generated from commercial and residential sources in the greater Hazelton area, which includes the community of South Hazelton, east to Witset, and north up the Kispiox Valley. Waste collected at the Kitwanga Transfer Station is consolidated and hauled to the HWMF for landfilling. The following communities use the Kitwanga Transfer Station: Cedarvale, Kitwanga, Gitsegukla, Gitwangak, and Gitanyow. The HWMF is operated in accordance with the Regional District Kitimat-Stikine Solid Waste Management Plan (1995).

Landfill operations are regulated by the Ministry of Environment and Climate Change Strategy (ENV) Operation Certificate MR-17226, most recently updated in October 2021 and conducted in accordance with the Design, Operations, and Closure Plan (DOCP) for Hazelton Waste Management Facility, authored by Sperling Hansen and Associates (2018). This annual report follows criteria outlined in the amended Operational Certificate issued October 19th, 2021.

The HWMF currently contains septage receiving lagoons, a landfill, an equipment storage building, Z-wall for public drop-off of garbage, and U-Bays for drop-off of tires and scrap metal including large appliances and propane tanks. The leachate treatment system includes an equalization pond, a series of four wetlands and discharge of treated effluent to a phytoremediation orchard.

Figure 1 Location of the Hazelton Waste Management Facility.

3 Waste Disposal

The Hazelton Waste Management Facility (HWMF) serves the Hazelton and Kitwanga area. Waste from the Kitwanga Transfer Station is hauled to the HWMF. Some communities in the Hazelton area provide residential curbside collection, which subsequently haul to the HWMF. The facility also provides disposal and diversion services to many residents and businesses who self-haul their garbage. Metal (including scrap, propane tanks, and large appliances), tires, and cardboard (commercial and residential) are collected and stored at the facility for recycling. Clean wood is segregated and burned on site following the criteria of the OC.

The OC permits the discharge of municipal solid waste, municipal liquid waste, asbestos, and contaminated soil (with contaminants in concentrations less than “hazardous waste” as defined by the

Hazardous Waste Regulation). Some types of municipal solid waste are considered Controlled Waste by RDKS bylaw 688, including:

- animal carcasses (over 50 kg)
- broken asphalt
- clean soils
- concrete up to 30 cm in diameter
- loads of construction and demolition (C&D) debris or land clearing debris greater than 5 m^3
- contaminated soils
- waste ash from incinerators

The annual totals for 2021 of each type of permitted waste discharged at the Hazelton Landfill are shown in Table 2. Septage was not tracked in 2021.

Table 2 Waste Discharged in 2021

Waste Type	Cubic Meters	Tonnes
Landfilled Waste	**23,304**	**4,384**
Asbestos Waste[1]	4	1
C&D[2]	4,703	1,351
Land Clearing[3]	18	1
Refuse[4]	18,579	3,031
Diverted Waste	**561**	**646**
Broken Concrete	15	8
Cardboard[5]	*	41
Clean Wood	23	2
Metal[6]	*	218
Soil[7]	273	382
Tires[8]	250	3
Total	**23,865**	**5,029**

*Estimate of volume not provided

3.1 Landfilled Wastes

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

Asbestos

Asbestos containing waste, including waste asbestos as defined in the HWR, generated from residential, commercial, and institutional customers is accepted at the HWMF through the Controlled Waste application process. Asbestos containing waste is received at the landfill using approved containment

[1] Asbestos tonnage was converted from cubic meters using the U.S. EPA's *Volume to Weight Conversion Factors* (2016) value of *C&D – Aggregate Construction & Demolition Bulk* estimated at 1 cubic yard = 484lbs.
[2] C&D tonnage was converted from cubic meters using the U.S. EPA's *Volume to Weight Conversion Factors* (2016) value of *C&D – Aggregate Construction & Demolition Bulk* estimated at 1 cubic yard = 484lbs.
[3] Land Clearing Waste tonnage was converted from cubic meters using the U.S. EPA's Volume to Weight Conversion Factors (2016) value of Yard Trimmings – Mixed Yard Waste: Branches and Stumps estimated at 1 cubic yard = 127 lbs.
[4] Refuse tonnage was converted from cubic meters using the U.S. EPA's Volume to Weight Conversion Factor of 1 cubic yard = 275lbs. This also applies to refuse from KTS as well.
[5] Tonnage provided from Recycle BC
[6] Includes propane tanks and white goods
[7] Assumed bulk density factor of 1.4
[8] The value of 250 is an approximate count of the physical number of tires on site. The estimated tonnage of tires was converted using the U.S. Environmental Protection Agency's Volume to Weight Conversion Factors (2016) value of Scrap—Light Duty Tires (passenger, light truck) estimated at 22.5lbs per unit.

methods under Section 40 of the HWR and is accepted by scheduled appointment for immediate burial in the landfill. Asbestos disposed at HWMF totalled **1 tonne**. Asbestos tonnage was converted from cubic metres using the U.S. EPA's *Volume to Weight Conversion Factors (2016)* value of *C&D – Aggregate Construction & Demolition Bulk* estimated at 1 cubic yard = 484lbs.

Construction and Demolition

C&D waste accepted at HWMF includes painted and treated wood waste, demolition waste, and construction waste. In 2021, **1,350.5 tonnes** of construction and demolition waste was disposed of in Hazelton landfill. C&D tonnage was converted from cubic meters using the U.S. EPA's *Volume to Weight Conversion Factors* (2016) value of *C&D – Aggregate Construction & Demolition Bulk* estimated at 1 cubic yard = 484lbs.

Land Clearing Waste

Land clearing waste is defined as waste produced from the clearing of land for development, including trunks, stumps, tree branches 75 millimeters in diameter or greater, treetops, and whole trees. Land clearing debris does not include other organic materials, such as vegetative matter, tree branches under 75 millimeters, and compostable structural wood waste. Due to presence of rock and gravel within this land clearing debris, this material is often deposited in the landfill. In 2021, **1.4 tonnes** of land clearing debris were disposed of in the landfill. Land Clearing Waste tonnage was converted from cubic meters using the U.S. EPA's *Volume to Weight Conversion Factors* (2016) value of *Yard Trimmings – Mixed Yard Waste: Branches and Stumps* estimated at 1 cubic yard = 127 lbs.

Refuse

Refuse is defined as discharged materials, substances, or objects, not including Restricted Wastes (metal, organics, and recyclable materials), hazardous or radioactive waste, contaminated soil, smoldering or flammable material, explosive or highly combustible materials, or tires. Refuse includes general municipal solid waste transferred from the KTS (curbside refuse, commercial and self hauled refuse, and small loads of C&D waste) and industrial work camp refuse received at HWMF.

In 2021 **3,031 tonnes** of refuse was received from the KTS and tipping at HWMF. Refuse tonnage was converted from cubic meters using the U.S. EPA's *Volume to Weight Conversion Factors* (2016) document. The mixed MSW-Residential, Institutional, Commercial: Uncompacted conversion factor of 1 cubic yard = 275lbs was used to calculate tonnage.

3.2 Diverted Wastes

The Hazelton Landfill restricts the disposal of recyclable materials that have other disposal options available. The District of New Hazelton provides residents with biweekly collection of recycling (unlimited quantities). Residents of other communities may access recycling depots run by industry-funded programs for no fee. Commercial waste generators are responsible for making their own arrangements to have some restricted materials collected separately and taken for processing.

The RDKS provides drop-off facilities for restricted materials that are not already managed by other operators in the service area. These include clean wood waste, metals, cardboard (primarily for commercial customers, although open to all site users) and tires.

Broken Concrete

Concrete includes concrete with or without rebar, in pieces less than 300mm at their widest width. Broken concrete is used as alternative daily cover for waste. In 2021, **8 tonnes** of broken concrete was received at the facility. Asbestos tonnage was converted from cubic metres using the U.S. EPA's *Volume to Weight Conversion Factors (2016)* value of *C&D – Concrete No Rebar* estimated at 1 cubic yard = 484lbs.

Cardboard

During 2021, **40.8 tonnes** of corrugated cardboard was collected at the Hazelton Waste Management Facility. The tonnage of cardboard was provided through the EPR Steward Reports.

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 2021, **2.3 tonnes** of clean wood waste were received from the at HWMF. The volume of wood is gathered from volumes tracked by Facility Staff.

Metals

Metals are segregated onsite and sold at market value to scrap yards. During 2021, **218.2 tonnes** of metal were recorded as received at the facility. The tonnage of metal was provided through the EPR Steward Reports.

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). Septage is disposed in the Hazelton septage receiving lagoons. The facility has two lagoons (i.e., septage bays) available for disposal. The liquid fraction is treated in the leachate treatment system. Dewatered solids are buried in the landfill.

The volume of septage was not tracked during 2021.

Tires

In 2021, a total of 250 individual tires or an estimated **2.6 tonnes** of tires were collected at the Hazelton Waste Management Facility for diversion through the Tire Stewardship of British Columbia. The estimated tonnage of tires was converted using the U.S. Environmental Protection Agency's Volume to Weight Conversion Factors (2016) value of Scrap—Light Duty Tires (passenger, light truck) estimated at 22.5lbs per unit. This volume was then converted to metric tonnes.

4 Wildlife Occurrences and Observations

The HWMF is located in an area with bears, wolves, coyotes, several species of birds of prey, and many other species of mammals that may attempt access to the facility. To prevent wildlife from gaining access, the entire facility is enclosed in a 2.1-metre-high composite electrified fence. To prevent vectors from gaining access to the landfill active face, Revelstoke Iron Grizzly (RIG) plates are used as alternative daily cover and are positioned on the active face at the end of each day to cover all waste. Soil from site is used as intermediate cover.

Facility operators are required to inspect the fence line daily, testing for proper voltage, proper tension on fence stands, overall condition of the fence, and signs of wildlife activity. The results of the inspections are recorded on the Daily Operation Inspection Forms.

There were no mammalian wildlife incidents or encounters observed during 2021 at the HWMF.

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 HWMF 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

5.1 Non-Compliance Reports

In 2021 ENV visited the site on October 18 to complete a planned inspection to assess compliance with the OC. Findings of the non-compliance inspection are provided in Table 3.

Table 3 Non-Compliances from ENV Inspection in 2021

Non-Compliance Report Date	Description of Non-Compliance
Section 8.2 Quantity, timing and duration of discharge	Exceeded the authorised duration for burns.
Section 8.6 Extinguishment Contingency Plan	Contingency plan did not detail specific information on how open burning will be extinguished.

Non-Compliance Report Date	Description of Non-Compliance
Section 9.1.5 Characteristics of the Discharge	pH for a surface water sample site exceeded the criteria.
Section 10.6 Water Quality Exceedance Response Plan	An exceedance response plan is required to detail SW-09 exceedances.
Section 10.7 Surface Water Quality Assessment	A surface water quality exceedance response is required for SW-09.
Section 10.8 Groundwater Quality Exceedances Response Plan	A groundwater quality exceedance response plan must include responses to the BC Water Quality Guideline and BC CSR exceedances
Section 10.9 Groundwater Quality Assessment	A groundwater quality exceedance response plan must be implemented, and the Director must be notified within 24 hours of any exceedances.
Section 10.10.8 Gates	Repairs to the gate are required to bring the gate into compliance.
Section 10.10.9 Fence Inspections	Weekly fence inspections were not available for all weeks.
Section 11.1 Treated Effluent to Phytoremediation Stand	Measurement of discharge to the phytoremediation stand was not recorded.
Section 11.2 Effluent Monitoring	Historical discharge events (pre-2021) did not include monitoring of discharge prior discharging.
Section 11.3 Groundwater Monitoring	Monthly monitoring did not take place during previous years (pre-2021).

Non-Compliance Report Date	Description of Non-Compliance
Section 11.4 Surface Water Monitoring	Monthly monitoring did not take place during previous years (pre-2021). Samples were not obtained on dry or ephemeral surface water monitoring sites
Section 11.5 Ground and Surface Water Monitoring Procedures	Duplicate samples were not given a fictitious name on the COC. Field blanks were not reported during 2019 and 2020.
Section 12.2 Annual Report	Effluent volumes were not included in the annual report.
Section 12.3 Non-compliance Notification	Immediate notification to the Director did not take place for non-compliances
Section 12.4 Non-compliance Reporting	Non-compliance reports were not submitted in the required timeframe following non-compliance events.
Section 12.5 Non-compliance Reporting and Exceedances	The annual reports for 2019 and 2020 did not include a statement summarizing non-compliances.

5.2 OC Amendments and Authorisations

In 2021 the RDKS received one Operational Certificate amendment consisting of changes to two existing sections as well as added one additional section. The amended OC, and temporary authorisation, are included in Appendix B. The details of the authorisations and amendments are listed in Table 4.

Table 4 Description Temporary Authorisations, and OC Amendments in 2021

Amendment Date and Section of the OC	Description
October 19, 2021 Section 11.3	Groundwater monitoring requirements changed due to inaccessibility and surface water inundation.
Section 11.4	Surface monitoring requirements altered due to a lack of a relationship of the sampling points to the landfill surface water runoff.
Section 12.7	Site-wide waster balance was added to OC to better assess sampling and monitoring regime.

5.3 Phytoremediation

Maintenance

On September 20th, 2021, the phytoremediation orchard underwent some general maintenance according to the *Phytoremediation Plantation Maintenance Manual* produced by R. McDougall and Sperling Hansen Associates. Prior to the maintenance in September, the phytoremediation orchard had a few volunteer species emerge including *Salix spp.* (willow) and *Typha latifolia* (common cattails) as well as a variety of tall grasses, shading out the smaller planted orchard species. A photo of the phytoremediation orchard post maintenance can be seen in Figure 2.

Figure 2: Phytoremediation Orchard September 28, 2021

5.3.1 Discharge to Phytoremediation Orchard

During 2021, there were efforts made to fully functionalize the leachate pump to the phytoremediation stand system. This work encountered issues which resulted in the system taking longer than anticipated for finished installation that was slated to end in Summer 2021. At the Hazelton Facility, treated leachate is authorized to discharge to either

the Phytoremediation Orchard or through the Wetland 4 Weir to the Ephemeral Creek Drainage. For 2021, the majority of treated leachate was discharged to the Ephemeral Creek Drainage. Volumes of discharge to either outlet have not been tracked. In 2022, a pressure transducer was installed at the Wetland 4 Weir to allow for the start of tracking treated leachate volumes discharged to the receiving environment.

5.4 Authorized Burn of Clean Wood Waste

On October 9th, 2021, starting at 4:00pm, a pile of clean wood and land clearing waste was burned at the Hazelton Facility. There was approximately 142 cubic meters of clean wood and 250 cubic meters of land clearing waste piled, totaling around 392 cubic meters. Prior to the beginning of the burn, it was noted that the venting index was at 81 (considered good) and the wind was found to be 16km/hour. On the afternoon of October 10th, 2021, the venting index was reported to be 77 (considered good) and the wind 11km/hr. On the afternoon of October 11th, 2021, at 3:45pm the fire was extinguished with a combination of water and gravel. An image of the authorized burn and its location is shown in Figure 3.

Figure 3 Clean Wood waste and Land Clearing Waste Burned on October 9, 2021, at Hazelton Waste Management Facility.

6 Environmental Monitoring

The RDKS performs regular monitoring and sampling of surface water, groundwater, phyto orchard soil, and leachate at the HWMF in accordance with the OC. The details of the Facility water quality monitoring program, including results of groundwater, surface water, and treated leachate discharge monitoring are discussed in the *Hazelton Waste Management Facility 2021 Annual Water Quality Monitoring Report*, prepared by WSP Golder, and contained in Appendix A of this report.

Groundwater

There are five monitoring wells located around the facility, two of which contain nested wells (BH-4A & B as well as BH-5A & B). The wells are monitored quarterly and sampled annually. In-Situ parameters are

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

Surface Water

There are five surface water and four shallow-ground well sampling and monitoring locations for this facility. The sites are monitored and sampled at a minimum annually and ideally once during the Spring, Summer and Fall if discharging during these seasons. In-Situ parameters are monitored using a YSI, a LaMotte Turbidity Meter and flow meter. Lab parameters are collected in sample bottles and shipped to ALS for analysis.

Facility

There are three facility compliance points. One is for treated leachate prior to discharge to the Phytoremediation area, another is a Composite Soil sample from the Phytoremediation area and the last one is of treated leachate at the Wetland 4 Outlet, where treated leachate is discharged to the receiving environment. The treated leachate prior to the Phyto orchard is monitored and sampled once prior to the first discharge of the year (spring) and once per summer and fall. It is monitored with a YSI as well as with a LaMotte Turbidity Meter. The phytoremediation soil is sampled once annually, prior to the start of discharge. The Wetland 4 Outlet is sampled and monitored once prior to the first discharge of the year (Spring) and once per Summer and Fall or monthly if discharging at any time during other months. This compliance point is monitored with a YSI as well as with a LaMotte Turbidity Meter. The level of treated leachate at the weir notch is also noted for approximate flow. Lab parameters for each of these points are collected in sample bottles and shipped to ALS for analysis.

7 Summary

In 2021, 4,384 tonnes of refuse were deposited into the landfill, including 1,351 tonnes of construction and demolition (C&D). Approximately 1.4 tonnes of land clearing waste were received at the facility. An estimated 40.8 tonnes of cardboard, 2 tonnes of clean wood waste, 218.2 tonnes of metal, and 250 individual tires or 2.6 tonnes of tires were diverted from the landfill. Septage was also diverted from landfill however, this volume was not tracked during 2021.

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In 2021 ENV visited the site on October 18 to complete a planned inspection to assess compliance with the OC which identified non-compliance issues as listed in this report. The OC received one amendment, changing two sections, and added an additional one. The phytoremediation orchard underwent some scheduled maintenance during September. The facility also had one authorized burn of clean wood waste and land clearing waste in October. The three facility samples as well as all five boreholes, four shallow ground wells and five surface water locations were sampled and monitored according to the requirements of the OC. The details of the Facility water quality monitoring program are discussed in the

Hazelton Waste Management Facility 2021 Annual Water Quality Monitoring Report, prepared by WSP Golder, and contained in Appendix A of this report.

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Appendix A Environmental Effects Monitoring Report

REPORT

Hazelton Waste Management Facility

2021 Annual Environmental Effects Monitoring Report

Submitted to:

Regional District of Kitimat-Stikine

300-4545 Lazelle Avenue
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Distribution List

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Executive Summary

Golder Associates Ltd., member of WSP (Golder) was retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2021 Annual Environmental Effects Monitoring (EEM) Report for the Hazelton Waste Management Facility (WMF, the "Site", also referred to as the landfill in previous reports). The Site is located approximately 3 km east of New Hazelton, British Columbia, refer to Figure 1 (Key Plan) and Figure 2 (Site Plan). The Ministry of Environment and Climate Change Strategy (ENV) requires annual reporting, as specified in Operational Certificate No. 17226, amended 19 October 2021 (the "OC", Appendix A).

The scope of work for the EEM Program includes the following:

- **Soil Sampling:** Composite soil sampling from the Phytoremediation Stand, collected annually, prior to first discharge of the year, as well as baseline data collection prior to very first discharge.
- **Treated Effluent Monitoring:** Sampling of treated leachate into the Phytoremediation Stand and treated effluent into Wetland #4 Infiltration Trench, conducted in the spring, summer and fall. Monthly sampling if flowing during any other months.
- **Surface Water Monitoring**: The 27 May 2020 OC called for surface water sampling at eight stations. This scope was modified in the 19 October 2021 OC amendment to sampling of five surface water stations upstream and downstream of the Site, three times per year in the spring, summer and fall.
- **Groundwater Monitoring**: The 27 May 2020 OC called for groundwater sampling at 10 locations. This scope was modified in the 19 October 2021 OC amendment to sampling at nine locations on a quarterly basis.
- **Quality Assurance/Quality Control (QA/QC) Program**: Collection of field duplicates and field blanks (field QA/QC program) as well the laboratory QA/QC program as documented in the laboratory reports.
- **Reporting**: An annual report is to be submitted to ENV no later than 30 June of the following year.

The results from 2021 EEM monitoring program indicate that it is possible that the elevated chloride in shallow groundwater at BH-5B and surface water monitoring locations SW-5 and SW-9 can be at least partially attributed to a landfill source. However, there are no other trends or exceedances in the groundwater and surface water monitoring results that would suggest a landfill impact. The low permeability glacial till underlying the Site appears to be limiting groundwater flow and the local wetlands appear to be attenuating leachate constituents that may be emanating from the WMF via surface water.

Results of monitoring from standpipes completed in ephemeral streams and wetlands (SGW-1 to SGW-5) should be interpreted with caution. Given the stagnant nature of the water in these installations, the samples may not be representative of shallow groundwater emanating from the Site.

Golder presents the following recommendations for future work at the Hazelton WMF:

- Discontinue groundwater sampling of shallow standpipes series (SGW-1 to SGW-5) as water collected from these installations in ephemeral streams and wetlands may not be representative of shallow groundwater emanating from the Site.
- Add dissolved organic carbon to surface water analyses to allow for a more accurate comparison to the BC WQG (AW-F) for dissolved copper. The guideline is based on the Copper Biotic Ligand Model (BLM) which is dependant on sample pH, hardness, and dissolved organic carbon. For results without DOC, the BLM is run with the conservative assumption of DOC equal to the laboratory detection limit (0.05 mg/L).
- Optimize the monitoring well network. At present, there are three deep upgradient groundwater monitoring wells (BH-01, BH-02 and BH-4A), one shallow upgradient monitoring well (BH-4B), and one deep side-gradient monitoring well BH-03 (located between the Site and a public water well). There is only one conventional downgradient monitoring well (BH-5B), where a potential landfill influence has been observed in shallow groundwater. Consideration should be given to optimizing the monitoring well network by reducing the upgradient monitoring program to one deep (BH-4A) and one shallow (BH-4B) monitoring well, retaining monitoring of the side-gradient monitoring well (BH-03), and adding two additional conventional shallow monitoring wells to the downgradient monitoring program.
- The 19 October 2021 amendment to the OC requires preparation of a site wide water balance analysis for surface water and groundwater monitoring by 1 October 2022.

Study Limitations

This report was prepared for the exclusive use of the Regional District of Kitimat-Stikine (RDKS). The report, which includes all tables, figures and appendices, is based on current and historical data and information provided by RDKS to Golder Associates Ltd., member of WSP (Golder) in March 2022. The findings, interpretations and conclusions concerning the Site conditions are based solely on the information provided to Golder.

Golder makes no warranty, expressed or implied, and assumes no liability with respect to the use of the information contained in this report at the subject Site, or any other Site, for other than its intended purpose. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Golder accepts no responsibilities for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The RDKS has the right to submit this report to the BC Ministry of Environment & Climate Change Strategy (ENV) for review and comment. ENV may rely on the information contained in this report solely to carry out such a review**.**

Golder disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up action and costs, which result from reporting the factual information contained herein.

The services performed as described in this report were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services. The content of this report is based on information provided by the RDKS to Golder in March 2022, our present understanding of the Site conditions, and our professional judgment in light of such information available at the time of this report. This report provides a professional opinion, and therefore no warranty is either expressed, implied or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change.

Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered during future work, including excavations, borings or other activities or studies, Golder should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

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1.0 INTRODUCTION

Golder Associates Ltd., member of WSP (Golder) was retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2021 Annual Environmental Effects Monitoring (EEM) Report for the Hazelton Waste Management Facility (WMF, the "Site", also referred to as the landfill). The Site is located approximately 3 km east of New Hazelton, British Columbia, refer to Figure 1 (Key Plan) and Figure 2 (Site Plan). The Ministry of Environment and Climate Change Strategy (ENV) requires annual reporting, as specified in Operational Certificate No. 17226, first issued on 30 May 2013, amended 27 May 2020 and 19 October 2021 (the "OC", Appendix A).

1.1 Objective and Scope of Work

As outlined in the OC, the objective of the EEM Program is to determine the potential effects of the Hazelton WMF on the receiving environment. The scope of work for the EEM Program includes the following:

- **Surface Water Monitoring**: The 27 May 2020 OC called for surface water sampling at eight stations. This scope was modified in the 19 October 2021 OC amendment to sampling of five surface water stations upstream and downstream of the Site, once per year, and once per spring, summer and fall if effluent discharge is occurring during those seasons..
- **Groundwater Monitoring**: The 27 May 2020 OC called for groundwater sampling at 10 locations. This scope was modified in the 19 October 2021 OC amendment to sampling at nine locations on an annual basis. In addition to sampling, groundwater locations are monitored for field parameters (water quality and water level measurements) on a quarterly basis per the OC.
- **Treated Effluent Monitoring:** Sampling of treated leachate prior to discharge into the Phytoremediation Stand conducted in the spring, summer and fall, as well as sampling of treated leachate into Wetland #4 Infiltration Trench conducted in the spring, summer and fall and monthly if flowing during any other months.
- **Soil Sampling:** Composite soil sampling from the Phytoremediation Stand, collected annually, prior to first discharge of the year, as well as baseline data collection prior to very first discharge.
- **Toxicity Testing:** Sampling of treated effluent discharging into Wetland #4 Infiltration Trench, conducted similar to the treated effluent monitoring events above.
- **Quality Assurance/Quality Control (QA/QC) Program**: Collection of field duplicates and field blanks (field QA/QC program) as well the laboratory QA/QC program as documented in the laboratory reports.
- **Reporting**: An annual report is to be submitted to ENV no later than 30 June of the following year.

The purpose of this report is to present the following information to satisfy the requirements presented in the OC:

- Summary of the regulatory framework and the OC EEM requirements.
- Methods of field investigations (as provided by RDKS).

- Figures showing EEM monitoring stations as well as groundwater elevation data.
- Chemistry plots of key water quality parameters at the Site (Appendix B).
- Tabulated chemistry results and comparison of these to applicable standards and guidelines (Appendix C).
- Discussion of chemistry results and temporal evolution of water quality at the Site.
- Discussion of the QAQC program.
- Conclusions and recommendations for the current EEM program.
- Record of laboratory analytical reports over the 2021 reporting period (Appendix D).
- Select Site photographs (as provided by RDKS in Appendix E).

1.2 Previous Investigations

Previous studies and annual monitoring reporting have been carried out by Sperling Hansen Associates (SHA). A Design, Operation and Closure Plan was prepared by SHA in 2018 (SHA 2018) prior to WMF upgrades and the construction of a leachate treatment system completed in 2019. The most recent 2020 annual EEM monitoring report was prepared by SHA in 2021 (SHA 2021).

1.3 Site Description

The following summary of the Site's topographic, geologic, and hydrologic setting is based on a review of the following maps and Reports:

- GeoBC's web-based mapping tool iMapBC (accessed May 2022)
- The Surficial Geology Map of the Skeena River and Bulkley River Area (Clague 1983)
- Google Earth (accessed May 2022)
- Hazelton Waste Management Facility Design, Operations and Closure Plan Update (SHA 2018)

The Site is located immediately south of the Yellowhead Highway, between Hagwilet Peak to the southwest and the Bulkley River to the north. The topography of the Site is relatively flat, with a slight downward slope towards the northwest.

Previous sub-surface investigation work indicates the Site is underlain by glacial till comprised of dense, silty sand with some gravel.

The WMF receives municipal solid and liquid waste. The WMF is constructed on glacial till that is considered by SHA to serve as a natural liner (SHA 2018). Leachate from the Site is accumulated in an equalization pond and treated through a series of engineered wetlands (Wetlands #1, #2 and #3). The treated effluent is discharged to a phytoremediation treatment area, and runoff from this area is captured by Wetland #4.

Surface water run-off flow is directed via a perimeter ditch network towards the northwest to a wetland area and towards the north to a beaver pond. Surface water from the wetlands discharges to Rossvale Creek Tributary II. The tributary flows to Rossvale Creek, which in turn flows to the Bulkley River.

1.4 Sampling Locations

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

Table 1: EEM Monitoring Locations

Monitoring Location	OC Station ID	Sample Type	Easting *UTM*	Northing *UTM*	Inferred Groundwater Gradient
SW-01	E309751	Surface Water	593026	6121890	Upgradient
SW-02	E309752	Surface Water	593226	6122015	Upgradient
SW-05	E287409	Surface Water	592822	6122589	Downgradient
SW-07	E287410	Surface Water	591670	6213024	Downgradient
SW-09	E310968	Surface Water	592531	6122439	Downgradient
BH-01	E251512	Groundwater	593625	6121809	Upgradient
BH-02	E251513	Groundwater	593246	6121899	Upgradient
BH-03	E251514	Groundwater	592642	6122035	Upgradient
BH-4B	E252313	Shallow Groundwater	593489	6122142	Upgradient
BH-5B	E252314	Shallow Groundwater	592575	6122994	Downgradient
SGW-1	E309746	Shallow Standpipe	592667	6122255	Downgradient
SGW-2	E309747	Shallow Standpipe	592577	6122445	Downgradient
SGW-4	E309749	Shallow Standpipe	592535	6122699	Downgradient
SGW-5	E309750	Shallow Standpipe	592524	6122323	Downgradient
Wetland 4 Outlet	E309786	Treated Leachate, Acute Toxicity	592715	6122425	Downgradient
Sand Filter	E288572	Treated Leachate	592809	6122452	Within WMF
Phytoremediation Stand (composite from Phyto 1, 2, 3)	E309686	Soil	N/A	N/A	Within WMF
Discontinued from the EEM					
SW-06*	E309754	Surface Water	593046	6122745	Upgradient
SW-08*	E273812	Surface Water	593090	6122786	Upgradient
SW-10*	E310969	Surface Water	592631	6122000	Upgradient
BH-4A	-	Groundwater	593489	6122142	Upgradient
BH-5A	-	Groundwater	592575	6122994	Downgradient
SGW-3*	-	Shallow Standpipe	592673	6122409	Downgradient
Wetland 1	-	Leachate	592974	6122515	Within WMF
Wetland 2	-	Leachate	592866	6122495	Within WMF
Wetland 3	-	Leachate	592824	6122456	Within WMF

Monitoring Location	OC Station ID	Sample Type	Easting *UTM*	Northing *UTM*	Inferred Groundwater Gradient
Wetland 4	-	Leachate	592756	6122427	Within WMF
EQ Pond	-	Leachate	593015	6122490	Within WMF
Pump Station	-	Leachate	593029	6122379	Within WMF
Phase 2 to EQ	-	Leachate	592992	6122316	Within WMF

Notes:
Coordinates are approximate.
*Locations discontinued in October 2021 per amended OC and were sampled prior to this date including events in April and July 2021.

1.5 Regulatory Framework

In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the ENV, pursuant to the Environmental Management Act (ENV 2003). Regulations and guidelines supporting EMA consist of the BC Contaminated Sites Regulation (ENV 1996) and the BC Water Quality Guidelines (ENV 2021a, 2021b), each of which is summarized in this section along with the OC criteria with respects to evaluating environmental media at the Site.

It should be noted that regulatory standards and guidelines are subject to change over time. Golder has screened Site chemistry data as provided by RDKS, including historical results, to the standards and guidelines applicable at the time of preparing this report. Golder has not reviewed the screening of historical data, nor compared screening results of previous EEM reports but rather has provided the historical data for completeness. The screening of current (2021) chemistry data to the standards and guidelines outlined below is the focus of this report.

- ***BC Contaminated Sites Regulation*** (CSR): Schedule 3.2 water standards for drinking water (DW) standards are considered applicable for groundwater quality at conventional wells and shallow standpipes (SGW-1 to SGW-5). Schedule 3.1 soil standards for industrial land use (IL) with exposure pathways AW-F, DW, intake (INT), toxicity (TOX), human health (HH), and ecological health (EH) are considered applicable for soil sampling from the Phytoremediation Stand.

  For groundwater screening criteria above, CSR DW was considered appliable to the Site based on ENV Protocol 21 *Water Use Determination* (ENV 2017). Section 3.2 of Protocol 21 outlines how DW applies regardless of whether drinking water wells currently exist near the Site to protect aquifers that could support future drinking water wells. For these reasons, protection of drinking water has been applied to screening criteria at the Site.

  In addition, for the screening of shallow standpipes, CSR AW-F standards were considered appliable based on ENV Technical Guidance 15 *Concentration Limits for the Protection of Aquatic Receiving Environments* (ENV 2017). The shallow standpipes are completed in aquatic environments at the Site, and so for these reasons, CSR AW-F standards were applied.

- ***BC Water Quality Guidelines*** (WQGs): The WQGs are considered applicable for surface waters at the Site for the protection AW-F. Because the shallow standpipe piezometers are installed in ephemeral creeks and wetlands, the AW-F WQGs are also considered applicable to the water quality of the shallow standpipes. The AW-F WQGs are comprised of working and approved guidelines with both 30-day mean (chronic) and maximum (acute) applied to the screening.

For surface water screening criteria above, WQG for the protection of DW was considered not appliable to the Site based on the understanding that surface water emanating from the Site is not used for drinking water consumption. This was supported by a recent search of the online BC Water Resource Atlas (accessed June 2022) which did not find any surface water leases at or within 1 km of the Site registered for human consumption.

- ***OC Permit Criteria***: The OC has outlined the following criteria in Table 2 below for discharge of treated leachate to the Phytoremediation Stand and Wetland 4 Outlet. In addition, the treated leachate discharged to Wetland 4 Outlet must not be lethally toxic to aquatic organisms, such that in a 48-hour toxicity test, in >95% effluent concentration, there must be a minimum 50% survival of Daphnia magna.

Table 2: OC Criteria for Discharge of Treated Leachate

Parameter	Units	OC Limits
pH	-	6.5 - 8.5
Ammonia, Total (as N)	mg/L	30
Chloride (Cl)	mg/L	3750
Total Nitrogen as N	mg/L	60
Cadmium (Cd)-Total	mg/L	0.1
Iron (Fe)-Total	mg/L	4.5
Zinc (Zn)-Total	mg/L	75

2.0 MONITORING METHODOLOGY

2.1 Sampling Methods

RDKS completed the field sampling and field QA/QC during the 2021 monitoring year. Water and soil samples were collected by RDKS field staff following established sampling procedures as outlined in the *British Columbia Field Sampling Manual* (ENV 2013). The YSI water quality meter was calibrated before each sampling event following manufactures instructions. Samples were collected in clean, laboratory-supplied sample bottles, and transported to an accredited laboratory for analyses of the parameters outlined in the OC.

2.2 Surface Water Sampling

The 27 May 2020 OC called for surface water sampling at eight stations (Figure 2). This scope was modified in the 19 October 2021 OC amendment to sampling at five surface water stations. Per the OC, surface water samples were collected in March April (Spring), July (Summer) and October (Fall) 2021. Accordingly, the April and July sampling events consisted of sampling at eight locations (where water was present) while the October sampling event consisted of sampling at five locations. A description of each surface water sampling location (historical to present) is provided in Table 3 below.

Table 3: Surface Water Locations

Location	Description
SW-01	South surface water monitoring location. Measures background concentrations of off-Site surface water upgradient of the WMF.
SW-02	Southeast surface water monitoring location. Measures background concentrations of off-Site surface water upgradient of the WMF.
SW-05	Beaver Pond outlet downstream of the WMF. Flows converge with Rossvale Creek Tributary II.
SW-07	Rossvale Creek Tributary II south of Highway 16. Measures downstream surface water flows that converge from SW-05 to form Rossvale Creek Tributary II.
SW-09	Downstream of WMF near west property boundary. Measures surface water quality in an ephemeral creek west of the WMF.
Discontinued from the EEM	
SW-03	Leachate seep. Measures raw leachate collected from the side slopes of the WMF.
SW-04	Log Weir. Measures surface water quality at the outlet of a wetland which directly receives flows from SW-03.
SW-06*	Highway Inlet to Beaver Pond. Measures upstream water quality on the south side of Highway16, prior to entering the inlet of Beaver Pond.
SW-08*	Highway Inlet to Beaver Pond. Measures upstream water quality entering Beaver Pond from the north side of Highway 16.
SW-10*	Side gradient of Site and downstream of BH-03, to monitor any run-off towards the drinking water wells.

Notes:
*Locations discontinued in October 2021 per amended OC and were sampled prior to this date including events in April and July 2021.

Deviations from OC requirements

Surface water samples were not collected in July due to dry conditions at the following locations: SW-01, SW-02, SW-06, SW-07, SW-08 and SW-10. Note that locations SW-06, SW-08, SW-10 were recently discontinued and not sampled in October per the amended OC that came into effect 19 October 2021.

2.3 Groundwater Sampling

The 2021 groundwater monitoring program consisted of groundwater sampling at 11 monitoring wells/standpipes at nine locations (Figure 2). Per the OC, groundwater samples were collected for field indicator parameters in January (Winter), April (Spring), July (Summer) and October (Fall) and for a more comprehensive suite of parameters once per year, usually in April. A description of each groundwater sampling location (historical to present) is provided in Table 4 below.

Table 4: Groundwater Locations

Location	Description
BH-01	Deep monitoring well southeast of the WMF east of the property boundary. Location inferred upgradient representing background groundwater quality.
BH-02	Deep monitoring well southeast of the WMF within the property boundary. Location inferred upgradient representing background groundwater quality.
BH-03	Deep monitoring well located at the southwest corner of the property line between the WMF and the closest public drinking water well approximately 2 km southwest from the WMF.
BH-4A	Deep monitoring well in BH-04. Southeast of the WMF inferred upgradient representing background groundwater quality.
BH-4B	Shallow monitoring well in BH-04. Southeast of the WMF inferred upgradient representing background groundwater quality.
BH-5A	Deep monitoring well in BH-05 and historically dry. Directly downgradient of the WMF and is situated near the intersection of the WMF access road and Highway 16
BH-5B	Shallow monitoring well in BH-05. Directly downgradient of the WMF and is situated near the intersection of the WMF access road and Highway 16.
SGW-1	Shallow standpipe SGW-1 located in an ephemeral creek west of the WMF, similar to the wetland areas bordering the WMF.
SGW-2	Shallow standpipe SGW-2 located within ponded stagnant water adjacent to an ephemeral creek downstream of SGW-3 and is situated near the western property boundary.
SGW-3	Shallow standpipe SGW-3 located in the Wetland #4 Infiltration Trench (weir pond) at the northwest corner of the Site.
SGW-4	Shallow standpipe SGW-4 located within the ephemeral creek downstream of the Beaver Pond and is situated near the western property boundary.
SGW-5	Shallow standpipe SGW-5 located within the ephemeral creek/wetland downstream of SGW-1 and is situated near the western property boundary.

Deviations from OC requirements

Groundwater samples were not collected from locations SGW-01 and SGW-03 during the four sampling events in January, April, July, and October 2021. SGW-01 was noted to be broken and SGW-03 was noted to be flooded. Note that SGW-03 was recently discontinued per the amended OC that came into effect 19 October 2021. A sample could not be collected from SGW-05 in January 2021 because the water was frozen.

2.4 Leachate, Soil and Toxicity Sampling

Leachate samples are collected from the Sand Filter manhole, OC station ID E288572, which is the OC compliance point for treated leachate discharge onto the phytoremediation area. A composite soil sample from the Phytoremediation Stand, OC station ID E309686, comprising of soil from locations Phyto 1, Phyto 2 and Phyto 3 (refer to Figure 2) is also sampled annually per the OC.

Leachate samples are collected from the weir of the Wetland 4 Outlet, OC station ID E309786, which is the OC compliance point for treated leachate discharge into the Wetland 4 Outlet. An acute toxicity sample (daphnia magna) from the weir of the Wetland 4 Outlet is also sampled three times a year per the OC.

Deviations from OC requirements

Samples were collected as per the requirements of OC 17227.

2.5 Quality Assurance and Control

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

The following data quality objectives (DQO) was considered acceptable for field QA/QC program:

- Submission of field duplicates for approximately 10% of the total sampling locations per sampling event. The results of the field duplicates are used to assess relative percent difference (RPD) or difference factor (DF) if concentrations are less than five times the reported detection limit (RDL), per targets below.
  - Water: RPD less than 20% for inorganics and 30% for organics.
  - Soil: RPD less than 30% for inorganics and 40% for organics.
  - All media: DF less than two.
- Submission of a field blank sample per sampling event.
  - Field blanks less than five times the laboratory RDL.

The following DQOs were considered acceptable for laboratory QA/QC program:

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

3.0 RESULTS AND DISCUSSION

3.1 Groundwater Elevations

Groundwater is present in the glacial till underlying the Site at depths ranging from 15 m below ground surface at BH-4A to 20 m below ground surface at BH-01 and BH-02 to 57 m below ground surface at BH-03. Groundwater flow within the till unit is directed towards the northwest, as illustrated in Figure 3 for the “dry event” monitoring event in July 2021. Previous work by Sperling Hansen Associates (Section 2.4 of 2018 DOCP update) estimates the permeability of the till material from grain size analysis to be 3.4 E-7 cm/s to 9E-10 cm/s. This low permeability suggests groundwater flow through the till material is limited. Based on this flow direction, BH-01, BH-02 and BH-4A are located upgradient of the WMF, while BH-03 is located side gradient. BH-5A represents the only monitoring well located downgradient of the WMF in the till unit; however, this monitoring well is consistently dry.

Previous test pitting programs by Agra Earth and Environmental (2000) and Sperling Hansen Associates (2013) did not identify shallow groundwater within 2.8 m of ground surface at the Site. However, shallow subsurface flow above the glacial till has been encountered in shallow monitoring wells BH-4B and BH-5B. This shallow subsurface flow is inferred to be directed towards the northwest, consistent with the Site topography. Based on this flow direction, BH-4B is located upgradient of the WMF, while SGW-5 is located downgradient. Standpipes SGW-2, SGW-4 and SGW-5 were installed in ephemeral streams and wetlands downgradient of the WMF where water was encountered at depths ranging from 1 m to 3 m below ground surface. Whether the water intercepted by these standpipes is representative of shallow subsurface flow emanating from the WMF is questionable.

For both the deep groundwater flow and the shallow subsurface flow, groundwater levels were highest in April and lowest in October, with a seasonal variation of less than 1 m.

3.2 Groundwater Quality

Analytical results for the EEM groundwater monitoring locations were compared to the applicable BC CSR standards (Appendix C). In 2021, groundwater concentrations were less than the CSR DW standards (conventional wells and shallow standpipes) and AW-F standards (shallow standpipes), with the exception of the following parameters:

- CSR DW: Dissolved antimony (BH-3)
- CSR DW: Dissolved cobalt (BH-4B, BH-5B, SGW-2, SGW-4, SGW-5)
- CSR DW: Dissolved iron (BH-5B)
- CSR DW: Dissolved manganese (BH-5B, SGW-4, SGW-5)

Samples collected from shallow standpipes completed in ephemeral streams and wetlands (SGW-1 to SWG-5) were also compared with the BC WQG AW-F and DW (Appendix C). In 2021, the following exceedances of the BC WQG were observed:

- WQG AW-F: Total alkalinity, dissolved copper (SGW-1, SGW-2, SGW-4, SGW-5)
- WQG AW-F: Dissolved oxygen(SGW-4, SGW-5)
- WQG DW: Total organic carbon (SGW-2, SGW-4)
- WQG AW-F: Dissolved aluminum, toluene (SGW-2)
- WQG AW-F: Dissolved iron (SGW-5)

3.3 Surface Water Quality

Analytical results for the surface water locations were compared to the applicable BC approved and working WQGs for AW-F (Appendix C). In 2021, surface water concentrations were less than the BC WQGs for AW, with the exception of the following parameters:

- pH and dissolved oxygen (SW-1, SW-2, SW-5, SW-6, SW-8, SW-9, SW-10)
- Total alkalinity (SW-5, SW-6, SW-7, SW-8, SW-10)
- Total iron (SW-1, SW-2, SW-5, SW-10)
- Total mercury (SW-10)
- Total zinc (SW-1, SW-2, SW-5)
- Dissolved aluminum and dissolved iron (SW-1, SW-2, SW-5, SW-6, SW-7, SW-8, SW-10)
- Dissolved copper* (all stations)
- Toluene (SW-1 and SW-2)

*For the screening of dissolved copper, note that the guideline is based on the Copper Biotic Ligand Model (BLM) which is dependant on sample pH, hardness, and dissolved organic carbon. For results without DOC, the BLM is run with the conservative assumption of DOC equal to the laboratory detection limit (0.05 mg/L).

3.4 Leachate Quality

Analytical results for the leachate samples were compared to the applicable OC criteria (Appendix C). In 2021, all leachate concentrations were less than the applicable OC limits.

3.5 Soil Quality

Analytical results from the Phytoremediation Stand were compared to the applicable CSR IL criteria (Appendix C). In 2021, soil concentrations were less than the applicable CSR standards, with the exception of the following parameters:

- Arsenic (sample collected on 6 June 2021)

3.6 Toxicity Data

Bioassay results using daphnia magna LC50 for Wetland 4 Discharge are presented in Appendix C. The toxicity data met the OC criteria (Section 1.5). There were no adverse effects observed on survival, resulting in LC values greater than the highest concentration tested (i.e., >100% v/v). All tests indicated 0% mortality of *Daphnia magna* for all tests conducted using treated effluent from Wetland 4 outlet in 2021.

3.7 QA/QC Program

Results of the field QA/QC program are presented with the screened chemistry data in Appendix C, whereas the laboratory QA/QC program is documented within the laboratory reports in Appendix D. Note that the laboratory reports document the chemistry results of 2021 field QA/QC program, whereas the QA/QC tables in Appendix C document the compiled data Golder received from RDKS. Where the QA/QC DQO did not meet the program objectives, further examination was conducted on a case-by-case basis as summarized in Table 5 below.

Table 5: Field QA/QC Results

Media	Location	Parameters Above RPD DQO	Parameters Above DF DQO
Leachate	Wetland 4 Discharge	Nitrite (29%,47%), T. Cadmium (23%), T. Chromium (26%), T. Iron (24%, 26%), T. Manganese (27%), T. Titanium (28%, 30%)	-
Surface Water	SW-5	D. Aluminum (22%), D. Arsenic (26%), D. Titanium (57%), T. Aluminum (33%), T. Iron (40%), T. Manganese (105%), T. Titanium (50%)	-
Surface Water	SW-09	D. Manganese (21%), D. Selenium (62%), T. Aluminum (24%)	-

In general, the RPDs/DFs greater than the DQO targets outlined above demonstrates the natural sample variability and reflects the nature of the chemistry distribution within the tested media. Of the parameters that exceeded the RPD DQO, only iron and aluminum exceeded the BC WGQs.

The results of the laboratory quality control program met the laboratory's internal criteria for acceptable results with the following exceptions:

- Duplicates: molybdenum and uranium (11 June 2021)
- Blanks: total alkalinity (19 October 2021), total magnesium (25 October 2021)
- Surrogate recoveries: 3,4 – dichlorotoluene (30 April 2021)
- Laboratory Control Sample: dissolved bismuth (BH-01 19 October 2021)

Generally, many analyses hold time outliers that were reported by the laboratory were a result of delayed sample submission by RDKS. There were few analyses hold time outliers which were a result of the laboratory analyzing the samples late (nitrate and nitrite at SW-05, SW-06, SW-07, SW-08 in 22 April 2021).

These parameters were not identified above applicable standards; therefore, these deviations from the laboratory's internal criteria are considered acceptable.

From the QA/QC information provided, the precision and accuracy of the laboratory data is acceptable.

4.0 DISCUSSION

The EEM data was examined graphically (Appendix B) to evaluate temporal water quality variations over time. The data set considered covers 2004 through 2021.

The following leachate indicator parameters were chosen to evaluate the potential environmental impact of landfill activities at the Site:

- Ammonia
- Electrical Conductivity
- Chloride
- Sulphate
- Iron (dissolved for groundwater, total for surface water)

While below the BC CSR for drinking water of 250 mg/L, chloride concentrations at shallow monitoring well BH-5B, located downgradient of the WMF and near the intersection of the Yellowhead Highway and entrance road, are higher (209 mg/L in 2021) than elsewhere across the Site, including the pump station itself (175 mg/L in 2020). In addition to landfills, chloride can be associated with other sources such as road salting and agricultural runoff. The fact that chloride concentrations at BH-5B are higher than the WMF itself suggests that additional sources are impacting the groundwater chemistry at this location. However, a landfill influence is also apparent, given the ratio of chloride to bromide concentrations at the monitoring well. Panno et. al (2006) presented representative ratios for chloride to bromide for seven different potential sources including agricultural chemicals, septic effluent, animal waste, municipal landfill leachate, sea water, basin brines, and road de-icers. Groundwater from BH-5B falls within the "landfill leachate" domain established by Panno, suggesting that groundwater at this location is at least being partially impacted by the WMF.

While well below the BC WQG for AW-F (150 mg/L), chloride concentrations at surface water sampling locations SW-5 (39 mg/L) and SW-9 (45.8 mg/L) are considered higher than upgradient locations and may be indicative of a landfill influence. Given its proximity to the access road, chloride concentrations at SW-5 may also be influenced by road de-icing.

In general, the temporal plots indicate that parameter values are relatively constant over the monitoring years, with the exception of chloride, which could be interpreted to have increased at BH-5B. For other constituents and at other locations, minor variations are apparent throughout the years, indicative of different sampling conditions (i.e., different levels of precipitation and seasonal variation).

Golder offers the following comments concerning the exceedances of the BC CSR in groundwater:

Dissolved antimony exceeded the BC CSR for DW (6 mg/L) at side-gradient monitoring well BH-3, screened at depth in the glacial till deposits, in January 2021 (9.14 mg/L). This exceedance is inferred to be an anomaly because antimony has not been present at BH-3 above the CSR DW over the period of record (since 2014) and subsequent antimony concentrations measured in October 2021 (0.37 mg/L) were well below the CSR.

Dissolved cobalt exceeded the BC CSR for DW (1 mg/L) at upgradient shallow monitoring well BH-4B, downgradient shallow monitoring well BH-5B and downgradient shallow standpipes SGW-2, SGW-4 and SGW-5. Dissolved cobalt has been consistently observed above the CSR DW over the period of record (since 2014) and no increases in cobalt concentrations at these locations are apparent. Furthermore, cobalt concentrations in shallow groundwater at upgradient monitoring well BH-4B are similar to those at the downgradient monitoring locations. Together, these observations indicate that the cobalt exceedances are naturally occurring and unrelated to the WMF.

Dissolved iron exceeded the BC CSR for DW (6.5 mg/L) at downgradient shallow monitoring well BH-5B (12.2 mg/L). Dissolved iron concentrations have been highly variable at this location over the period of record (since 2014), and frequently above the CSR DW. A review of the temporal plot (Appendix B) shows that dissolved iron concentrations are not increasing at this location and are frequently in excess of the CSR at upgradient shallow groundwater monitoring location BH-4B. Therefore, the dissolved iron exceedance at BH-5B is inferred to be related to dissolved iron being released from the local sediments in response to fluctuations in redox conditions.

Dissolved manganese exceeded the BC CSR for DW (1.5 mg/L) in shallow groundwater at downgradient monitoring well BH-5B and downgradient shallow standpipes SGW-4 and SGW-5. Similar to dissolved iron, dissolved manganese concentrations have been highly variable at BH-5B, together with SGW-4 and SGW-5, over the period of record and frequently observed above the CSR at these locations, with no upward trend in concentrations. While manganese exceedances were not observed at shallow upgradient well BH-4B in 2021, similar manganese concentrations above the CSR DW have frequently been observed at BH-4B in the past, indicating that like iron, the manganese exceedances are related to the release of manganese from local sediments in response to variable redox conditions.

Detectable toluene was measured above the BC WQG AW-F at standpipe SGW-2. Toluene has been known to occur as a result of naturally occurring organic material.

Golder offers the following comments concerning the exceedances of the BC WGQ for AW-F in surface water:

Measurements of pH and dissolved oxygen exceeded the BC WQG for AW-F at upgradient surface water monitoring locations SW-1 and SW-2, side gradient surface water monitoring location SW-10, and downgradient surface water monitoring locations SW-5, SW-6, SW-8 and SW-9. Downgradient measurements of pH and dissolved oxygen cannot be differentiated from upgradient conditions and are therefore not attributed to the WMF.

Total alkalinity was below the minimum BC WQG for AW-F (20 mg/L) at upgradient surface water monitoring location SW-10 and downgradient surface water monitoring locations SW-5, SW-6, SW-7 and SW-8. Alkalinity at these locations is variable, fluctuating above and below the guideline over the period of record. These fluctuations are also evident at upgradient surface water monitoring locations SW-1 and SW-2, where alkalinity concentrations were above the minimum guideline in 2021 but have frequently been observed

below the guideline. This suggests the alkalinity measured below the minimum WQG in 2021 is not attributed to the WMF.

Total iron exceeded the BC WQG for AW-F at upgradient surface water monitoring locations SW-1 and SW-2 and side-gradient location SW-10, together with downgradient monitoring location SW-5, and dissolved iron exceeded the BC WQG for AW-F at these same locations, together with downgradient locations SW-6, SW-7 and SW-8. Trend plots of total iron (Appendix B) show that iron concentrations at these locations have remained at concentrations similar to the guidelines over the period of record, with no upward trends in concentrations nor any differentiation between upgradient and downgradient concentrations. This suggests the iron exceedances are not attributed to the WMF.

Similarly, total zinc exceeded the BC WQG for AW-F at upgradient surface water monitoring locations SW-1 and SW-2 and downgradient surface water monitoring location SW-5. Because zinc is present in surface water upgradient of the Site at similar concentrations to the downgradient concentration, the exceedance is not attributable to the WMF.

The exceedance of total mercury at side-gradient surface water monitoring location SW-10 is an isolated occurrence unrelated to the WMF.

Dissolved aluminum exceeded the BC WQG for AW-F at upgradient surface water monitoring locations SW-1 and SW-2, side-gradient surface water monitoring location SW-10, and downgradient monitoring locations SW-5, SW-6, SW-7 and SW-8. Dissolved aluminum has been consistently above the BC WQG for AW-F at all these locations over the period of record, with no increasing trends and no discernable differences in concentrations between upgradient and downgradient locations.

Similarly, dissolved copper has exceeded the BC WQG for AW-F at all surface water sampling locations with no discernable differences in concentrations between upgradient and downgradient locations.

Detectable toluene was measured above the BC WQG for AW-F at upgradient surface water sampling locations SW-1 and SW-2. Given their upgradient locations, the toluene is inferred to be unrelated to the WMF; toluene has been known to occur as a result of laboratory contamination and/or associated with naturally occurring organic material.

In summary, it is possible that the elevated chloride in shallow groundwater at BH-5B and surface water monitoring locations SW-5 and SW-9 can be at least partially attributed to a landfill source. However, there are no other trends or exceedances in the groundwater and surface water monitoring results that would suggest a landfill impact. The low permeability glacial till underlying the Site appears to be limiting groundwater flow and the local wetlands appear to be attenuating leachate constituents that may be emanating from the WMF via surface water.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results from 2021 EEM monitoring program indicate that it is possible that the elevated chloride in shallow groundwater at BH-5B and surface water monitoring locations SW-5 and SW-9 can be at least partially attributed to a landfill source. However, there are no other trends or exceedances in the groundwater and surface water monitoring results that would suggest a landfill impact. The low permeability glacial till underlying the Site appears to be limiting groundwater flow and the local wetlands appear to be attenuating leachate constituents that may be emanating from the WMF via surface water.

Results of monitoring from standpipes completed in ephemeral streams and wetlands should be interpreted with caution. Given the stagnant nature of the water in these installations, the samples may not be representative of shallow groundwater emanating from the Site.

Golder presents the following recommendations for future work at the Hazelton WMF:

- Discontinue groundwater sampling of shallow standpipes series (SGW-1 to SGW-5) as water collected from these installations in ephemeral streams and wetlands may not be representative of shallow groundwater emanating from the Site.
- Add dissolved organic carbon to surface water analyses to allow for a more accurate comparison to the BC WQG (AW-F) for dissolved copper. The guideline is based on the Copper Biotic Ligand Model (BLM) which is dependant on sample pH, hardness, and dissolved organic carbon. For results without DOC, the BLM is run with the conservative assumption of DOC equal to the laboratory detection limit (0.05 mg/L).
- Optimize the monitoring well network. At present, there are three deep upgradient groundwater monitoring wells (BH-01, BH-02 and BH-4A), one shallow upgradient monitoring well (BH-4B), and one deep side-gradient monitoring well BH-03 (located between the Site and a public water well). There is only one conventional downgradient monitoring well (BH-5B), where a potential landfill influence has been observed in shallow groundwater. Consideration should be given to optimizing the monitoring well network by reducing the upgradient monitoring program to one deep (BH-4A) and one shallow (BH-4B) monitoring well, retaining monitoring of the side-gradient monitoring well (BH-03), and adding two additional conventional shallow monitoring wells to the downgradient monitoring program.
- The 19 October 2021 amendment to the OC requires preparation of a site wide water balance analysis for surface water and groundwater monitoring by 1 October 2022.

6.0 CLOSURE

We trust that this report provides the information required at this time. If you have any questions, please feel free to contact the undersigned.

Golder Associates Ltd.

Lindsay Carson, EIT
Environmental Engineer

Jillian Sacré, MSc, PGeo
Principal, Senior Hydrogeologist

LC/JS/asd

https://golderassociates.sharepoint.com/sites/156582/project files/6 deliverables/3.0_issued/21506108-006-r-rev0/21506108-006-r-rev0-1000-hazelton 2021 eem_23jun_22.docx

PERMIT TO PRACTICE #1003064
Engineers & Geoscientists BC

7.0 REFERENCES

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KEY MAP

FIGURE EXTENT

HAZELTON WASTE MANAGEMENT FACILITY

Peace
Edmonton
ROCKY MOUNTAINS
Calgary
Vancouver
Seattle
Columbia

Kitwanga Mountain Provincial Park
Gitanyow
2301m
37
Ross Lake Provincial Park
Ksan
Bulkley Junction Provincial Park
New Hazelton
16
BULKLEY RANGES
2514m
Kitsegueda
SEVEN SISTERS PEAKS
Moricetown
Kitseguecla River
Seven Sisters Provincial Park
Kitsums Creek
HUDSON BAY RANGE
2575m
Kitimat River
2027m
Sleeping Beauty Mountain Provincial Park
Kleanza Creek Provincial Park
Kleanza Creek
Zymagotitz River
Terrace
Thornhill
OK RANGE
Zymoetz River
Kitimaat River
HOWSON PEAK
2758m
TELKWA RANGE
Hai Lake - Mount Herman Provincial Park
Lakelse Lake Provincial Park
Williams Creek
Tazdli Wyiez Bin/Bumie-Shea Provincial Park
Lakelse Lake Wetlands Provincial Park
MOUNT CATT
Christ Creek
Burnie River
Shea Creek
2362m
Wedeene River
Gosnell Creek
Nalbeelah Creek Wetlands Provincial Park
2394m
Kitimat
MORICE RANGE
Atna River
Hirsch Creek
Atna River Provincial Park
2240m
Morice Lake Provincial Park
Kitamaat Village
Nenelkekh/Nanika-Kidprice Provincial Park

520000 540000 560000 580000 600000
6120000 6100000 6080000 6060000 6040000 6020000 6000000 5980000

LEGEND

★ SITE LOCATION

REFERENCE(S)

1. TOPOGRAPHIC MAP © ESRI AND ITS LICENSORS. USED UNDER LICENSE, ALL RIGHTS RESERVED.

NOT FOR CONSTRUCTION

0 9 18

1:450,000 KILOMETRES

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

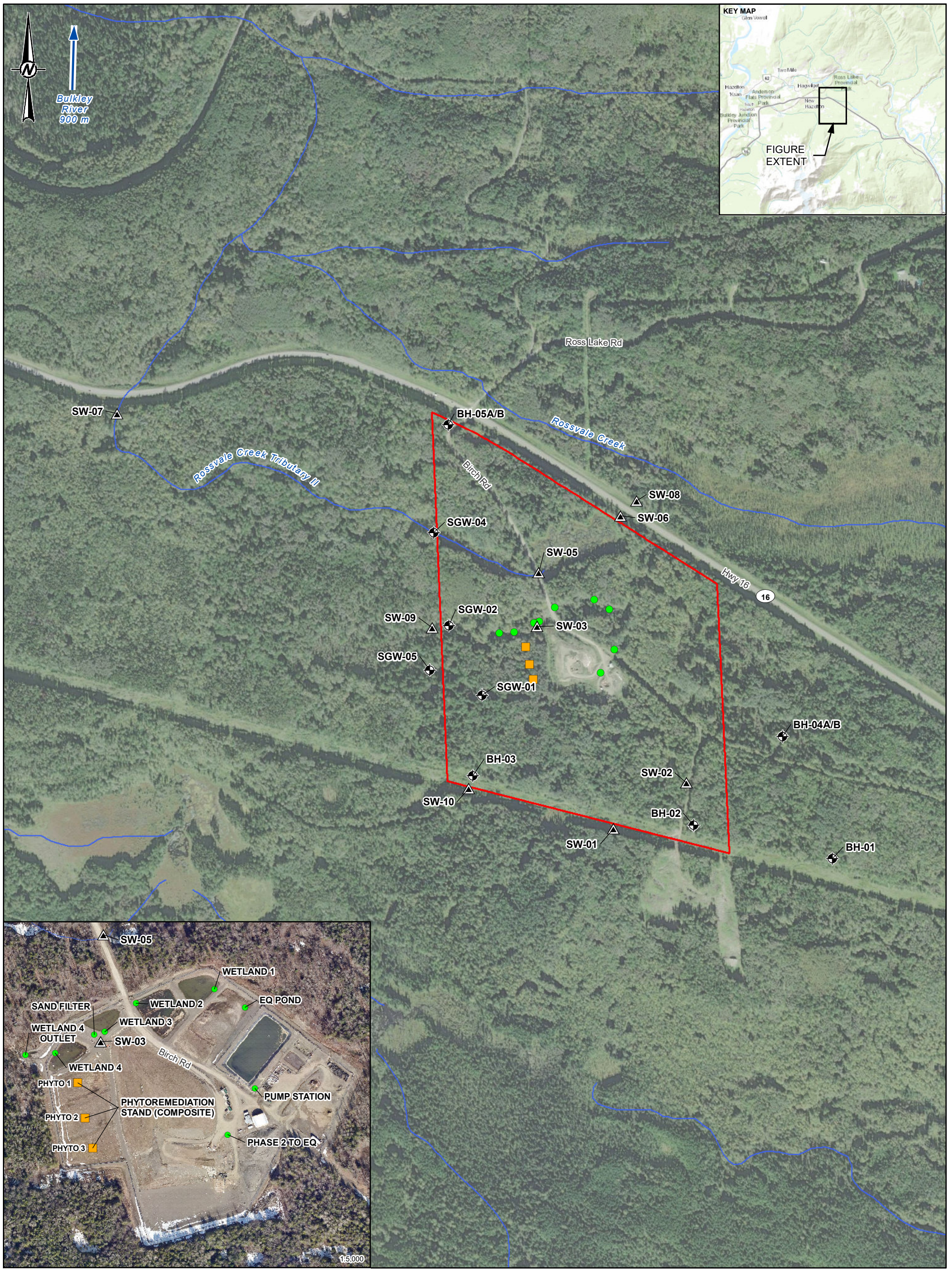
PROJECT
HAZELTON WASTE MANAGEMENT FACILITY

CONSULTANT
WSP GOLDER

YYYY-MM-DD	2022-06-23
DESIGNED	LC
PREPARED	LH
REVIEWED	LC
APPROVED	JS

TITLE
KEY PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
21506108	2000/2001	0	1



LEGEND

PROJECT DATA

SAMPLE LOCATIONS

- MONITORING WELL
- SURFACE WATER
- SOIL SAMPLE LOCATION
- LEACHATE SAMPLE LOCATION
- SITE BOUNDARY
- WATERCOURSE

NOT FOR CONSTRUCTION

0 200 400

1:10,000 METRES

NOTE(S)

1. SITE FEATURES ARE APPROXIMATE.

REFERENCE(S)

1. PROJECT IMAGERY (2021) OBTAINED FROM RDKS (HAZ2021.TIF).
2. IMAGERY COPYRIGHT © 20170719 ESRI AND ITS LICENSORS. SOURCE: VIVID. USED UNDER LICENSE, ALL RIGHTS RESERVED.
3. WATERBODY DATA CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – BRITISH COLUMBIA.
4. CONTOUR DATA CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – CANADA.
5. SITE BOUNDARY DATA CONTAINS INFORMATION DERIVED FROM AND LICENSED UNDER THE OPEN GOVERNMENT LICENSE – BRITISH COLUMBIA (TANTALIS CROWN LAND LEASE).

COORDINATE SYSTEM: NAD 1983 UTM ZONE 9N

CLIENT

REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT

HAZELTON WASTE MANAGEMENT FACILITY

CONSULTANT

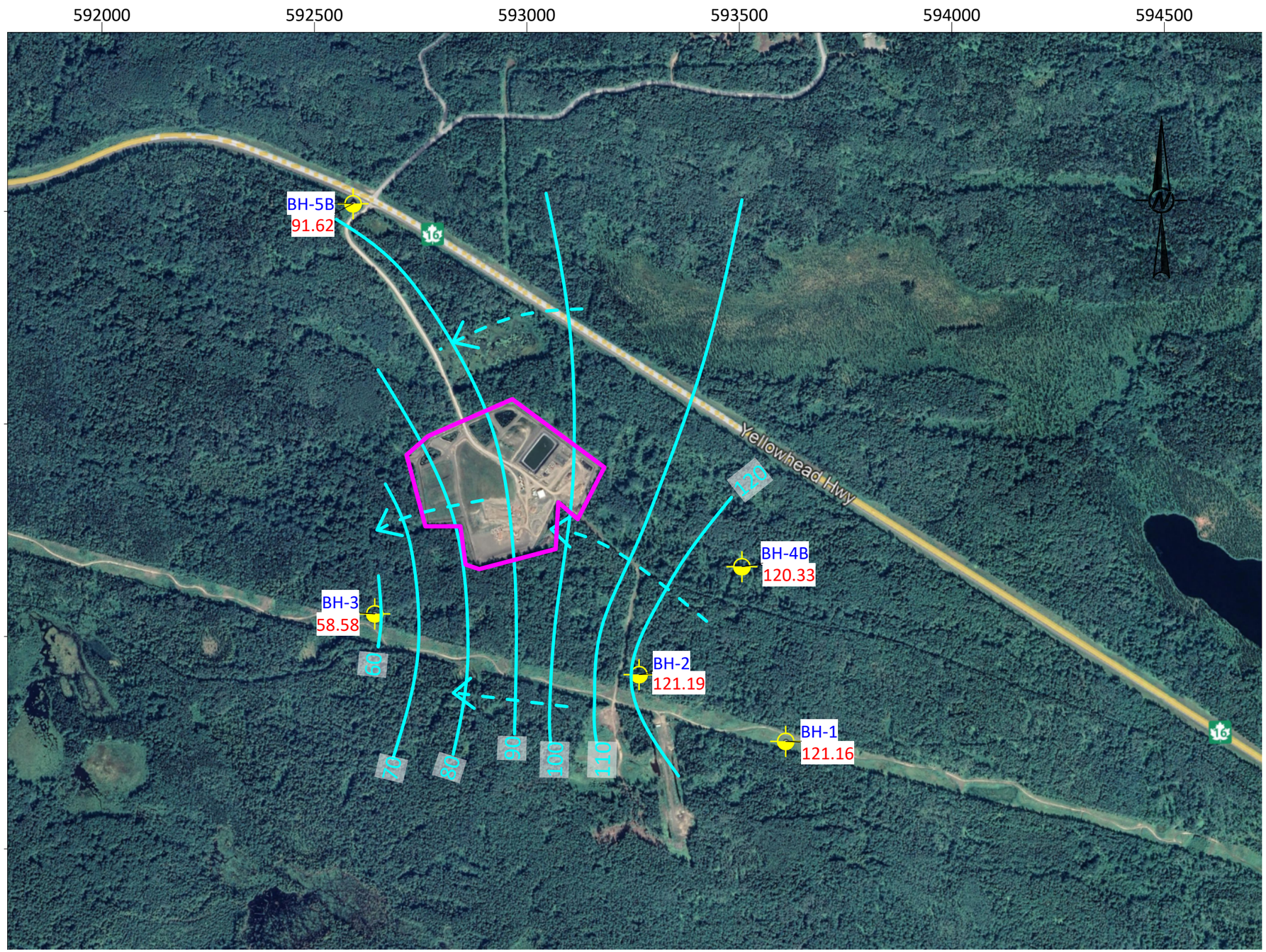
WSP GOLDER

YYYY-MM-DD	2022-06-23
DESIGNED	LC
PREPARED	LH
REVIEWED	LC
APPROVED	JS

TITLE

SITE PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
21506108	1000/1001	0	2



LEGEND

- BH-1 — Groundwater Monitoring Well
- 121.16 — Water Level - Monitoring Well (mard)
- 120 — Inferred Water Table Elevation Contours (JULY 2021)
- Approximate Groundwater Flow Direction
- Waste Management Facility Area

NOTE(S)

REFERENCE(S)

Base Map: Google Earth (2021).

NOT FOR CONSTRUCTION

0m 200m 400m 600m

CLIENT

Reginal District of Kitimat-Stickie

CONSULTANT

WSP GOLDER

YYYY-MM-DD	2022-06-20
DESIGNED	KQ
PREPARED	KQ
REVIEWED	LC
APPROVED	JS

PROJECT

Hazelton Waste Management Facility
Environmental Effects Monitoring Program

TITLE

GROUNDWATER ELEVATIONS JULY 2021

PROJECT NO.	CONTROL	REV.	FIGURE
21506108	1001	0	3

APPENDIX A

Operational Certificate

May 27, 2020

Tracking Number: 392981
Authorization Number: 17226

REGISTERED MAIL

REGIONAL DISTRICT OF KITIMAT-STIKINE
300 4545 LAZELLE AVENUE
TERRACE, BC
V8G 4E1

Dear Operational Certificate Holder:

Enclosed is Operational Certificate 17226 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate.

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.

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

Administration of this operational certificate will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data, reports, non-compliance notifications and non-compliance reports pertinent to the permit are to be submitted to the Environmental Protection Division via email or other electronic means as directed in the following web link: https://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions

Yours truly,

Karen Moores, P.Ag.
for Director, *Environmental Management Act*

Environmental Protection Division
Ministry of Environment
3726 Alfred Avenue
Smithers, BC, V0J 2N0
Authorizations - North Region
Telephone: (250) 847-7260
Facsimile: (250) 847-7591

Authorizations - North Region

Enclosure

cc: Environment Canada

MINISTRY OF ENVIRONMENT

OPERATIONAL CERTIFICATE

17226

for the

HAZELTON REGIONAL LANDFILL

Under the Provisions of the Environmental Management Act and in accordance with the Regional District of Kitimat-Stikine's Solid Waste Management Plan, the

REGIONAL DISTRICT OF KITIMAT-STIKINE

Suite 300 – 4545 Lazelle Avenue

Terrace, British Columbia

V8G 4E1

is authorized to store, handle, treat and discharge municipal waste from Hazelton, Kitwanga and surrounding areas at the Hazelton Regional Landfill subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution.

1. LOCATION OF LANDFILL PROPERTY

The location of the property where discharges are authorized to occur is the SW ¼ Part of District Lot 1574, Cassiar Land District.

2. DESIGN, OPERATIONS and CLOSURE PLAN

The landfill and associated works must 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. These details must be incorporated into a "Design, Operations, and Closure Plan" (DOCP) which must be reviewed, updated and submitted to the Director for approval every 5 years

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Date amended: May 27, 2020
(most recent)

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

thereafter. The landfill must be operated at all times in accordance with the approved DOCP.

The DOCP must include, at a minimum:

- extent and location of each disposal area, clearly shown on a site plan;
- quantities of wastes (solid, liquid and leachate) discharged;
- works associated with each disposal area;
- any proposed restrictions on salvaging by the public;
- scaled site plan accurately showing the legal survey, the engineered final design footprint, and final design contours;
- proposed litter control measures on-site and at neighbouring properties;
- proposed measures to meet the Landfill Gas Regulation and landfill gas health and safety requirements;
- proposed surface and groundwater management plan including an assessment of the adequacy of the number and location of groundwater monitoring wells;
- proposed preliminary water quality exceedance response plans;
- proposed maximum lift height of compacted waste;
- proposed leachate system design and management plan, including the priority of and circumstances dictating when effluent is sent to the phytoremediation stand and when it is sent to the infiltration trench;
- proposed maximum allowable surface area of exposed waste;
- proposed maximum volume of waste in a cell at any given time;
- proposed method, coverage (area) and timing of progressive closure;

- design, construction and operation of the liquid waste (septic tank pumpage) disposal lagoon(s);
- signage and fencing at and around the liquid waste disposal lagoon(s);
- nature/volume of wastes to be discharged at the liquid waste lagoon(s);
- location of the designated wood residue open burning area;
- groundwater model that, in relation to the final landfill design:
    - (i) is developed by a qualified professional (experienced in groundwater hydrogeology);
    - (ii) outlines the groundwater regime including flow directions, estimated rates, inferred leachate plume, etc. at and in the surrounding area of the landfill site influenced by landfill leachate;
    - (iii) appropriately assesses the correct number and location of wells such that groundwater can be intercepted and assessed to determine groundwater quality and flow direction;
    - (iv) estimates the loadings of Potential Contaminants of Concern (PCOC)'s from landfill leachate to the environment. The groundwater model and PCOC loading estimates must be updated with each review of the DOCP.
- maximum allowable slopes of the various disposal areas;
- engineered final design footprint delineating the maximum extent of solid waste disposal allowable at the facility horizontally and vertically;
- engineered excavation grade for municipal solid waste;
- landfill design waste density;

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- proposed notification schedule for closure;
- proposed closure plan including:

  i) intended end-use of the landfill property after closure;

  ii) anticipated total waste volume, tonnage, and life remaining of the landfill;

  iii) a topographic plan showing the final elevation contours of the landfill and surface water diversion and drainage controls;

  iv) 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;

  v) procedures for notifying the public about the closure and about alternative waste disposal facilities;

  vi) nuisance wildlife control procedures;

  vii) a comprehensive long-term monitoring plan by a qualified professional, including groundwater monitoring, surface water monitoring, aquatic effects monitoring (including acute and chronic toxicity testing if determined to be necessary), landfill gas monitoring, leachate monitoring, final cover monitoring, and erosion and settlement monitoring, for a minimum post-closure period of 25 years;

  viii) design, if necessary, for the collection, storage and treatment/use of landfill gas for a minimum 25-year post-closure period

  ix) plan for the operation of any required pollution abatement engineering works such as leachate collection and treatment systems, for a minimum post-closure period of 25 years; and

x) an estimated cost updated every five years, to carry out closure and post-closure activities for a minimum period of 25 years.

3. DISCHARGE OF MUNICIPAL SOLID WASTE

Municipal solid waste is authorized to be discharged to ground in accordance with the approved DOCP. The site reference number for this discharge is E288569.

4. STORAGE AND HANDLING OF WASTES FOR SALVAGE AND RECYCLING

Wastes are authorized to be stored and handled for salvage and recycling in accordance with the approved DOCP.

5. DISCHARGE OF MUNICIPAL LIQUID WASTE

Municipal liquid waste is authorized to be discharged to an appropriate discharge facility in accordance with the approved DOCP. The site reference number for this discharge is E288571.

6. DISCHARGE OF TREATED EFFLUENT TO PHYTOREMEDIATION STAND

Treated effluent is authorized to be discharged to the Phytoremediation Stand in accordance with the approved DOCP and Section 9. The site reference number for this discharge is E288572.

7. DISCHARGE OF TREATED EFFLUENT TO WETLAND #4 INFILTRATION TRENCH

Treated effluent is authorized to be discharged to the Wetland #4 Infiltration Trench within the Ephemeral Creek Drainage in accordance with the approved DOCP and Section 9. The site reference number for this discharge is E309786.

8. DISCHARGE OF AIR CONTAMINANTS FROM OPEN BURNING OF WOOD RESIDUE

Air contaminants are authorized to be released from the open burning of wood residue in accordance with this section and the approved DOCP. The site reference number for this discharge is E288570.

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Date amended: May 27, 2020
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for Director, *Environmental Management Act*
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8.1 Location

Any open burning of selected wastes must be restricted to the designated open burning area as shown on the attached site plan and as identified on-site. Signs which identify the nature of the waste acceptable at the designated open burning area must be erected and maintained.

8.2 Quantity, Timing, and Duration of Discharge

The maximum authorized quantity of wood residue to be open burned during each event is that which has accumulated at the time of burn initiation.

The maximum authorized duration of each burn must be limited to the period between two hours after sunrise on the day of ignition, and sunset on the following day. Each open burn must be completely extinguished at the end of the authorized burn duration.

Should a condition arise which prevents the burn pile(s) from being burned within this period, the Director must be notified in accordance with this authorization.

8.3 Nature of Wastes

Acceptable materials for burning may only include dry, unpainted, untreated demolition, construction and packing-related wood residue, clean stumps, prunings, vegetative debris and brush, but must exclude nuisance-causing combustibles such as glue-containing wood, painted and treated wood, sawdust , mulch, wood chips, rubber, plastics, tars, insulation, roofing material, asphalt shingles, etc.

8.4 Favourable Weather for Smoke Dispersion

Open burning must not proceed unless the recorded Environment Canada Ventilation Index Forecast for Smithers is greater than 55 (GOOD) for both days of the proposed burn.

The contact number for the forecast is 1-888-281-2992. Ventilation index forecasts can also be obtained after 7:00 a.m. from the following Environment Canada website:
http://www.weatheroffice.gc.ca/forecast/textforecast_e.html?Bulletin=flcn39.cwvr

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Date amended: May 27, 2020
(most recent)

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

A burn registration number must be obtained from the Ministry of Forests (1-888-797-1717) prior to ignition.

Open burning of wood residue must not be initiated or continued if the local air flow will cause the smoke to negatively impact a nearby population or cause pollution. No burning must occur during periods of fire hazard or when burning is prohibited by other agencies.

8.5 Minimization of Smoke

Each burn must be tended in a manner that ensures minimization of smoke emissions. Measures to minimize smoke must include, but not necessarily be limited to: stacking of waste in a manner that eliminates inclusion of dirt; waiting to burn until wastes are reasonably dry after any significant precipitation event; and using adequate equipment and staff.

8.6 Extinguishment Contingency Plan

Prior to burning, a contingency plan must be in place detailing how the open burn will be extinguished in the event of any of the following occurring:

i) Inadequate smoke dispersion in the surrounding environment;

ii) wood continues to smoulder after the authorized burn period; and,

ii) the Director requires that the open burn be extinguished for environmental protection reasons

8.7 Extinguishment

All combustion must be completely extinguished at the end of the authorized period as set out in Section 8.2

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(most recent)

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Authorizations - North Region

9. LEACHATE MANAGEMENT REQUIREMENTS

9.1 Leachate Management

9.1.1 Leachate Containment

A leachate containment and appropriate barrier system must be utilized. The barrier system must consist of a minimum of 2 metres of natural *in-situ* clay with a hydraulic conductivity of 1 x 10^{-6} cm/s or less. Alternatively, an engineered barrier may be used provided it is equivalent to or better than the natural clay barrier specified above.

9.1.2 Leachate Collection

A leachate collection system must be utilized. A continuous drainage blanket must be established beneath all landfill phases. The drainage blanket must consist of, or be equivalent to, a minimum 300 mm thick layer of clean gravel with an effective hydraulic conductivity exceeding 1 x 10^{-1} cm/s. The leachate collection system must be designed such that the hydraulic head on top of the barrier layer does not exceed 300 mm at any time.

9.1.3 Quantity of the Discharge

The maximum authorized quantity of discharge is indeterminate.

9.1.4 Timing of the Discharge

The discharge may occur 24 hours/day, 7 days/week, 365 days/year if in accordance with Sections 9.1.5, 11.1 and 11.2.

9.1.5 Characteristics of the Discharge

Acceptable constituents of the effluent include landfill leachate, liquid waste from the septage facility, site storm water, and run-off from the Phytoremediation Stand. The effluent must be directed in order of priority to the Phytoremediation Stand (Section 6), or to

Wetland #4 Infiltration Trench within the Ephemeral Creek Drainage (Section 7) and as established in the DOCP.

The characteristics of the effluent discharged to the Phytoremediation Stand (Section 6) or Wetland #4 Infiltration Trench within the Ephemeral Creek drainage (Section 7) must not exceed the following limits:

Daphnia magna acute lethality*,[1]	50% survival in 100% concentration, Minimum
Total Nitrogen	60 mg/L
Ammonia	30 mg/L
pH	6.5 to 8.5
Chloride	3750 mg/L
Total Iron	4.5 mg/L
Total Zinc	75 mg/L
Total Cadmium	0.1 mg/L

* not applicable if discharge only occurs to the Phytoremediation Stand

[1] this limit became effective June 30 2019 to allow for commissioning of the works and an assessment of the first year of monitoring data and effectiveness to occur as required in Section 12.2(iii)

9.1.6 Site Water Balance Model and Phytoremediation Stand Uptake Review

By December 31 2023 a qualified professional must re-evaluate the site water balance model including the rate of effluent uptake by the trees in the Phytoremediation Stand. Recommendations for any alterations to the discharge requirements in this section must be submitted to the Director by June 30 2024.

9.1.7 Authorized Works

The authorized works include storm water collection infrastructure, leachate collection and treatment facilities including an equalization basin, 4 engineered wetlands, and a sand filter and

related appurtenances, with the final point of discharge being to either the Phytoremediation Stand or to the Wetland #4 Infiltration Trench within the Ephemeral Creek drainage approximately as shown on the attached Site Plan A. It is permissible to bypass one or more components of the authorized works in order to achieve improved effluent quality through recirculation or additional retention time. In all cases, Section 9.1.5 must be met prior to discharge.

9.1.8 Authorized Works Functionality

The operational certificate holder must not discharge under this authorization unless the authorized works are complete and fully functional according to the treatment flow options as established in the DOCP.

10. GENERAL REQUIREMENTS

10.1 Lethal Toxicity of the Discharge

Commencing July 1, 2019 (post facility commissioning period) for any discharge to the Wetland #4 Infiltration Trench within the Ephemeral Creek Drainage (Section 7) the treated effluent and storm water must not be lethally toxic to aquatic organisms at the point of discharge (Wetland #4 Outlet Culvert) For the purposes of this 48 hour test, in >95% effluent concentration, there must be a minimum 50% survival of Daphnia magna. This Section does not apply to discharges of effluent to the Phytoremediation Stand (Section 6).

10.2 Prohibited Wastes

No wastes as defined by the Hazardous Waste Regulation (B.C. Reg. 243/2016, November 1, 2017) must be treated or disposed of at this site except as authorized by the Director. Materials which are regulated under the Recycling Regulation must not be treated or disposed of at this site if local marshalling and recycling facilities are available.

10.3 Waste Asbestos

Notwithstanding Section 10.2 of this operational certificate, the disposal of waste asbestos under Section 3 of this operational certificate and in

compliance with the requirements of Section 40 of the Hazardous Waste Regulation is hereby authorized.

10.4 **Contaminated Soil**

Soil that contains contaminants in concentrations less than "Hazardous Waste" as defined by the Hazardous Waste Regulation may be disposed at the landfill site. Disposal does not include use as final cover material.

10.5 **Waste Measurement**

The quantity of waste material landfilled at the site must be measured or estimated on an annual basis. This data must be made available for inspection upon request.

10.6 **Surface Water Quality Exceedances Response Plan**

The operational certificate holder must submit to the Director, a response plan detailing how the operational certificate holder will report and respond to:

- exceedances at sampling station SW-09 of the British Columbia Water Quality Guidelines for the Protection of Aquatic Life (BCWQGAL)

The response plan must be submitted a minimum of 60 days prior to the commissioning (first discharge) of the leachate treatment system. Upon completion, the response plan must also form a part of the approved DOCP.

10.7 **Surface Water Quality Assessment**

If, during monitoring under Section 11.4, surface water quality measured at the property boundary (SW-09) exceeds the BCWQGAL then the operational certificate holder must implement the Surface Water Quality Exceedances Response Plan required in Section 10.6. The Director must be notified within 24 hours of the operational certificate holder triggering the response plan required in Section 10.6.

10.8 **Ground Water Quality Exceedances Response Plan**

The operational certificate holder must submit to the Director, a response plan detailing how the operational certificate holder will report and respond to:

- exceedances at sampling stations SGW-2, SGW-4, SGW-5, BH-3 and BH-5B of the Contaminated Sites Regulation Schedule 6 Drinking Water Standards

The response plan must be submitted a minimum of 60 days prior to the commissioning (first discharge) of the leachate treatment system. Upon completion, the response plan must also form a part of the approved DOCP.

10.9 Ground Water Quality Assessment

If, during monitoring under Section 11.3, ground water quality measured at sampling stations SGW-2, SGW-4, SGW-5, BH-3 and BH-5B exceeds the Contaminated Sites Regulation Schedule 6 Drinking Water Standards then the operational certificate holder must implement the Ground Water Quality Exceedances Response Plan required in Section 10.8. The Director must be notified within 24 hours of the operational certificate holder triggering the response plan required in Section 10.8.

10.10 Electric Fencing

10.10.1 Design, Construction and Maintenance

Wherever required, electric fencing and gate systems at the landfill must be designed, constructed, and maintained such that bears are prevented from entering into the landfill through any portion of the fence or gates at any time of the day.

10.10.2 Fence Type

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 as follows: the bottom strand must be a grounded (-) strand and must not be more than 10 cm from the earth at any location; and thence starting from the bottom strand, the other seven strands must be spaced 15 ± 2 cm, 15 ± 2 cm, 15 ± 2 cm, 20 ± 2 cm, 20 ± 2 cm, 20

± 2 cm, and 25 ± 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 must: 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 must not be more than 10 cm from the earth 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 earth; and each of the remaining three strands must be spaced approximately 25 cm apart from adjacent charged strands.

10.10.3 Wire Tension

For a high tensile smooth wire fence construction, all strands must 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

10.10.4 Post Spacing

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

10.10.5 Grounding System

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 metres. A minimum of three grounding rods (spaced at least 3 metres 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 metres along the fence and connected to the grounded wire strands or uncharged fence fabric. Additional

grounding may be required for dry sites or if other conditions affect proper grounding.

10.10.6 Period of Operation

Electric fencing 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 the snow line must be isolated from the remainder of the system and energized.

10.10.7 Minimum Voltage

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

10.10.8 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 always be electrified to a minimum voltage of 6,000 volts 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 the earth, and between gate panels (for a double-hung gate), must not exceed 10 cm.

10.10.9 Fence Inspections

The perimeter of the electric fencing must be inspected on every day that the site is open to the public and the voltage of the fencing measured at several points and at each gate using a proper electric fence voltmeter. The results of voltage testing must be recorded in a log book. 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 wires, broken insulators, breaks in the grounding system, etc.). Corrective actions to restore proper voltage must be immediately undertaken.

Any discernible penetrations through electric fencing by bears and other wildlife must be immediately reported to the Conservation Officer Service at 1-877-952-7277 and to the Director at 1-250-847-7260.

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for Director, *Environmental Management Act*
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In cases of low voltage or signs of penetration attempts, inspections must 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.

10.11 **Dead Animal Disposal**

Dead animals and animal parts must be disposed of in the solid waste disposal area and covered as soon as practicable with a minimum of 60 centimetres of soil and/or waste material such that flies and scavenging animals are prevented from accessing the carrion. Disposal of Specified Risk Material from cattle must only be done in accordance with Canadian Food Inspection Agency requirements and procedures.

11. MONITORING REQUIREMENTS

The operational certificate holder must carry out an environmental monitoring program for the locations specified below and as shown on Site Plan "B" as follows:

11.1 **Treated Effluent to Phytoremediation Stand**

Location	Parameters	Frequency
Effluent: E288572 Treated Leachate Post Sand Filter/Pre Phytoremediation Stand	Lab: total metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total organic carbon, orthophosphorus, COD, BOD, pH, EPH, BTEX/VPH total Kjeldahl nitrogen Field: conductivity, pH, temperature, DO, turbidity, volume (flow measurement)	Lab/Field: Once prior to first discharge event of the year (spring) and once per summer and fall Volume: Continuous during discharge
Soil: E309686 Composite Soil Sample[1] from Phytoremediation Stand	Lab: metals, salinity, nutrients, cations, ions	Lab: Once annually, prior to first discharge of the year, as well as baseline data collection prior to very first discharge to the phytoremediation stand soil

[1] Composite sample assembled from 4 locations from a pre-established list of 12 locations

11.2 **Treated Effluent to Wetland #4 Infiltration Trench**

Location	Parameters	Frequency

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Effluent: E309786 Treated Leachate at Wetland#4 Outlet	Lab: total metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total organic carbon, orthophosphorus, COD, BOD, EPH, BTEX/VPH, pH, total Kjeldahl nitrogen Field: conductivity, pH, temperature, DO, turbidity, volume (flow measurement), visual[1] Acute Toxicity: Daphnia magna	Lab/Field: Once prior to first discharge event of the year (spring) and once per summer and fall. Monthly if discharging at any time during other months Volume: Continuous during discharge Visual: Traverse area between Wetland # 4 Infiltration Trench and SW-09 twice per week during any period of discharge to identify any surface breakouts of discharge Acute Toxicity: Once prior to start of each distinct continuous discharge event, or at least once per spring, summer and fall during discharge, whichever is more frequent

[1]Visual inspection to detect surfacing of effluent between Wetland #4 Infiltration Trench and SW-09. If surface flow of effluent is detected, then the discharge must cease and the Director must be notified within 24 hours

11.3 **Groundwater Monitoring**

Location	Parameters	Frequency
E251512 BH-01	Lab:	Quarterly → Annually[1,3]

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E251513 BH-02 E251514 BH-03 E252313 BH-4B E252314 BH-5B E309746 SGW-1 E309747 SGW-2 E309748 SGW-3 E309749 SGW-4 E309750 SGW-5	Dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH,	
	Field: Conductivity, temperature, pH, water elevation[4]	Monthly→Quarterly[1,3]

[1] Quarterly reduced to annually and monthly reduced to quarterly following two complete years of sampling
[2] Water elevation quarterly
[3] Spring sampling to be conducted on or before May 15 of each year

11.4 **Surface Water Monitoring**

Location	Parameters	Frequency
E309751 SW-01 E309752 SW-02 E287409 SW-05 E309754 SW-06 E287410 SW-07 E273812 SW-08 E310968 SW-09[1](property boundary)	Lab: Total metals, dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons
E310969 SW-10 (downstream of BH-03)	Field: Conductivity, temperature, pH, turbidity, flow rate, dissolved oxygen	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons

[1] SW-09 As near to property boundary as possible but at a location where discernible flow begins in ephemeral creek drainage
[2] Annual sample date should be consistent year to year, and preferably taken in fall

11.5 **Ground and Surface Water Monitoring Procedures**

11.5.1 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 www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html

11.5.2 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 www.env.gov.bc.ca/epd/wamr/labsys/lab_meth_manual.html

11.5.3 Toxicity Sampling and Analytical Procedures

Samples must be collected from the discharge described in Section 7 and in accordance with Section 10.1 at frequencies established as per the monitoring program specified in Section 11.2 and tested for Daphnia magna acute lethality. Daphnia magna acute lethality test means the test to determine the acute lethality of effluent to Daphnia magna as set out in Reference Method EPS 1/RM/14.

11.5.4 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(ies).

b) Collect one duplicate sample during each sampling session from one of the discharge points.

c) Each duplicate sample must be submitted to the laboratory; one of the 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 must be prepared, containing distilled water, and preservative if required, and submitted as a blank sample with one sample set per session. If any result for any parameter indicates detectable concentrations, then efforts must be made to determine and control the source of contamination.

12 Data Analyses and Reporting

12.1 Log Book

As required by section 10.10.9 (fence inspections), the operational certificate holder must maintain a log book or electronic record. The log book or electronic record must be made available for inspection upon request by Ministry staff.

12.2 Annual Report

The operational certificate holder must collect and maintain data of effluent and soil analyses, and any other records required under this authorization for inspection when requested by Ministry staff and submit the data for the previous calendar year in a form satisfactory to the Director. The operational certificate holder must submit the annual report on or before June 30 each year for the previous calendar year.

The operational certificate holder must submit all data required to be submitted under this section by email to the Ministry's Routine Environmental Reporting Submission Mailbox (RERSM) at EnvAuthorizationsReporting@gov.bc.ca or as otherwise instructed by the

Director. For guidelines on how to properly name the files and email subject lines or for more information visit the Ministry website:

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

The annual report must contain at minimum:

i) The type and tonnage or volume of waste received, recycled, composted and landfilled for the year;

ii) Volume of effluent discharged to each of the Phytoremediation Stand and Wetland #4 Infiltration Trench within the Ephemeral Creek Drainage, with tabulation of volume and duration of each discharge event and the total volume discharged per year;

iii) Occurrences or observations of wildlife attempting to access the facility;

iv) The results of all required monitoring programs undertaken by the operational certificate holder for the site. Trend analysis, evaluation of any identified impacts of the discharges on the receiving environment in the previous year, and evaluation of the effectiveness of the established monitoring programs must be carried out by qualified professionals appropriate to the subject matter. Any identified recommendations must be included as they pertain to the ground water, surface water and aquatic effects (including acute toxicity) monitoring programs. Should the parameters and frequencies of the previous year's monitoring programs be identified as being not representative of receiving environment conditions, recommendations must be made for corrective actions that can be taken. Recommendations can be made to either increase or decrease parameters and frequency of any monitoring program

12.3 **Non-Compliance Notification**

The operational certificate holder must immediately notify the Director or designate by email at EnvironmentalCompliance@gov.bc.ca or as

otherwise instructed by the Director, of any non-compliance with the requirements of this authorization by the operational certificate holder and take remedial action to remedy any effects of such non-compliance. The operational certificate holder must provide to the Director with written confirmation of all such non-compliance events, including available test results, within 24 hours of the original notification, unless otherwise directed by the Director.

12.4 **Non-Compliance Reporting**

If the operational certificate holder fails to comply with any of the requirements of this authorization, the operational certificate holder must, within 30 days of such non-compliance, submit a written report that is satisfactory to the Director and 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-compliances in the future.

The operational certificate holder must submit all non-compliance reporting required to be submitted under this section by email to the Ministry's Compliance Reporting Submission Mailbox (CRSM) at EnvironmentalCompliance@gov.bc.ca or as otherwise instructed by the Director. For guidelines on how to report a non-compliance or for more information visit the Ministry website: http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions/non-compliance-reporting-mailbox

12.5 **Non-compliance Reporting and Exceedances**

The operational certificate holder must cause each data submission required by this authorization to include a statement outlining the number

of exceedances of permitted discharges that occurred during the reporting period, the dates of each such exceedance, an explanation as to the cause of the exceedances, and a description of the measures taken by the operational certificate holder to rectify the cause of each such exceedance. If no exceedances occurred over the reporting period, the required statement may instead indicate that no exceedance of permitted discharges occurred during the reporting period.

12.6 Toxicity Test Failure Reporting

The operational certificate holder must report any failure of Daphnia magna acute toxicity tests as referenced in Sections 10.1, 11.2 and 11.5.3 to the Director within 24 hours of receiving the test failure result. As required in Section 9.1.5, beginning July 1, 2019, no discharge to the Wetland #4 Infiltration Trench may occur following a failed toxicity test unless there is a successful test result (non-failure) for Daphnia magna toxicity.

13. Closure Requirements

13.1 Notification of Closure

The operational certificate holder must notify the Director in writing of intentions to close the landfill site at least one year prior to closure date.

13.2 Closure Plan

As per Section 2 (Design, Operations and Closure Plan) closure requirements must be included in the DOCP.

13.3 Closure Funding

The operational certificate holder must ensure that sufficient funds will be available to provide for all closure and post-closure requirements as outlined in the closure plan required in Section 2, plus a reasonable contingency for any remediation which may be required.

13.4 Final Cover

The final cover system must 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.). The final cover must consist of a layer of a minimum 600 mm of low permeability ($<1 \times 10^{-6}$ 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 Director. The final cover must be constructed with minimum and maximum slopes as specified by a qualified professional in the DOCP to promote runoff and minimize erosion, with appropriate run-on/runoff drainage controls, erosion controls, and gas venting controls. The site must be seeded with a grass/legume mixture suited to the local climate.

13.5 Progressive Application of Final Cover

Completed portions of the landfill must progressively receive final cover during the active life of the landfill. The maximum area of disposed refuse that has not yet received final cover must not exceed 25% of the total final footprint area. Final cover is to be applied according to the specifications identified in section 13.4.

14. ENVIRONMENTAL IMPACT

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

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for Director, *Environmental Management Act*
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Site Plan A

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Date amended: May 27, 2020
(most recent)

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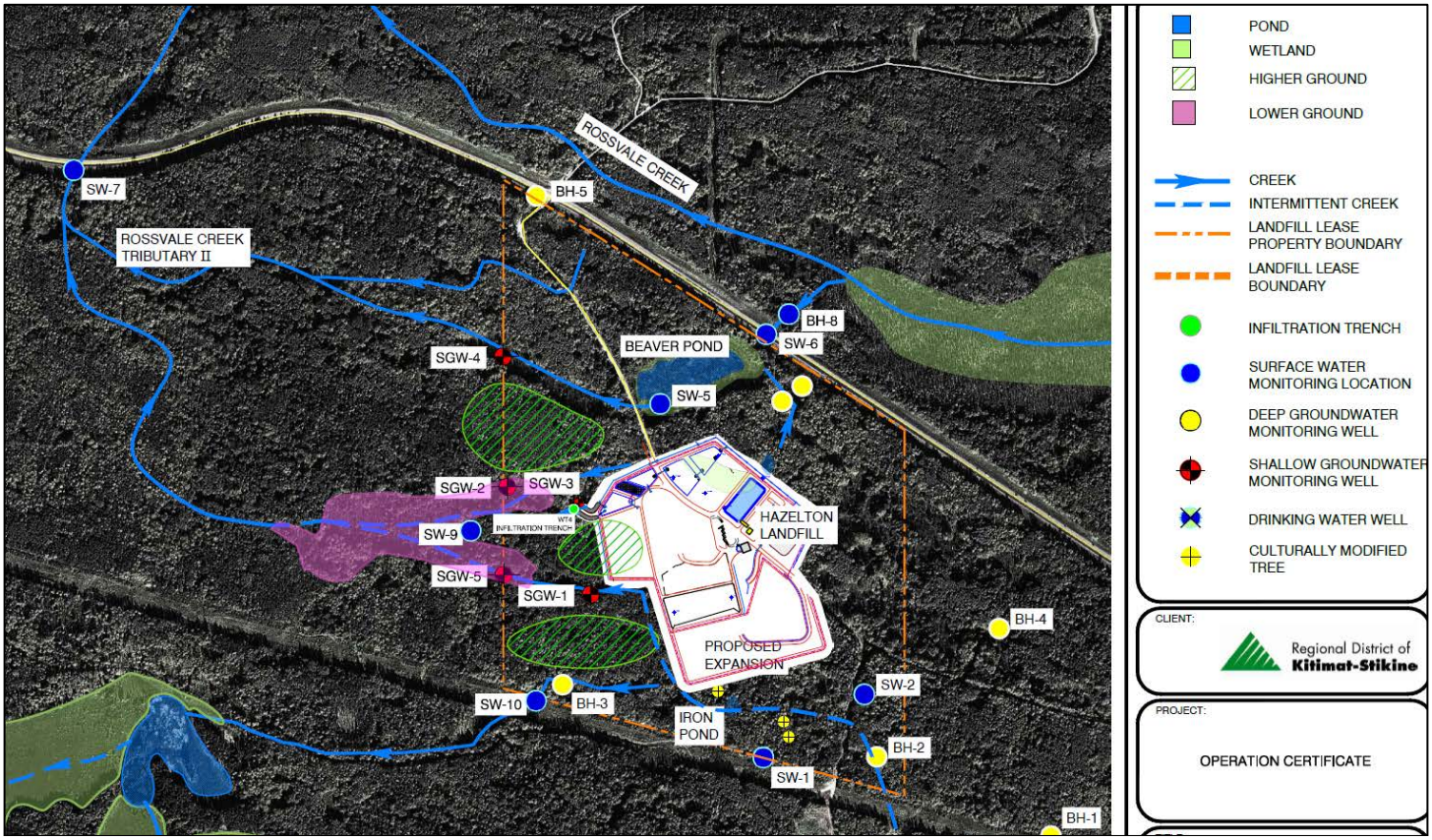
for Director, *Environmental Management Act*
Authorizations - North Region

Site Plan B



Date issued: May 30, 2013
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Karen Moores, P.Ag.
for Director, *Environmental Management Act*
Authorizations - North Region

October 19, 2021

Tracking Number: 407972
Authorization Number: 17226

REGIONAL DISTRICT OF KITIMAT-STIKINE
300 4545 LAZELLE AVENUE
TERRACE, BC
V8G 4E1

Dear REGIONAL DISTRICT OF KITIMAT-STIKINE,

Your application for an Authorization amendment under the Environmental Management Act

In response to your letter dated October 18, 2021, and pursuant to Section 14(4) of the *Environmental Management Act*, the Director hereby consents to the following changes to Sections 11.3 and 11.4 of the Operational Certificate OC17226:

From Section 11.3:
11.3 **Groundwater Monitoring**

Location	Parameters	Frequency
E251512 BH-01 E251513 BH-02 E251514 BH-03 E252313 BH-4B E252314 BH-5B E309746 SGW-1 E309747 SGW-2 E309748 SGW-3 E309749 SGW-4 E309750 SGW-5	Lab: Dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH,	Quarterly → Annually[1,3]
	Field: Conductivity, temperature, pH, water elevation[4]	Monthly→Quarterly[1,3]

To Section 11.3:
11.3 **Groundwater Monitoring**

Location	Parameters	Frequency
E251512 BH-01 E251513 BH-02 E251514 BH-03 E252313 BH-4B E252314 BH-5B E309746 SGW-1 E309747 SGW-2 E309749 SGW-4 E309750 SGW-5	Lab: Dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH,	Quarterly → Annually[1,3]
	Field:	Monthly→Quarterly[1,3]

	Conductivity, temperature, pH, water elevation[4]	

From Section 11.4:

11.4 **Surface Water Monitoring**

Location	Parameters	Frequency
E309751 SW-01 E309752 SW-02 E287409 SW-05 E309754 SW-06 E287410 SW-07 E273812 SW-08 E310968 SW-09[1](property boundary)	Lab: Total metals, dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons
E310969 SW-10 (downstream of BH-03)	Field: Conductivity, temperature, pH, turbidity, flow rate, dissolved oxygen	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons

To Section 11.4:

11.4 **Surface Water Monitoring**

Location	Parameters	Frequency
E309751 SW-01 E309752 SW-02 E287409 SW-05 E287410 SW-07 E310968 SW-09[1](property boundary)	Lab: Total metals, dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons
	Field: Conductivity, temperature, pH, turbidity, flow rate, dissolved oxygen	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons

The change to Section 11.3 was made due to inaccessibility and surface water inundation.

The changes to Section 11.4 were made due to a lack to relationship of the sampling points to the landfill surface water runoff.

In addition, the following Reporting requirement is added:

Addition of Section 12.7

12.7 **Site-Wide Water Balance**

Complete a site-wide water balance and assessment report for surface and groundwater monitoring. The report must be submitted to the Director for review and approval by the Director by October 1, 2022.

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

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

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

Yours truly,

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

ENCL: None

APPENDIX B

Chemistry Plots

1.0 SURFACE WATER

The following notes apply to Surface Water Figure B-1 to B-5:

- BC WQG = British Columbia Water Quality Guidelines, the most conservative values were used.
- Non-detectable results were plotted at the detection limit without fill.

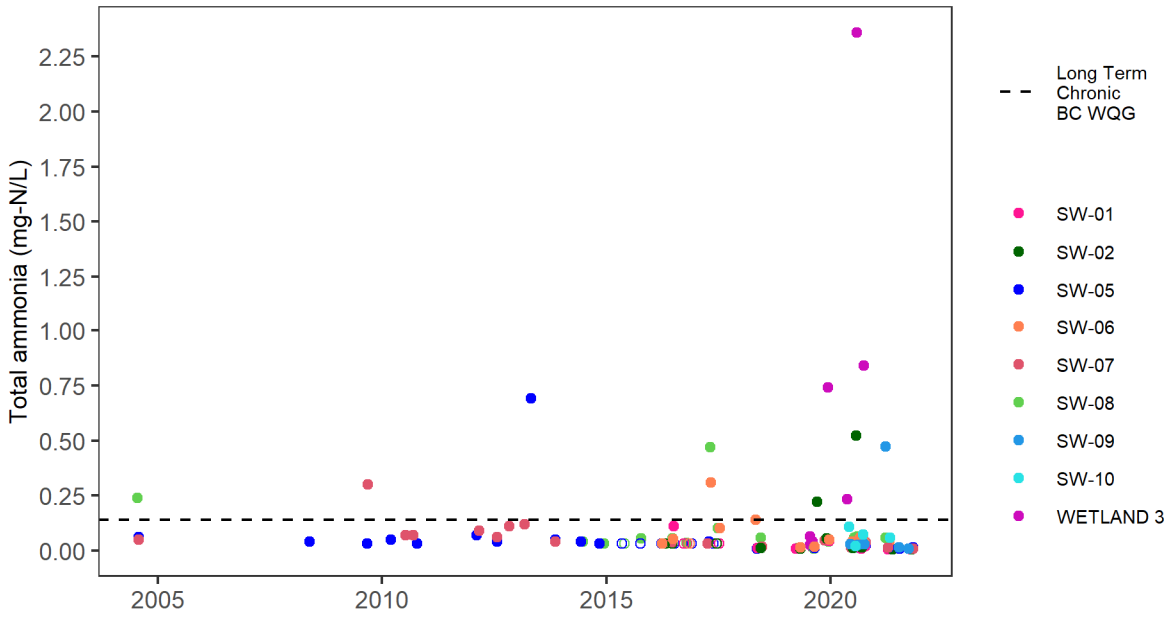

Figure B-1: Temporal plot of total ammonia surface water concentrations, 2004 to 2021.

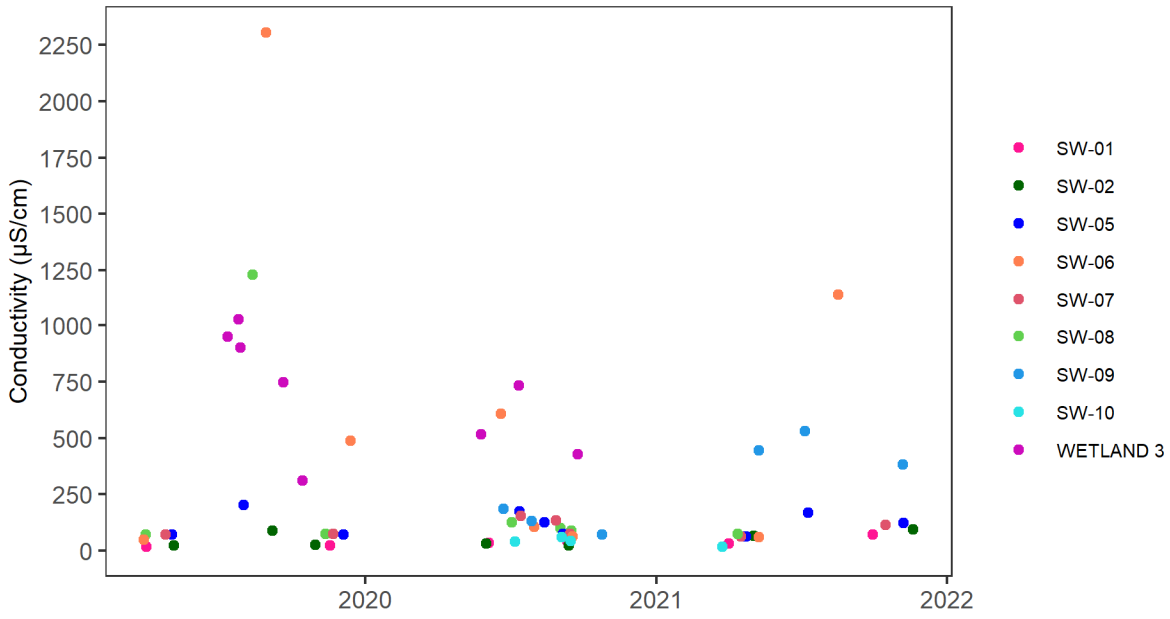

Figure B-2: Temporal plot of conductivity surface water concentrations, 2019 to 2021.

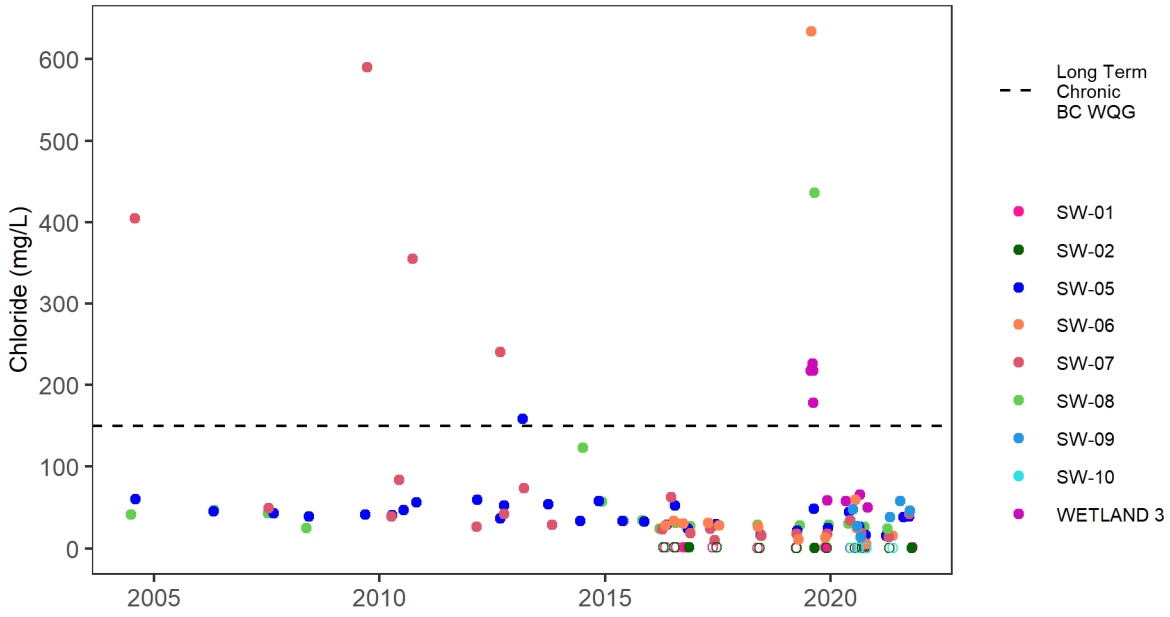

Figure B-3: Temporal plot of chloride surface water concentrations, 2004 to 2021.

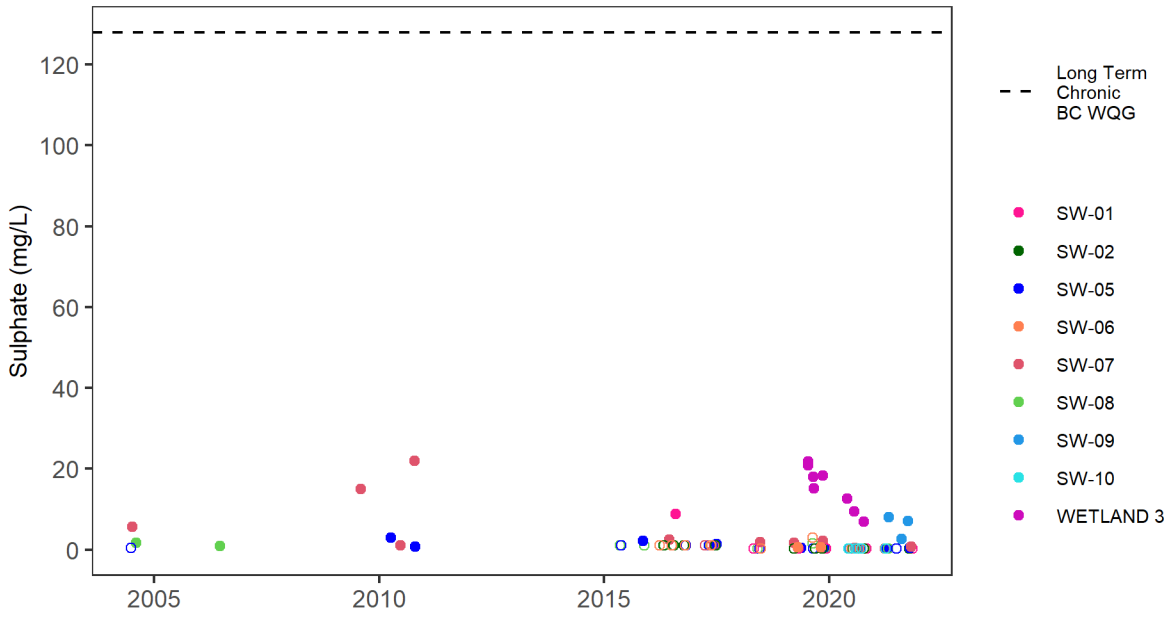

Figure B-4: Temporal plot of sulphate surface water concentrations, 2004 to 2021.

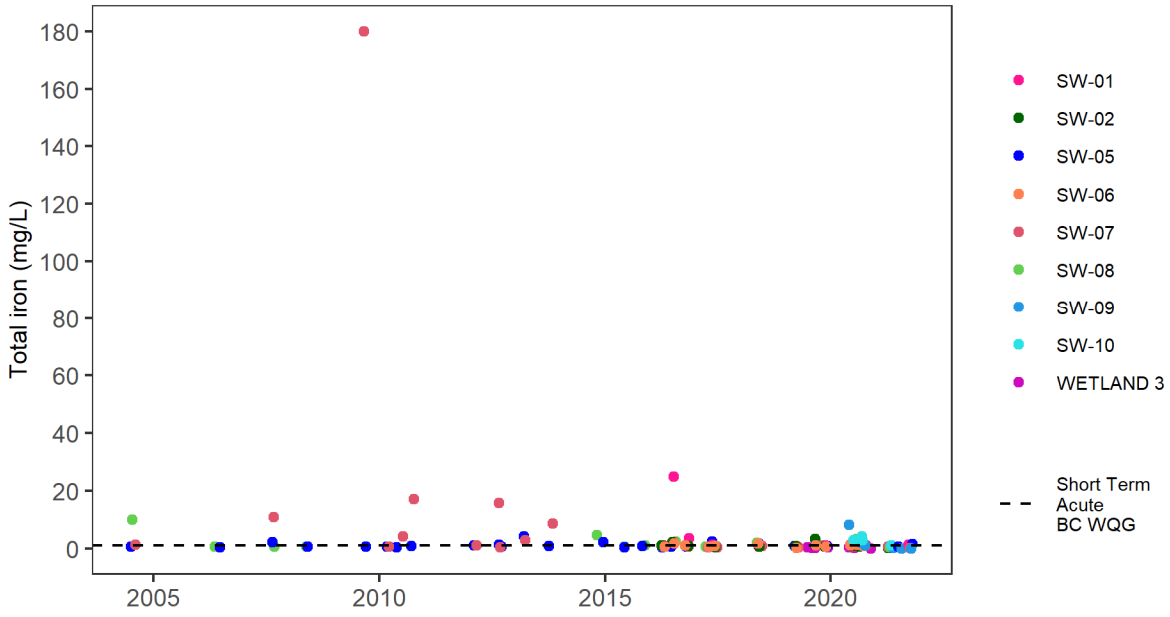

Figure B-5: Temporal plot of total iron surface water concentrations, 2004 to 2021.

2.0 GROUNDWATER

The following notes apply to Ground water Figures B-6 to B-10:

- BC CSR = British Columbia Contaminated Sites Regulation, the most conservative values were used.
- Non-detectable results were plotted at the detection limit without fill.

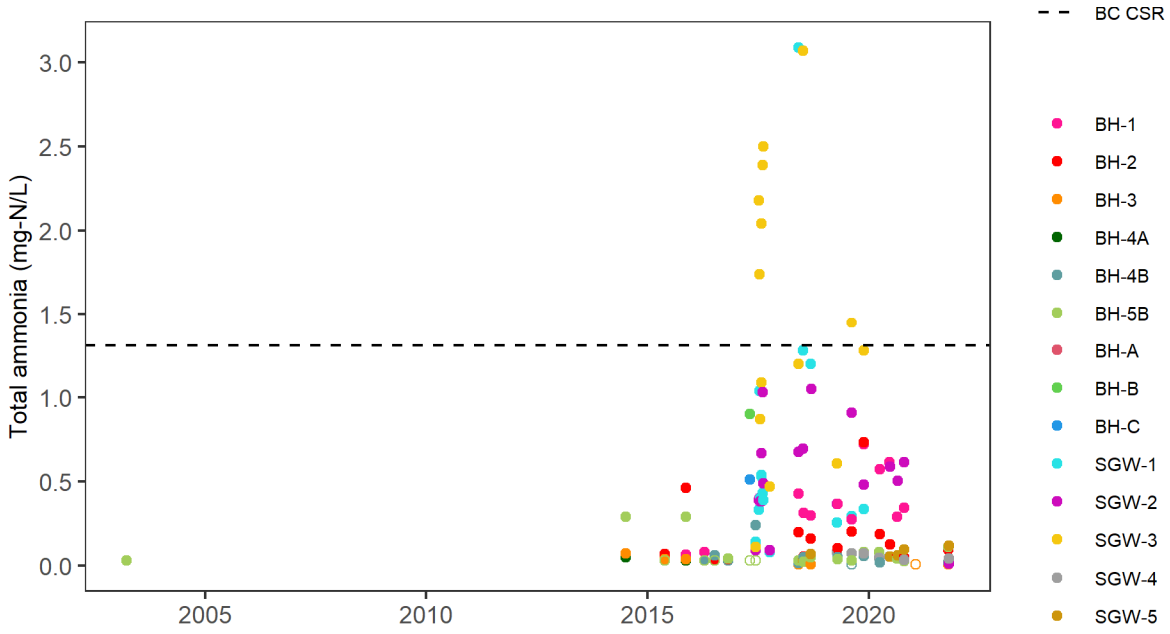

Figure B-6: Temporal plot of total ammonia ground water concentrations, 2003 to 2021.

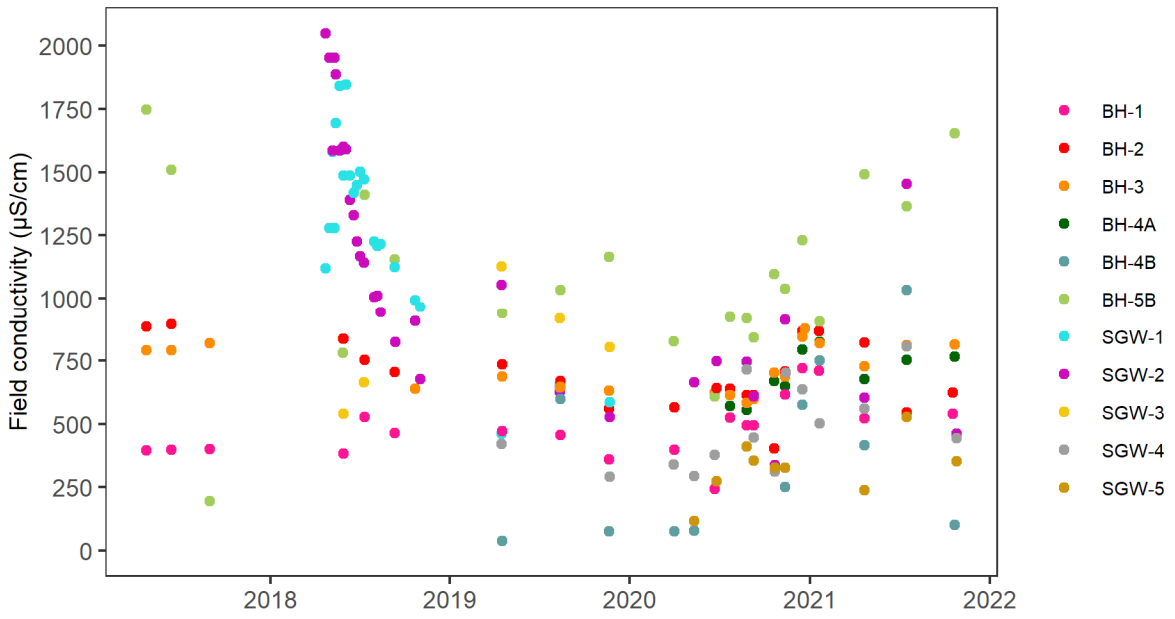

Figure B-7: Temporal plot of field conductivity ground water concentrations, 2017 to 2021.

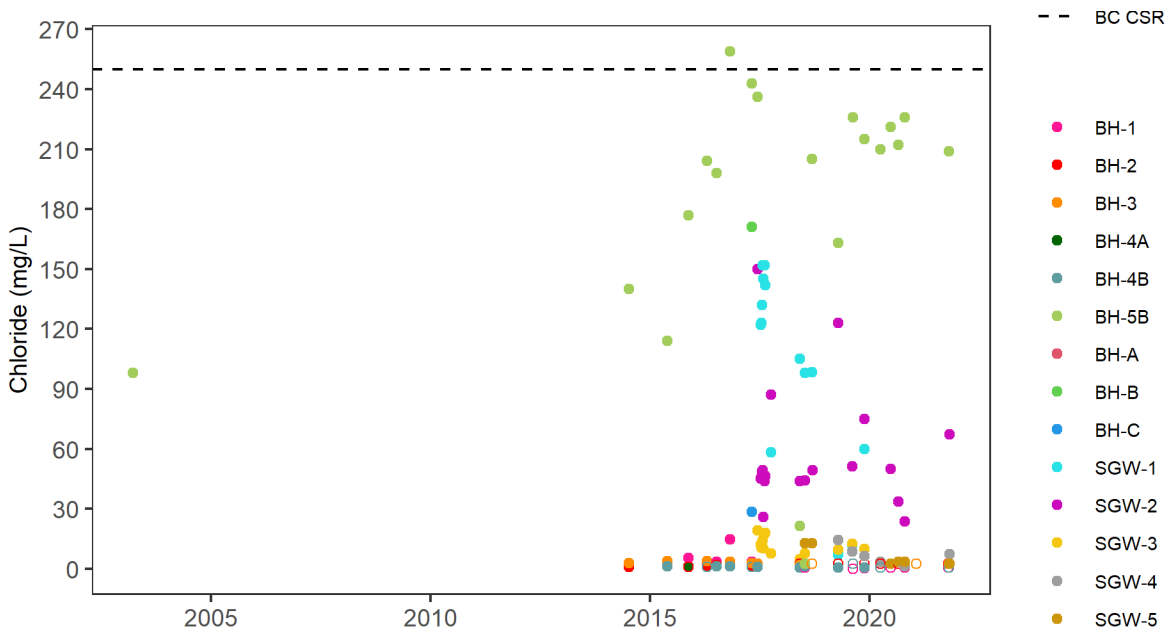

Figure B-8: Temporal plot of chloride ground water concentrations, 2003 to 2021.

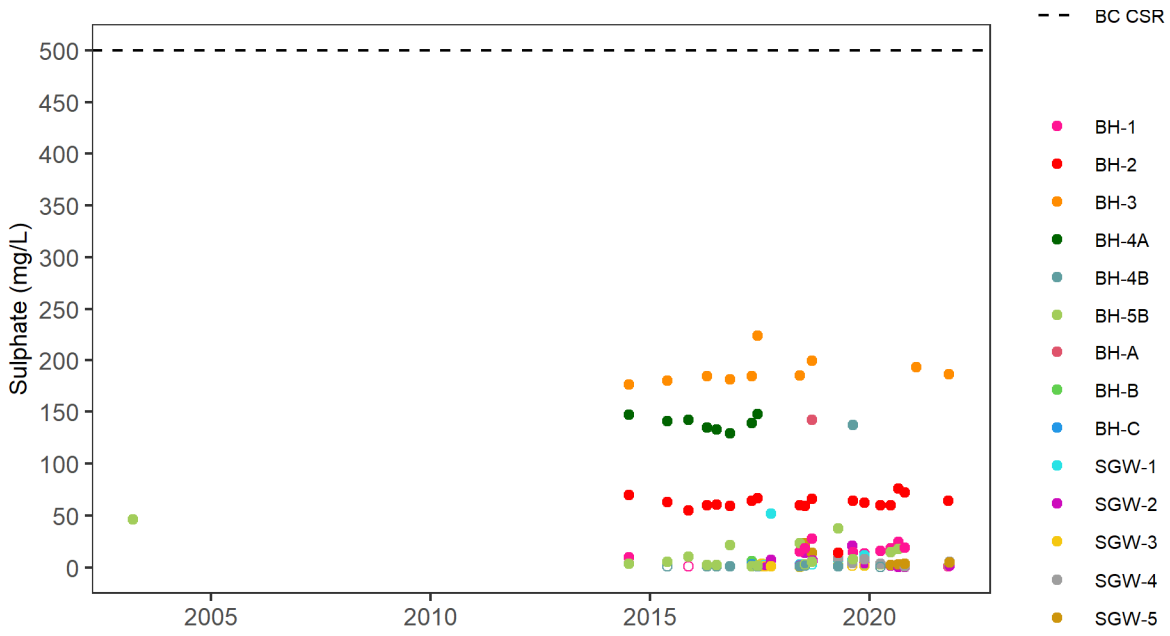

Figure B-9: Temporal plot of sulphate ground water concentrations, 2003 to 2021.

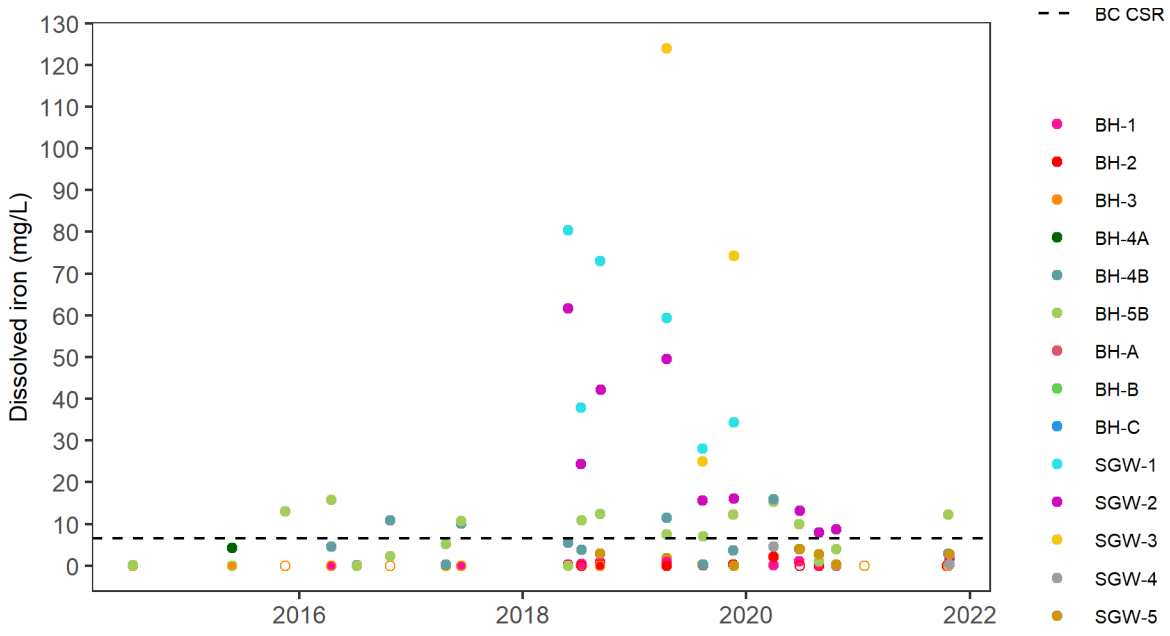

Figure B-10: Temporal plot of dissolved iron ground water concentrations, 2014 to 2021.

APPENDIX C

Analytical Data

1 - Surface Water Data

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-09	SW-09	SW-09	SW-09	SW-09	SW-09	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-10	SW-10
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-07-20	2021-10-26	2016-04-16	2016-07-07	2016-10-25	2017-06-14	2018-05-28	2019-04-16	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-10-22	2020-06-24	2020-08-20
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	**6.1** (Mn, Mx)	**6.3** (Mn, Mx)	**6.1** (Mn, Mx)	7.8	**9.3** (Mn, Mx)	7.9	-	-	-	-	-	**6.0** (Mn, Mx)	7.5	**6.3** (Mn, Mx)	**5.7** (Mn, Mx)	**5.8** (Mn, Mx)	**6.2** (Mn, Mx)	**6.1** (Mn, Mx)	6.7	**5.4** (Mn, Mx)
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	15	14	10	10	15	5.9	-	-	-	-	-	5.4	1.4	14	14	9.5	8.4	5.3	11	13
Dissolved oxygen	mg/L	8 [a]	5 [a]	**2.5** (Mn, Mx)	**3.2** (Mn, Mx)	**4.5** (Mn, Mx)	**6.6** (Mn)	**6.6** (Mn)	9.3	-	-	-	-	-	**6.3** (Mn)	**5.3** (Mn)	**2.8** (Mn, Mx)	**3.2** (Mn, Mx)	**3.2** (Mn, Mx)	**2.8** (Mn, Mx)	**1.6** (Mn, Mx)	**4.0** (Mn, Mx)	**3.6** (Mn, Mx)
Turbidity	NTU	-	-	-	2.9	3.8	2.4	1.4	0.32	-	-	-	-	-	8.0	17	-	4.9	5.0	2.9	2.9	-	5.3
Conductivity	µS/cm	-	-	184	130	70	444	531	383	-	-	-	-	-	17	23	34	40	39	31	71	38	60
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
pH, lab	-	6.5 - 9.0	6.5 - 9.0	6.7	6.9	7.1	8.1	8.2	8.4	**6.2** (Mn, Mx)	**5.2** (Mn, Mx)	6.5	**6.1** (Mn, Mx)	-	-	7.0	6.6	6.6	7.1	6.7	**6.4** (Mn, Mx)	**5.2** (Mn, Mx)	**5.8** (Mn, Mx)
Specific conductivity	µS/cm	-	-	231	166	96	629	669	600	34	44	51	44	-	-	38	37	50	53	44	66	48	47
Hardness, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-	18	41	23	22	16	11	17	-	-	-	-	31	-	-
Total alkalinity, as $CaCO_3$	mg/L	20 [a]	-	33	36	20	273	275	257	**17** (Mn)	**10** (Mn)	23	20	-	-	**15** (Mn)	**16** (Mn)	24	23	22	29	**3.6** (Mn)	**11** (Mn)
Total organic carbon	mg/L	-	-	38	34	40	12	16	12	12	42	18	1.0	-	-	18	18	16	22	11	19	118	66
Major Ions																							
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	17	14	10	71	68	63	-	-	-	-	-	-	5.0	5.2	7.0	7.4	5.4	8.6	9.6	10
Chloride	mg/L	150	600	47	27	14	38	58	46	<1.0	<1.0	1.5	<1.0	<0.5	<0.5	1.2	<0.5	<0.5	0.64	<0.5	1.2	<0.5	<0.5
Fluoride	mg/L	-	0.46 - 1.9 [d]	0.032	0.048	0.040	0.092	<0.1	0.091	-	-	-	-	-	0.028	0.027	0.024	0.034	0.035	0.029	0.031	0.027	0.044
Magnesium	mg/L	-	-	3.5	2.7	2.0	15	16	17	-	-	-	-	-	-	1.1	1.4	1.6	1.7	1.5	2.3	1.6	1.9
Potassium	mg/L	-	-	0.66	0.66	0.94	7.6	8.1	6.3	-	-	-	-	-	-	1.4	0.39	1.1	1.3	0.87	2.2	0.84	0.81
Sodium	mg/L	-	-	24	19	9.1	34	46	39	-	-	-	-	-	-	1.3	1.2	1.7	1.7	1.3	1.7	1.5	2.2
Sulphate	mg/L	128 - 429 [b, c]	-	<0.3	<0.3	<0.3	8.0	2.6	7.1	<1.0	8.8	<1.0	<1.0	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Nutrients																							
Nitrate	mg-N/L	3.0	33	<0.001	0.012	<0.005	1.3	0.27	0.10	0.014	0.010	<0.01	<0.01	0.0061	0.0086	<0.005	0.0057	<0.005	0.0051	<0.005	<0.005	0.011	<0.005
Nitrite	mg-N/L	0.020 - 0.20 [d]	0.060 - 0.60 [d]	<0.005	<0.001	<0.001	0.050	<0.005	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total ammonia	mg-N/L	0.14 - 2.1 [e]	0.70 - 28 [f]	0.030	0.024	0.027	0.47	0.014	0.0076	<0.03	0.11	<0.03	<0.03	0.012	0.0070	0.043	0.015	0.0086	0.021	0.0062	<0.005	0.11	0.019
Total Kjeldahl nitrogen	mg-N/L	-	-	1.3	1.2	1.0	1.1	0.82	0.52	-	-	-	-	-	-	1.3	1.0	0.55	0.37	0.39	0.74	5.2	1.9
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	0.25	0.056	<0.05	0.050	0.065	<0.05	0.090	1.7	0.10	0.062	0.075	0.078	0.097	0.061	<0.05	0.072	<0.05	0.19	0.082	0.069
Dissolved phosphorus	mg-P/L	-	-	0.072	0.059	0.063	<0.05	0.065	<0.05	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.13	0.071	<0.05
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	102	103	102	26	50	41	42	145	50	92	45	37	47	64	45	61	28	66	332	175
Total Metals																							
Aluminum	mg/L	-	-	0.43	0.19	0.46	0.23	0.059	0.018	0.33	11	0.28	0.16	0.12	0.84	1.6	0.15	0.25	0.63	0.18	0.25	0.83	0.91
Antimony	mg/L	0.0090	-	<0.0001	<0.0001	<0.0001	0.00014	0.00014	<0.0001	0.00010	0.00050	0.00030	<0.0001	<0.0001	0.00018	0.00022	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	0.0050	0.0046	0.0015	0.00099	0.00075	0.0011	0.00057	0.00080	**0.0064** (Mx)	0.0024	0.00078	0.00053	0.00054	0.00083	0.00040	0.00089	0.00084	0.00041	0.0011	0.0010	0.0012
Barium	mg/L	1.0	-	0.048	0.017	0.016	0.047	0.042	0.042	0.014	0.17	0.020	0.014	0.012	0.014	0.020	0.014	0.014	0.017	0.0089	0.014	0.028	0.033
Beryllium	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	**0.00030** (Mn)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	<0.01	<0.01	<0.01	0.30	0.45	0.29	0.0050	0.045	<0.004	0.0050	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	-	0.000062	0.0000093	0.000013	0.000016	0.000033	<0.000005	0.000070	0.0033	0.00017	0.000047	0.000048	0.000044	0.000056	0.000034	0.000016	0.000022	0.000011	0.000036	0.000057	0.000047
Calcium	mg/L	-	-	20	14	10	70	75	63	5.6	12	7.1	6.7	4.8	3.3	5.0	5.5	6.9	7.4	5.2	8.5	11	11
Cesium	mg/L	-	-	0.000022	<0.00001	0.000020	0.000020	<0.00001	<0.00001	-	-	-	-	<0.00001	0.000056	0.000084	<0.00001	0.000012	0.000039	<0.00001	0.000020	0.000012	0.000030
Chromium	mg/L	0.0010 [g]	-	0.00070	0.00052	0.00072	<0.0005	<0.0005	<0.0005	0.00070	**0.011** (Mn)	0.00090	0.00067	0.00040	0.00089	**0.0016** (Mn)	0.00044	0.00056	0.00085	<0.0005	0.00057	**0.0011** (Mn)	**0.0016** (Mn)
Cobalt	mg/L	0.0040	0.11	**0.0077** (Mn)	0.00058	0.00018	0.00044	0.00017	0.00011	0.00082	**0.013** (Mn)	0.0027	0.0011	0.00072	0.00045	0.00049	0.00026	0.00054	0.00063	0.00020	0.00081	0.00092	0.00093
Copper	mg/L	-	-	0.0015	0.00088	0.002	0.0014	0.00084	0.00060	0.0028	0.032	0.0017	0.0016	0.0012	0.0035	0.0071	0.0012	0.0021	0.0033	0.0022	0.0015	0.0014	0.0018
Iron	mg/L	-	1.0	**8.1** (Mx)	**1.9** (Mx)	**1.1** (Mx)	0.24	0.047	0.022	**1.1** (Mx)	**25** (Mx)	**3.5** (Mx)	**1.3** (Mx)	0.66	0.79	0.97	0.38	0.72	**1.0** (Mx)	0.36	**1.2** (Mx)	**2.9** (Mx)	**4.2** (Mx)
Lead	mg/L	0.0035 - 0.020 [b]	0.0051 - 0.42 [b]	0.00041	0.00016	0.00015	0.000086	<0.00005	<0.00005	0.00020	**0.0061** (Mn)	<0.0001	<0.0001	0.000059	0.00020	0.00037	<0.00005	0.000082	0.00018	0.000054	0.000074	0.00064	0.00030
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00020	0.0046	0.00010	0.00011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	3.9	2.9	2.1	15	17	16	1.1	2.8	1.4	1.2	1.1	0.79	1.3	1.4	1.7	1.8	1.5	2.3	1.7	2.1
Manganese	mg/L	0.77 - 2.4 [b]	0.82 - 3.4 [b]	**3.3** (Mn, Mx)	0.13	0.013	0.13	0.018	0.0073	0.18	**1.6** (Mn, Mx)	0.55	0.17	0.13	0.057	0.063	0.045	0.10	0.10	0.027	0.20	0.055	0.069
Mercury	mg/L	0.000010	-	<0.000005	<0.000005	0.0000076	<0.000005	<0.000005	<0.000005	<0.00002 [UL>MH]	<0.00002 [UL>MH]	<0.00002 [UL>MH]	<0.00002 [UL>MH]	<0.000005	0.0000091	**0.000012** (Mn)	<0.000005	<0.000005	<0.000005	<0.000005	0.0000084	0.0000059	<0.000005
Molybdenum	mg/L	7.6	46	0.00022	0.00017	0.00016	0.00057	0.0010	0.00045	0.00020	0.0019	0.00020	0.00012	0.00015	0.00011	0.00011	0.000063	0.00012	0.00010	0.000087	0.000079	0.00026	0.000090
Nickel	mg/L	0.025 - 0.15 [b]	-	0.0017	0.0013	0.0013	0.0030	0.0033	0.0024	0.0011	0.016	0.0016	0.0011	0.0011	0.0013	0.0018	0.00059	0.0012	0.0016	0.00071	0.0012	0.0019	0.0023
Potassium	mg/L	-	-	0.75	0.58	0.94	7.4	7.8	6.0	0.79	1.7	1.1	0.66	0.17	0.59	1.4	0.44	1.1	1.4	0.81	2.3	0.93	1.1
Rubidium	mg/L	-	-	0.00070	0.00048	0.00074	0.0013	0.0013	0.00079	-	-	-	-	0.00025	0.00075	0.0015	0.00064	0.0010	0.0012	0.00059	0.0027	0.0012	0.0020
Selenium	mg/L	0.0020	-	0.00012	0.000082	0.00011	0.000064	0.000070	0.000070	<0.0005	<0.0005	<0.0005	<0.0005	<0.00005	0.000073	0.000071	0.000055	0.000071	0.00011	0.000084	0.000088	0.00012	0.00030
Silicon	mg/L	-	-	1.9	2.7	4.1	3.4	4.6	3.0	3.7	15	4.8	3.5	1.6	3.6	6.3	2.5	4.4	4.8	2.8	4.4	4.0	5.4
Silver	mg/L	0.000050 - 0.0015 [b]	0.00010 - 0.0030 [b]	0.000015	<0.00001	0.000015	<0.00001	<0.00001	<0.00001	<0.00005	**0.00026** (Mn, Mx)	<0.00005	<0.00005	<0.00001	0.000018	0.000027	<0.00001	<0.00001	0.000019	<0.00001	0.000015	<0.00001	0.000016
Sodium	mg/L	-	-	25	19	8.9	33	45	38	1.5	1.1	1.5	1.5	1.5	1.1	1.4	1.3	1.8	1.7	1.3	1.8	1.5	2.1
Strontium	mg/L	-	-	0.13	0.087	0.067	0.46	0.47	0.42	0.038	0.082	0.060	0.042	0.034	0.023	0.035	0.041	0.048	0.050	0.038	0.054	0.075	0.077
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	2.9	1.4	2.8	<1.0	3.0	<1.0	<3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	0.00080	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	0.000050	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	0.0052	0.0024	0.0059	0.0021	0.00071	0.00031	0.0070	0.12	<0.005	<0.005	0.0013	0.013	0.030	0.0020	0.0034	<0.009	0.0025	0.0039	0.013	0.015
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0085	-	0.000021	0.000014	0.000022	0.00039	0.00056	0.00036	<0.00002	0.00027	<0.00002	<0.00002	<0.00001	0.000022	0.000044	<0.00001	<0.00001	<0.00001	0.000021	<0.00001	0.000013	0.000035	0.00020
Vanadium	mg/L	-	-	0.0019	0.00058	0.00088	<0.0005	<0.0005	<0.0005	<0.001	0.024	0.0010	<0.001	<0.0005	0.0017	0.0029	<0.0005	0.00053	0.0010	<0.0005	0.00053	0.0017	0.0024
Zinc	mg/L	0.0075 - 0.19 [b]	0.033 - 0.27 [b]	**0.023** (Mn)	**0.0088** (Mn)	**0.0078** (Mn)	<0.003	<0.003	<0.003	**0.0080** (Mn)	**0.056** (Mn, Mx)	**0.0080** (Mn)	0.0051	0.0033	0.0065	**0.0096** (Mn)	0.0056	0.0046	**0.013** (Mn)	0.0034	**0.0078** (Mn)	0.0072	0.0070
Zirconium	mg/L	-	-	0.00029	0.00026	<0.0006	<0.0002	<0.0002	<0.0002	0.00030	0.00090	0.00020	0.00020	0.00015	<0.0009	<0.0012	0.00022	0.00031	0.00033	0.00023	0.0013	0.00058	0.00088

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-10	SW-10	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-5	SW-5	SW-5	SW-5	SW-5
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-09-30	2021-04-21	2016-04-16	2016-07-07	2016-10-25	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-10-22	2004-07-26	2006-05-25	2007-08-08	2008-06-10	2009-08-25
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	**5.0**(Mn, Mx)	**5.6**(Mn, Mx)	-	-	-	-	-	**6.0**(Mn, Mx)	**5.6**(Mn, Mx)	7.4	**5.9**(Mn, Mx)	**5.9**(Mn, Mx)	**6.0**(Mn, Mx)	6.5	**6.2**(Mn, Mx)	-	-	-	-	-
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	8.8	1.1	-	-	-	-	-	3.6	17	1.6	18	14	9.8	4.6	5.2	-	-	-	-	-
Dissolved oxygen	mg/L	8[a]	5[a]	**1.0**(Mn, Mx)	**2.5**(Mn, Mx)	-	-	-	-	-	**2.6**(Mn, Mx)	**0.20**(Mn, Mx)	**2.5**(Mn, Mx)	**2.1**(Mn, Mx)	**3.7**(Mn, Mx)	**3.1**(Mn, Mx)	**3.2**(Mn, Mx)	**0.30**(Mn, Mx)	-	-	-	-	-
Turbidity	NTU	-	-	14	4.9	-	-	-	-	-	5.6	38	3.5	-	2.7	1.2	2.5	3.7	-	-	-	-	-
Conductivity	µS/cm	-	-	42	17	-	-	-	-	-	22	89	24	30	23	-	65	93	-	-	-	-	-
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
pH, lab	-	6.5 - 9.0	6.5 - 9.0	**6.1**(Mn, Mx)	**6.0**(Mn, Mx)	**6.4**(Mn, Mx)	**6.3**(Mn, Mx)	7.0	6.6	-	-	7.1	7.2	6.5	6.5	7.0	7.0	6.7	6.5	6.6	6.5	**6.2**(Mn, Mx)	6.9
Specific conductivity	µS/cm	-	-	36	25	44	45	64	33	-	-	-	40	24	30	37	98	132	257	176	193	149	173
Hardness, as $CaCO_3$	mg/L	-	-	-	-	22	21	26	14	12	11	33	15	-	-	-	45	-	-	-	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	**9.5**(Min)	**7.7**(Min)	21	22	31	**17**(Min)	-	-	-	21	**11**(Min)	**13**(Min)	**16**(Min)	52	55	24	21	28	22	20
Total organic carbon	mg/L	-	-	57	22	9.4	9.1	10	1.3	-	-	-	12	11	8.8	14	11	44	-	-	-	-	-
Major Ions																							
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	7.5	3.3	-	-	-	-	-	-	-	3.9	3.5	4.2	4.7	13	18	-	-	-	-	-
Chloride	mg/L	150	600	<0.5	<0.5	<1.0	<1.0	1.0	<1.0	<0.5	<0.5	0.57	<0.5	<0.5	<0.5	<0.5	<0.5	0.66	60	45	43	39	41
Fluoride	mg/L	-	0.46 - 1.9[c]	0.044	0.028	-	-	-	-	-	0.028	0.025	<0.02	<0.02	<0.02	<0.02	0.044	<0.072	-	-	-	-	-
Magnesium	mg/L	-	-	1.6	0.79	-	-	-	-	-	-	-	1.2	0.83	0.97	1.1	3.2	5.0	-	-	-	-	-
Potassium	mg/L	-	-	1.4	0.78	-	-	-	-	-	-	-	3.3	0.23	1.1	2.7	0.41	6.2	-	-	-	-	-
Sodium	mg/L	-	-	1.5	1.1	-	-	-	-	-	-	-	0.49	0.43	0.18	0.70	2.3	2.4	-	-	-	-	-
Sulphate	mg/L	128 - 429[b, c]	-	<0.3	<0.3	<1.0	<1.0	<1.0	<1.0	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.33	<0.5	-	-	-	-
Nutrients																							
Nitrate	mg-N/L	3.0	33	0.0062	<0.005	0.011	<0.01	0.012	<0.01	<0.005	0.0086	<0.005	<0.005	<0.005	<0.005	0.0065	0.018	0.012	-	-	-	-	-
Nitrite	mg-N/L	0.020 - 0.20[d]	0.060 - 0.60[d]	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-
Total ammonia	mg-N/L	0.14 - 2.1[e]	0.70 - 28[f]	0.072	0.059	<0.03	<0.03	<0.03	<0.03	0.011	0.0070	0.22	0.055	0.0095	0.52	0.013	0.0059	0.0064	0.060	-	-	0.040	0.030
Total Kjeldahl nitrogen	mg-N/L	-	-	1.4	0.77	-	-	-	-	-	-	-	1.8	0.70	0.37	0.48	0.28	1.5	0.88	0.96	1.2	0.93	0.82
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	0.17	0.18	0.070	0.11	0.14	<0.05	0.079	0.078	0.35	0.21	0.17	0.10	0.30	<0.05	0.83	<0.1	-	-	-	-
Dissolved phosphorus	mg-P/L	-	-	0.25	0.14	-	-	-	-	-	-	-	0.16	<0.05	0.070	0.072	<0.05	0.82	-	-	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	145	71	33	38	35	46	27	37	145	43	49	44	36	26	168	73	61	88	74	81
Total Metals																							
Aluminum	mg/L	-	-	1.9	0.43	0.48	1.6	0.031	0.047	0.033	0.84	1.8	0.19	0.070	0.018	0.13	0.18	0.21	0.070	0.20	0.24	0.19	0.36
Antimony	mg/L	0.0090	-	<0.0001	<0.0001	0.00020	0.00040	0.00020	<0.0001	<0.0001	0.00018	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00012	<0.05(DL>Mn)	-	-	-	-
Arsenic	mg/L	-	0.0050	0.0014	0.00038	0.0010	0.0015	0.00090	0.00066	0.00048	0.00054	0.0013	0.00059	0.00049	0.00037	0.00070	0.00029	0.0032	<0.05(DL>Mx)	-	-	0.00070	0.0010
Barium	mg/L	1.0	-	0.024	0.0092	0.014	0.024	0.014	0.0069	0.0083	0.014	0.049	0.0089	0.011	0.0062	0.010	0.010	0.020	0.024	0.014	0.024	0.018	0.016
Beryllium	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002(DL>Mn)	-	-	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.05	-	-	-	-
Boron	mg/L	1.2	-	<0.01	<0.01	0.0040	0.015	<0.004	0.0050	<0.01	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	0.012	<0.008	-	-	-	-
Cadmium	mg/L	-	-	0.000030	0.000021	0.000040	0.00051	0.000040	0.000027	0.0000052	0.000044	0.00035	0.00011	0.000056	0.000018	0.000040	0.000011	0.000099	<0.002	-	-	0.000060	0.000020
Calcium	mg/L	-	-	7.1	3.3	6.2	6.2	7.3	4.0	3.4	3.3	9.3	4.1	4.0	4.0	4.5	13	17	16	13	13	12	11
Cesium	mg/L	-	-	0.000091	0.000022	-	-	-	-	<0.00001	0.000056	0.00017	0.000011	<0.00001	<0.00001	0.000010	<0.00001	0.000012	-	-	-	-	-
Chromium	mg/L	0.0010[g]	-	**0.0019**(Mn)	<0.0005	0.00070	**0.0021**(Mn)	<0.0005	<0.0005	0.00018	0.00089	**0.0016**(Mn)	0.00031	0.00014	<0.0001	0.00029	<0.0005	0.00050	<0.005(DL>Mn)	-	-	0.0010	-
Cobalt	mg/L	0.0040	0.11	0.00097	0.00030	0.00068	0.00082	0.00022	0.00014	0.00030	0.00045	0.0012	0.00025	0.00052	0.00016	0.00054	0.00011	0.00087	<0.005(DL>Mn)	-	-	-	-
Copper	mg/L	-	-	0.0032	0.0013	0.004	0.0066	0.00040	0.00075	<0.0005	0.0035	0.0059	0.0014	0.00068	<0.0005	0.00056	0.0013	0.0031	<0.005	-	0.0070	0.0023	0.0067
Iron	mg/L	-	1.0	**2.9**(Mx)	**1.1**(Mx)	**1.1**(Mx)	**2.1**(Mx)	0.84	0.31	0.54	0.79	**3.3**(Mx)	0.53	0.81	0.55	**1.2**(Mx)	0.21	**1.5**(Mx)	0.62	0.42	**2.1**(Mx)	0.50	0.67
Lead	mg/L	0.0035 - 0.020[b]	0.0051 - 0.42[b]	0.00054	0.00018	0.00030	0.00060	<0.0001	<0.0001	<0.00005	0.00020	0.00066	0.00018	0.00014	<0.00005	<0.00005	<0.00005	0.00014	<0.03(DL>Mn)	-	-	-	0.00040
Lithium	mg/L	-	-	<0.001	<0.001	0.00030	0.00080	0.00010	0.00010	<0.001	<0.001	0.0014	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-
Magnesium	mg/L	-	-	1.6	0.80	1.5	1.3	1.9	0.89	0.79	0.79	2.4	1.3	0.85	0.98	1.1	3.3	5.0	3.3	2.6	2.5	2.4	2.6
Manganese	mg/L	0.77 - 2.4[b]	0.82 - 3.4[b]	0.057	0.028	0.13	0.12	0.10	0.030	0.12	0.057	0.26	0.18	0.18	0.051	0.20	0.0084	0.25	0.060	0.021	0.17	0.050	0.041
Mercury	mg/L	0.000010	-	**0.000016**(Min)	**0.000011**(Min)	<0.00002(DL>Mn)	<0.00002(DL>Mn)	<0.00002(DL>Mn)	<0.00002(DL>Mn)	<0.000005	0.0000091	<0.000025(DL>Mn)	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.0000062	<0.00005(DL>Mn)	-	-	-	-
Molybdenum	mg/L	7.6	46	0.00028	<0.00005	0.00020	0.00020	<0.0001	<0.0001	0.000095	0.00011	0.00019	0.00014	0.00019	0.00014	0.00036	0.000057	0.000073	<0.005	-	-	-	-
Nickel	mg/L	0.025 - 0.15[b]	-	0.0029	0.00072	0.0012	0.0021	0.00020	<0.0002	<0.0005	0.0013	0.0028	<0.0005	<0.0005	<0.0005	<0.0005	0.00054	0.0011	<0.008	-	-	0.0010	-
Potassium	mg/L	-	-	1.0	0.73	0.93	0.89	3.2	0.86	0.73	0.59	1.8	3.3	0.31	1.1	2.7	0.42	6.1	<1.0	-	-	0.71	0.32
Rubidium	mg/L	-	-	0.0015	0.0010	-	-	-	-	0.00049	0.00075	0.0024	0.0015	0.00023	0.00071	0.0016	0.00023	0.0017	-	-	-	-	-
Selenium	mg/L	0.0020	-	0.00018	0.000076	<0.0005	<0.0005	<0.0005	<0.0005	<0.00005	0.000073	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000086	0.00013	<0.03(DL>Mn)	-	-	-	-
Silicon	mg/L	-	-	6.9	2.7	4.8	5.0	2.7	2.0	1.6	3.6	4.4	1.4	1.1	0.92	1.7	4.2	3.7	<0.01	0.36	0.41	0.49	0.55
Silver	mg/L	0.000050 - 0.0015[b]	0.00010 - 0.0030[b]	0.000036	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	0.000018	0.000028	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000033	**32**(Mn, Mx)	-	-	0.0000060	-
Sodium	mg/L	-	-	1.6	1.1	1.8	1.0	1.2	0.72	0.80	1.1	1.1	0.49	0.47	0.17	0.72	2.4	2.5	0.11	22	23	16	22
Strontium	mg/L	-	-	0.048	0.025	0.040	0.035	0.055	0.026	0.023	0.023	0.066	0.025	0.027	0.028	0.030	0.072	0.084	0.30	0.076	0.090	0.075	0.080
Sulphur	mg/L	-	-	<0.5	<0.5	<1.0	<1.0	<1.0	<3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	0.30	0.70	-	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Thallium	mg/L	0.00080	-	<0.00001	<0.00001	<0.00002	<0.00002	<0.00002	0.000048	<0.00001	<0.00001	0.000016	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.03(DL>Mn)	-	-	-	-
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.02	-	-	-	-
Titanium	mg/L	-	-	0.032	0.0067	0.0090	0.034	<0.005	<0.005	0.00096	0.013	0.022	0.0073	0.0019	0.00046	0.0035	0.0027	0.0049	<0.003	-	-	-	0.010
Tungsten	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Uranium	mg/L	0.0085	-	0.000088	0.000032	<0.00002	0.000030	<0.00002	<0.00002	<0.00001	0.000022	0.000022	<0.00001	<0.00001	<0.00001	<0.00001	0.000011	0.000051	-	-	-	-	-
Vanadium	mg/L	-	-	0.0034	0.00083	0.0020	0.0030	<0.001	<0.001	<0.0005	0.0017	0.0031	0.00098	<0.0005	<0.0005	<0.0005	<0.0005	0.00074	<0.005	-	-	-	-
Zinc	mg/L	0.0075 - 0.19[b]	0.033 - 0.27[b]	**0.0081**(Mn)	0.0036	0.0060	**0.0090**(Mn)	**0.0090**(Mn)	<0.004	0.0054	0.0065	**0.024**(Mn)	**0.016**(Mn)	**0.015**(Mn)	**0.012**(Mn)	**0.022**(Mn)	<0.003	**0.020**(Mn)	<0.005	**0.010**(Mn)	0.023	**0.014**(Mn)	0.010
Zirconium	mg/L	-	-	0.00049	0.00029	0.00030	0.0014	<0.0001	<0.0001	<0.00006	<0.0009	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00030	0.00071	<0.005	-	-	-	-

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2010-03-16	2010-06-22	2010-09-30	2012-02-28	2012-08-14	2012-10-04	2013-03-27	2013-10-17	2014-07-07	2014-11-25	2015-05-26	2015-11-01	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21
Field Measured																								
pH	-	6.5 - 9.0	6.5 - 9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.9 (Mn, Mx)	6.4 (Mn, Mx)	6.8
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	17	1.2
Dissolved oxygen	mg/L	8 [a]	5 [a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.0 (Mn)	1.6 (Mn, Mx)	7.1 (Mn)
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.6	4.9	7.4
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	202	72
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																								
pH, lab	-	6.5 - 9.0	6.5 - 9.0	6.1 (Mn, Mx)	6.3 (Mn, Mx)	6.7	5.9 (Mn, Mx)	6.4 (Mn, Mx)	6.4 (Mn, Mx)	5.9 (Mn, Mx)	6.6	6.5	6.0 (Mn, Mx)	6.3 (Mn, Mx)	6.1 (Mn, Mx)	6.4 (Mn, Mx)	6.3 (Mn, Mx)	6.7	6.3 (Mn, Mx)	6.6	-	-	7.2	7.1
Specific conductivity	µS/cm	-	-	187	220	259	243	182	261	602	278	162	271	136	162	130	219	119	152	170	-	-	-	132
Hardness, as $CaCO_3$	mg/L	-	-	41	46	50	43	40	46	-	49	-	59	33	42	35	46	33	33	51	32	29	50	36
Total alkalinity, as $CaCO_3$	mg/L	20 [a]	-	21	23	32	19 (Mn)	23	34	45	44	17 (Mn)	35	16 (Mn)	23	17 (Mn)	22	21	21	34	-	-	-	20 (Mn)
Total organic carbon	mg/L	-	-	-	-	-	-	-	-	-	-	25	-	-	-	36	30	41	23	24	-	-	-	41
Major Ions																								
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	11
Chloride	mg/L	150	600	41	47	56	59	37	52	158 (Mn)	54	34	58	34	33	29	52	24	29	30	16	22	49	25
Fluoride	mg/L	-	0.46 - 1.9 [b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.031	0.038	0.024
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	2.3	-	-	-	-	-	-	-	-	-	-	-	2.4
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	0.059	-	-	-	-	-	-	-	-	-	-	-	0.69
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	13
Sulphate	mg/L	128 - 429 [b, c]	-	2.9	-	0.80	-	-	-	-	-	-	-	<1.0	2.1	<1.0	<1.0	<1.0	<1.0	1.4	<0.3	0.36	<0.3	0.55
Nutrients																								
Nitrate	mg-N/L	3.0	33	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	0.010	0.014	0.013	0.014	<0.005	<0.005	0.0059	<0.005
Nitrite	mg-N/L	0.020 - 0.20 [d]	0.060 - 0.60 [d]	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
Total ammonia	mg-N/L	0.14 - 2.1 [e]	0.70 - 28 [f]	0.050	-	0.030	0.070	0.040	-	0.69	0.050	0.040	0.030	<0.03	<0.03	<0.03	<0.03	<0.03	0.039	<0.03	0.0085	0.0086	0.012	0.046
Total Kjeldahl nitrogen	mg-N/L	-	-	0.90	1.4	1.3	0.72	2.2	1.4	2.8	1.2	1.0	1.4	1.1	1.2	-	-	-	-	-	-	-	-	1.5
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	-	-	-	-	0.18	0.080	0.22	0.058	-	0.087	0.049	0.030	<0.02	0.030	<0.02	0.077	0.069	0.083	<0.05	0.052	<0.05
Dissolved phosphorus	mg-P/L	-	-	-	-	-	-	-	-	-	-	0.015	-	-	-	-	-	-	-	-	-	-	-	<0.05
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	53	91	64	-	120	74	126	65	69	71	83	107	87	70	86	74	80	69	74	59	100
Total Metals																								
Aluminum	mg/L	-	-	0.24	0.12	0.050	0.32	0.33	0.22	1.2	0.23	-	0.35	0.26	0.27	0.22	0.10	0.30	0.24	1.4	0.62	0.36	0.20	0.58
Antimony	mg/L	0.0090	-	-	0.000080	-	0.000060	-	-	-	-	-	-	0.00010	<0.0001	<0.0001	<0.0001	0.00020	<0.0001	0.00018	<0.0001	0.00011	<0.0001	0.00010
Arsenic	mg/L	-	0.0050	0.00040	0.00093	0.00060	0.00058	0.0010	0.00066	0.0012	0.00055	-	0.00080	0.00060	<0.0005	0.00060	0.00070	0.00060	0.00094	0.0021	0.0022	0.00081	0.0014	0.00069
Barium	mg/L	1.0	-	0.019	0.016	0.024	0.022	0.020	0.021	0.066	0.019	-	0.031	0.011	0.015	0.010	0.023	0.015	0.018	0.033	0.019	0.012	0.024	0.017
Beryllium	mg/L	0.00013	-	-	0.000010	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	-	-	-	-	-	-	-	-	-	-	0.0090	0.0060	0.0070	0.0080	0.091	0.010	0.038	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	-	0.000040	0.00030	-	0.000044	0.00015	0.000023	0.000071	0.000012	-	0.000021	0.000090	0.000020	0.00021	<0.00001	0.000040	0.000011	0.000025	0.000020	0.000014	0.0000072	0.000015
Calcium	mg/L	-	-	12	13	15	13	12	13	31	15	-	17	9.4	13	10	15	9.4	9.8	15	9.4	8.6	15	11
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000057	0.000016	0.000016	0.000030
Chromium	mg/L	0.0010 [g]	-	-	0.00080	-	0.00080	-	-	0.0015 (Mn)	-	-	-	0.00050	0.00060	0.00050	<0.0005	0.00060	0.00053	0.0017 (Mn)	0.00087	0.00048	0.00030	0.00068
Cobalt	mg/L	0.0040	0.11	-	0.00016	-	0.00031	0.00083	-	0.0016	-	-	0.0013	0.00014	0.00029	0.00014	0.00024	0.00015	0.00045	0.00099	0.00098	0.00030	0.00043	0.00025
Copper	mg/L	-	-	0.0021	0.0033	0.0014	0.0027	0.0023	0.0017	0.0034	0.0012	-	0.0023	0.0028	0.0016	0.0036	0.00040	0.0016	0.0023	0.0045	0.0021	0.002	0.00084	0.0027
Iron	mg/L	-	1.0	0.60	0.31	0.79	1.1 (Mx)	1.2 (Mx)	0.61	4.3 (Mx)	0.73	-	2.1 (Mx)	0.43	0.82	0.42	0.54	0.65	0.86	2.5 (Mx)	1.6 (Mx)	0.73	1.0	0.91
Lead	mg/L	0.0035 - 0.020 [b]	0.0051 - 0.42 [b]	0.00050	0.00019	-	0.00027	0.00050	0.00029	0.0014	0.00020	-	0.00032	0.00010	0.00010	0.00030	<0.0001	0.00010	0.00030	0.0016	0.00060	0.00018	0.00023	0.00024
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00030	0.00030	0.00020	0.00030	0.00030	0.00020	0.0011	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	2.6	3.1	3.1	2.6	2.5	3.2	5.9	2.9	-	3.7	2.4	2.7	2.3	2.3	2.3	2.2	3.3	2.1	1.9	3.0	2.5
Manganese	mg/L	0.77 - 2.4 [b]	0.82 - 3.4 [b]	0.067	0.015	0.075	0.074	0.19	0.11	0.53	0.076	-	0.65	0.032	0.071	0.026	0.060	0.031	0.13	0.17	0.24	0.052	0.11	0.028
Mercury	mg/L	0.000010	-	-	-	-	-	-	-	-	-	-	-	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.00002 (DL>Mri)	<0.000005	0.0000060	<0.000005	0.0000088
Molybdenum	mg/L	7.6	46	-	0.00011	-	0.00092	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	0.00018	0.00023	0.00011	0.000086	<0.00005	0.000089
Nickel	mg/L	0.025 - 0.15 [b]	-	-	0.00098	0.0010	0.0011	-	-	0.0022	-	-	0.0014	0.00090	0.0013	0.0010	0.00050	0.00080	0.00097	0.0025	0.0016	0.00083	0.00093	0.0012
Potassium	mg/L	-	-	0.85	0.48	1.4	0.80	0.64	1.5	2.0	0.85	-	1.2	0.52	0.39	0.51	0.11	0.48	2.5	1.3	1.1	0.96	0.41	0.67
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00091	0.00056	0.00048	0.00050
Selenium	mg/L	0.0020	-	-	0.000060	-	0.000070	-	-	-	-	-	-	0.00060	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000054	0.000066	0.000054	0.000097
Silicon	mg/L	-	-	3.0	-	0.14	4.2	0.48	1.2	6.2	1.8	-	3.2	1.4	3.0	1.1	0.60	2.9	1.6	3.6	2.4	2.9	1.0	4.0
Silver	mg/L	0.000050 - 0.0015 [b]	0.00010 - 0.0030 [b]	-	-	-	0.0000060	-	-	0.000024	-	-	0.000026	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	0.000014
Sodium	mg/L	-	-	20	28	30	28	21	39	76	41	-	30	16	15	17	22	12	17	14	9.1	12	21	14
Strontium	mg/L	-	-	0.076	0.092	0.11	0.077	0.083	0.11	0.20	0.067	-	0.11	0.063	0.068	0.057	0.090	0.070	0.064	0.093	0.065	0.047	0.10	0.068
Sulphur	mg/L	-	-	3.0	-	-	-	-	-	-	-	-	-	4.0	<1.0	<1.0	1.0	<1.0	<3.0	<3.0	<0.5	<0.5	<0.5	<0.5
Tellurium	mg/L	-	-	-	-	-	-	-	-	<0.0002	<0.0002	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	0.00080	-	-	-	-	0.0000040	-	-	-	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	-	-	-	-	-	-	<0.0001	<0.0001	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	-	-	-	0.000030	-	0.00020	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	0.0013	-	-	0.0064	-	0.016	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.023	0.0085	0.0042	<0.0039	0.0070
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0085	-	-	0.0000070	-	0.000014	-	-	-	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.000028	0.000017	0.000018	<0.00001	0.000023
Vanadium	mg/L	-	-	-	-	-	0.00070	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0033	0.0014	0.00082	0.00072	0.0012
Zinc	mg/L	0.0075 - 0.19 [b]	0.033 - 0.27 [b]	0.028 (Mn)	0.0061	0.0060	0.0080 (Mn)	0.0096 (Mn)	0.0056	0.015 (Mn)	-	-	0.011 (Mn)	0.0080 (Mn)	0.0080 (Mn)	0.010 (Mn)	<0.004	0.0050	0.0051	0.011 (Mn)	0.0072	0.012 (Mn)	<0.003	0.012 (Mn)
Zirconium	mg/L	-	-	-	0.00010	-	0.00030	-	-	-	-	-	-	0.00030	0.00030	0.00030	<0.0001	0.00020	0.00026	0.00031	0.00023	0.00034	<0.0002	<0.0006

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-07-20	2021-10-22	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-22	2021-07-20
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	**5.4**[Mn, Mx]	**5.6**[Mn, Mx]	**5.9**[Mn, Mx]	**6.2**[Mn, Mx]	8.4	**6.4**[Mn, Mx]	-	-	-	-	-	-	**6.3**[Mn, Mx]	6.5	8.2	**6.3**[Mn, Mx]	7.4	**6.1**[Mn, Mx]	**6.3**[Mn, Mx]	8.5
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	17	15	11	7.9	19	5.5	-	-	-	-	-	-	3.7	15	1.3	12	13	11	6.6	16
Dissolved oxygen	mg/L	8[a]	5[a]	**3.4**[Mn, Mx]	**3.2**[Mn, Mx]	**3.9**[Mn, Mx]	**5.5**[Mn]	**6.0**[Mn]	**6.0**[Mn]	-	-	-	-	-	-	8.6	**1.5**[Mn, Mx]	11	**3.1**[Mn, Mx]	**4.8**[Mn, Mx]	**5.7**[Mn]	**6.6**[Mn]	**3.5**[Mn, Mx]
Turbidity	NTU	-	-	-	1.0	1.9	1.0	1.1	1.1	-	-	-	-	-	-	1.5	8.3	5.0	-	8.4	1.6	1.2	7.7
Conductivity	µS/cm	-	-	172	125	74	61	167	122	-	-	-	-	-	-	49	2,306	486	608	104	61	60	1,142
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
pH, lab	-	6.5 - 9.0	6.5 - 9.0	6.6	6.7	6.9	6.6	6.9	6.6	**6.1**[Mn, Mx]	**6.4**[Mn, Mx]	6.5	**5.9**[Mn, Mx]	**5.9**[Mn, Mx]	-	-	7.7	7.1	6.9	6.5	7.2	6.7	-
Specific conductivity	µS/cm	-	-	199	163	98	91	181	196	121	173	132	153	128	-	-	-	86	282	134	73	90	-
Hardness, as $CaCO_3$	mg/L	-	-	-	-	31	-	-	-	31	51	34	32	30	36	25	276	28	-	-	-	-	-
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	**20**[Min]	34	**17**[Min]	**17**[Min]	24	26	**12**[Min]	26	**16**[Min]	**18**[Min]	**11**[Min]	-	-	-	**15**[Min]	36	**16**[Min]	22	**15**[Min]	-
Total organic carbon	mg/L	-	-	36	36	37	21	25	34	43	58	39	21	49	-	-	-	37	44	49	42	23	-
Major Ions																							
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	14	13	9.9	7.3	13	14	-	-	-	-	-	-	-	-	8.5	16	12	9.9	7.2	-
Chloride	mg/L	150	600	44	27	16	15	38	39	28	33	31	31	28	27	11	**634**[Mn, Mx]	13	59	25	5.6	15	-
Fluoride	mg/L	-	0.46 - 1.9[b]	0.030	0.047	0.039	0.034	0.038	0.032	-	-	-	-	-	-	0.034	<0.2	0.027	0.033	0.037	0.041	0.031	-
Magnesium	mg/L	-	-	2.7	2.5	2.1	1.6	2.4	2.7	-	-	-	-	-	-	-	-	1.7	2.9	2.5	1.9	1.6	-
Potassium	mg/L	-	-	<0.05	0.39	0.77	0.69	0.099	0.70	-	-	-	-	-	-	-	-	0.48	0.56	0.37	0.85	0.67	-
Sodium	mg/L	-	-	24	20	10	8.6	17	24	-	-	-	-	-	-	-	-	8.2	29	14	6.6	8.8	-
Sulphate	mg/L	128 - 429[b, c]	-	<0.3	<0.3	<0.3	0.30	<0.3	0.46	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3	0.61	<3.0	0.64	<0.3	<0.3	<0.3	<0.3	-
Nutrients																							
Nitrate	mg-N/L	3.0	33	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.020	0.050	0.016	0.090	0.035	0.11	0.031	<0.05	0.068	0.0059	0.0088	0.011	0.047	-
Nitrite	mg-N/L	0.020 - 0.20[d]	0.060 - 0.60[d]	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01	0.0042	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
Total ammonia	mg-N/L	0.14 - 2.1[e]	0.70 - 28[f]	0.016	0.014	0.021	0.013	0.0094	0.014	0.030	0.053	<0.03	0.31	0.10	0.14	0.013	0.016	0.049	0.041	0.056	0.037	0.041	-
Total Kjeldahl nitrogen	mg-N/L	-	-	1.2	1.2	1.0	0.66	0.92	1.1	-	-	-	-	-	-	-	-	1.8	1.3	1.4	1.1	0.65	-
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	0.058	0.066	<0.05	<0.05	<0.05	<0.05	<0.02	0.050	<0.02	<0.05	<0.05	0.12	<0.05	<0.05	0.053	0.063	<0.05	<0.05	<0.05	-
Dissolved phosphorus	mg-P/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	0.072	<0.05	-
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	95	105	104	62	80	107	94	128	165	62	98	113	71	49	94	118	143	105	62	-
Total Metals																							
Aluminum	mg/L	-	-	0.20	0.27	0.42	0.18	0.086	0.28	0.19	0.25	0.27	0.26	0.22	0.33	0.39	0.012	0.64	0.31	0.24	0.43	0.19	-
Antimony	mg/L	0.0090	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00020	<0.0001	<0.0001	<0.0001	0.00013	0.00017	0.00012	0.00012	<0.0001	<0.0001	<0.0001	-
Arsenic	mg/L	-	0.0050	0.00087	0.0011	0.00084	0.00055	0.00089	0.00080	0.00050	0.0014	0.00080	0.00057	0.00088	0.0015	0.00046	0.00064	0.00052	0.0011	0.00099	0.00079	0.00040	-
Barium	mg/L	1.0	-	0.027	0.023	0.016	0.0100	0.018	0.018	0.010	0.018	0.016	0.016	0.012	0.014	0.013	0.17	0.014	0.029	0.017	0.015	0.0089	-
Beryllium	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Boron	mg/L	1.2	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.004	0.010	0.027	<0.004	0.0050	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-
Cadmium	mg/L	-	-	0.0000096	0.0000099	0.000015	0.000017	0.000016	0.0000089	0.000040	0.000020	0.000050	0.000011	0.000016	0.000024	0.000017	<0.000005	0.000022	0.000029	0.000020	0.000020	0.000012	-
Calcium	mg/L	-	-	14	12	9.3	7.1	14	13	8.7	16	9.5	9.4	8.5	10	7.6	88	9.0	18	11	9.9	7.1	-
Cesium	mg/L	-	-	<0.00001	<0.00001	0.000015	<0.00001	<0.00001	0.000010	-	-	-	-	-	0.000020	<0.00001	<0.00001	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	-
Chromium	mg/L	0.0010[g]	-	0.00039	0.00058	0.00065	<0.0005	<0.0005	<0.0005	<0.0005	0.00060	0.00060	<0.0005	<0.0005	0.00051	0.00060	0.00013	0.00079	0.00059	0.00043	0.00075	<0.0005	-
Cobalt	mg/L	0.0040	0.11	0.00038	0.0016	0.00032	0.00016	0.00025	0.00082	0.00025	0.00076	0.00038	0.00046	0.00049	0.0011	0.00014	0.0012	0.00019	0.00061	0.00060	0.00021	0.00015	-
Copper	mg/L	-	-	0.00098	0.00086	0.0020	0.0015	<0.0005	0.0012	0.0019	0.0010	0.0010	0.0022	0.00073	0.0011	0.0031	<0.0005	0.0038	0.0020	0.0010	0.0023	0.0014	-
Iron	mg/L	-	1.0	0.83	**2.0**[Mx]	**1.0**[Mx]	0.41	0.61	**1.4**[Mx]	0.65	**1.7**[Mx]	0.97	0.68	0.80	**1.7**[Mx]	0.27	0.97	0.52	**1.1**[Mx]	**1.3**[Mx]	0.75	0.39	-
Lead	mg/L	0.0035 - 0.020[b]	0.0051 - 0.42[b]	0.00011	0.00030	0.00025	0.00013	0.000074	0.00019	0.00040	0.00040	0.00030	0.00016	0.00022	0.00071	0.000076	<0.00005	0.00017	0.00020	0.00060	0.00017	0.00014	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00030	0.00040	0.00040	0.00031	0.00029	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-
Magnesium	mg/L	-	-	2.6	2.6	2.0	1.6	2.7	2.7	2.3	3.0	2.6	2.0	2.1	2.5	1.4	14	1.7	3.1	2.6	1.9	1.6	-
Manganese	mg/L	0.77 - 2.4[b]	0.82 - 3.4[b]	0.075	0.37	0.051	0.029	0.058	0.22	0.060	0.18	0.100	0.12	0.13	0.30	0.020	1.4	0.023	0.26	0.15	0.041	0.030	-
Mercury	mg/L	0.000010	-	<0.000005	<0.000005	0.0000065	<0.000005	<0.000005	<0.000005	<0.00002[LDL>Mn]	<0.00002[LDL>Mn]	<0.00002[LDL>Mn]	<0.00002[LDL>Mn]	<0.00002[LDL>Mn]	<0.000005	**0.000011**[Min]	<0.000005	**0.000018**[Min]	<0.000005	<0.000005	**0.000015**[Min]	<0.000005	-
Molybdenum	mg/L	7.6	46	<0.00005	0.00044	0.00011	0.00091	<0.00005	0.000057	<0.0001	0.00010	0.00020	0.00014	0.00015	0.000097	0.000055	0.00020	0.000090	0.00015	0.000099	0.00015	0.000066	-
Nickel	mg/L	0.025 - 0.15[b]	-	0.00076	0.0012	0.0012	0.00082	0.00075	0.00098	0.00070	0.00080	0.00080	0.00092	0.00056	0.0011	0.0010	0.00098	0.0013	0.0014	0.00088	0.0014	0.00078	-
Potassium	mg/L	-	-	0.077	0.38	0.75	0.66	0.14	0.67	0.35	0.40	0.23	1.6	0.81	0.56	0.54	3.9	0.47	0.69	0.35	0.83	0.61	-
Rubidium	mg/L	-	-	<0.0002	0.00041	0.00066	0.00038	<0.0002	0.00049	-	-	-	-	-	0.00076	0.00030	0.0012	0.00032	0.00053	0.00048	0.00067	0.00045	-
Selenium	mg/L	0.0020	-	0.000074	0.000079	0.00011	0.000075	<0.00005	<0.00005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000053	0.000093	0.000060	0.00011	0.00011	0.000079	0.00015	0.000062	-
Silicon	mg/L	-	-	0.99	2.6	3.8	1.2	0.58	2.9	2.5	3.5	3.2	2.1	2.4	2.3	3.6	3.5	5.0	2.6	2.5	4.8	2.3	-
Silver	mg/L	0.000050 - 0.0015[b]	0.00010 - 0.0030[b]	<0.00001	<0.00001	0.000017	<0.00001	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	0.000012	<0.00001	0.000027	0.000010	<0.00001	0.000022	<0.00001	-
Sodium	mg/L	-	-	24	20	10	8.8	18	23	13	16	15	16	13	15	7.5	332	8.0	38	15	6.5	8.6	-
Strontium	mg/L	-	-	0.10	0.083	0.060	0.049	0.096	0.079	0.054	0.082	0.075	0.059	0.057	0.070	0.048	0.57	0.055	0.12	0.077	0.061	0.048	-
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0	1.0	<1.0	<3.0	<3.0	<0.5	<0.5	1.1	0.66	<0.5	<0.5	<0.5	<0.5	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Thallium	mg/L	0.00080	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Titanium	mg/L	-	-	0.0014	0.0027	0.0058	0.0014	<0.0012	0.0027	<0.005	<0.005	<0.005	<0.005	<0.005	0.0044	0.0026	<0.0003	0.0066	0.0026	0.0025	0.0040	0.0014	-
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Uranium	mg/L	0.0085	-	0.000010	0.000011	0.000017	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	<0.00002	0.000026	<0.00002	0.000011	0.000028	0.000022	0.000037	0.000022	0.000012	0.000024	0.000012	-
Vanadium	mg/L	-	-	<0.0005	0.00067	0.00087	<0.0005	<0.0005	0.00056	<0.001	<0.001	<0.001	<0.001	0.0011	0.0011	0.00055	<0.0005	0.0010	0.00067	0.00071	0.00070	0.00053	-
Zinc	mg/L	0.0075 - 0.19[b]	0.033 - 0.27[b]	0.0063	**0.0096**[Min]	**0.0098**[Min]	0.0063	0.0069	**0.010**[Min]	**0.012**[Min]	0.0050	0.0050	<0.004	0.0059	0.0055	**0.015**[Min]	0.029	0.0071	**0.023**[Min]	**0.011**[Min]	0.0050	<0.003	-
Zirconium	mg/L	-	-	<0.0002	0.00026	0.00038	0.00030	<0.0002	0.00033	0.00020	0.00010	0.00020	0.00030	0.00015	0.00018	0.00054	<0.0002	0.00062	0.00048	<0.0002	0.00056	0.00036	-

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2004-07-26	2007-08-08	2009-08-25	2010-03-16	2010-06-22	2010-09-30	2012-02-28	2012-08-14	2012-10-04	2013-03-27	2013-10-17	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-11-21	2020-06-24
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	8.4	6.6
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	2.1	12
Dissolved oxygen	mg/L	8[a]	5[a]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	9.3	**5.2**[Mn]
Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	17	-
Conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71	73	152
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
pH, lab	-	6.5 - 9.0	6.5 - 9.0	7.0	**6.4**[Mn, Mx]	6.7	**5.8**[Mn, Mx]	**6.2**[Mn, Mx]	7.0	**5.8**[Mn, Mx]	6.6	**6.1**[Mn, Mx]	6.5	**6.2**[Mn, Mx]	7.1	7.1	7.1	**6.4**[Mn, Mx]	7.0	-	-	7.6	7.4
Specific conductivity	µS/cm	-	-	1,480	230	2,050	163	421	1,540	118	1,020	196	313	147	132	327	122	142	124	-	-	126	210
Hardness, as $CaCO_3$	mg/L	-	-	-	-	-	44	112	307	32	165	19	-	51	42	74	40	38	42	52	33	38	-
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	132	38	174	**14**[Mn]	63	200	**9.6**[Mn]	92	**18**[Mn]	33	**19**[Mn]	31	67	33	33	44	-	-	30	44
Total organic carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	30	14	28	16	16	-	-	29	19
Major Ions																							
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	19
Chloride	mg/L	150	600	**405**[Mn]	49	**590**[Mn]	39	84	**355**[Mn]	27	**240**[Mn]	42	73	29	24	63	19	24	10	15	18	18	34
Fluoride	mg/L	-	0.46 - 1.9[b]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.039	0.029	0.032
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	4.5
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.91	1.2
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	17
Sulphate	mg/L	128 - 429[b, c]	-	5.6	-	15	-	1.1	22	-	-	-	-	-	<1.0	2.5	<1.0	<1.0	<1.0	1.8	1.6	2.2	0.44
Nutrients																							
Nitrate	mg-N/L	3.0	33	-	-	-	-	-	-	-	-	-	-	-	<0.01	0.020	0.012	0.043	0.012	0.0095	<0.005	0.031	<0.005
Nitrite	mg-N/L	0.020 - 0.20[d]	0.060 - 0.60[d]	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
Total ammonia	mg-N/L	0.14 - 2.1[e]	0.70 - 28[f]	0.050	-	0.30	-	0.070	0.070	0.090	0.060	0.11	0.12	0.040	<0.03	0.037	<0.03	0.032	<0.03	0.016	0.0070	0.047	0.013
Total Kjeldahl nitrogen	mg-N/L	-	-	1.3	1.9	1.2	0.96	2.0	0.90	0.71	1.5	1.6	1.2	1.7	-	-	-	-	-	-	-	1.8	0.56
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	<0.1	0.10	-	-	-	-	-	0.23	0.031	0.084	0.15	0.020	0.090	0.030	<0.05	<0.05	<0.05	<0.05	0.054	0.066
Dissolved phosphorus	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	54	114	246	84	140	71	95	112	120	101	144	69	36	67	<20	53	42	52	70	48
Total Metals																							
Aluminum	mg/L	-	-	0.060	0.85	3.8	0.27	0.38	0.58	0.25	0.94	0.18	1.3	1.3	0.64	1.1	0.58	0.32	0.33	0.62	0.57	1.1	0.70
Antimony	mg/L	0.0090	-	<0.05[UL>Mn]	-	0.00090	-	0.00015	-	-	-	-	-	-	0.00010	0.00010	0.00030	<0.0001	0.00010	0.00010	0.00011	0.00012	<0.0001
Arsenic	mg/L	-	0.0050	<0.05[UL>Mx]	-	**0.039**[Mx]	0.00050	0.0019	0.0023	0.00058	**0.0075**[Mx]	0.00037	0.0013	0.0034	0.00060	0.0015	0.00070	<0.0005	0.00054	0.00090	0.00048	0.00072	0.00087
Barium	mg/L	1.0	-	0.13	0.052	0.70	0.017	0.055	0.17	0.011	0.17	0.0091	0.035	0.033	0.019	0.035	0.018	0.014	0.015	0.022	0.015	0.021	0.030
Beryllium	mg/L	0.00013	-	<0.0002[UL>Mn]	-	0.00010	-	0.000030	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.05	-	-	-	0.000011	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	0.010	-	-	-	-	-	-	-	-	-	-	0.028	0.014	0.039	0.026	0.048	0.024	0.026	0.038	0.041
Cadmium	mg/L	-	-	<0.002	0.0020	0.00041	0.00019	0.00021	0.000080	0.000052	0.00030	0.000021	0.000077	0.000066	0.00011	0.000050	0.000050	0.000011	<0.00001	0.000015	0.000016	0.000029	0.000030
Calcium	mg/L	-	-	78	22	130	12	34	98	9.0	54	5.6	19	15	12	23	11	11	12	15	9.4	12	19
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000053	0.000036	0.000080	0.000041
Chromium	mg/L	0.0010[g]	-	<0.005[UL>Mn]	-	**0.0050**[Mn]	-	**0.0015**[Mn]	**0.0020**[Mn]	0.00070	**0.0015**[Mn]	-	**0.0020**[Mn]	**0.0019**[Mn]	0.00090	**0.0013**[Mn]	0.00090	0.00055	0.00055	0.00076	0.00064	**0.0011**[Mn]	0.00080
Cobalt	mg/L	0.0040	0.11	<0.005[UL>Mn]	**0.0070**[Mn]	**0.023**[Mn]	0.00050	**0.0071**[Mn]	0.0015	0.00049	**0.0065**[Mn]	-	0.0019	0.0020	0.00024	0.0013	0.00025	0.00017	0.00017	0.00067	0.00019	0.00036	0.00096
Copper	mg/L	-	-	<0.005	0.0060	0.016	0.0023	0.0051	0.0045	0.0021	0.0046	0.0013	0.0091	0.0029	0.0058	0.003	0.004	0.0024	0.0021	0.0023	0.0026	0.0038	0.0023
Iron	mg/L	-	1.0	**1.4**[Mx]	**11**[Mx]	**180**[Mx]	0.58	**4.2**[Mx]	**17**[Mx]	**1.1**[Mx]	**16**[Mx]	0.49	**2.8**[Mx]	**8.6**[Mx]	0.57	**2.2**[Mx]	0.60	0.34	0.27	0.84	0.44	**1.0**[Mx]	**1.2**[Mx]
Lead	mg/L	0.0035 - 0.020[b]	0.0051 - 0.42[b]	<0.03[UL>Mn]	-	**0.012**[Mn]	0.00030	0.00092	0.0011	0.00053	0.0019	0.00026	0.0020	0.0021	0.00080	0.0015	0.00020	0.00012	<0.0001	0.00028	0.00010	0.00025	0.00083
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00030	0.00070	0.00030	0.00016	0.00013	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	-	-	11	4.1	16	3.3	6.5	15	2.4	7.5	1.3	4.3	3.3	2.9	4.2	2.9	2.7	2.9	3.7	2.2	2.9	4.9
Manganese	mg/L	0.77 - 2.4[b]	0.82 - 3.4[b]	0.42	**1.8**[Mn]	**4.5**[Mn, Mx]	0.22	**2.5**[Mn, Mx]	0.65	0.14	**5.2**[Mn, Mx]	0.047	0.43	0.34	0.018	0.33	0.026	0.023	0.029	0.22	0.0075	0.015	0.29
Mercury	mg/L	0.000010	-	<0.00005[UL>Mn]	-	-	-	-	-	0.0000021	-	-	-	-	<0.00002[UL>Mn]	<0.00002[UL>Mn]	<0.00002[UL>Mn]	<0.00002[UL>Mn]	<0.00002[UL>Mn]	<0.000005	0.0000084	**0.000012**[Mn]	<0.000005
Molybdenum	mg/L	7.6	46	<0.005	-	0.0020	-	0.00022	-	0.00085	-	-	-	-	<0.0001	0.00020	0.00020	0.00012	<0.0001	0.00010	0.000083	0.00011	0.00015
Nickel	mg/L	0.025 - 0.15[b]	-	<0.008	-	0.0060	0.0010	0.0027	0.0020	0.00080	0.0023	-	0.0023	0.0020	0.0016	0.0020	0.0015	0.0011	0.0011	0.0017	0.0012	0.0020	0.0016
Potassium	mg/L	-	-	2.0	-	1.9	1.2	0.55	2.3	-	1.4	0.30	0.96	0.53	1.1	1.1	0.74	1.4	1.2	1.1	1.0	0.90	1.3
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00072	0.00054	0.00087	0.00082
Selenium	mg/L	0.0020	-	<0.03[UL>Mn]	-	0.00010	-	0.000090	-	0.000060	-	-	-	0.00016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000098	0.000093	0.00011	0.000094
Silicon	mg/L	-	-	<0.01	4.6	12	3.2	3.3	4.7	3.8	5.2	1.3	5.2	4.6	3.9	5.7	4.1	3.0	3.8	4.6	3.9	5.2	4.3
Silver	mg/L	0.000050 - 0.0015[b]	0.00010 - 0.0030[b]	**221**[Mn, Mx]	-	**0.070**[Mn, Mx]	-	0.0000060	0.000020	0.0000060	0.000027	-	0.000022	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00002	0.000011	0.000028	0.000010
Sodium	mg/L	-	-	0.44	25	253	15	44	176	11	134	8.7	32	16	16	34	11	14	8.6	12	12	11	17
Strontium	mg/L	-	-	2.4	0.14	0.77	0.075	0.21	0.62	0.056	0.35	0.041	0.12	0.092	0.072	0.12	0.082	0.069	0.077	0.095	0.059	0.072	0.13
Sulphur	mg/L	-	-	<0.05	0.90	9.0	3.0	-	5.0	-	-	-	-	-	<1.0	2.0	<1.0	<3.0	<3.0	<0.5	<0.5	1.0	<0.5
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	0.00080	-	<0.03[UL>Mn]	-	-	-	0.0000030	-	0.0000030	-	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	-	-	<0.02	-	-	-	0.000020	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	<0.003	0.0090	0.081	-	0.0055	0.0070	-	0.012	-	0.027	0.019	0.0070	0.016	0.0060	0.0055	<0.005	0.010	0.0073	0.013	0.0097
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0085	-	-	-	0.00030	-	0.000070	0.00020	0.0000090	-	-	-	-	0.000030	0.000040	0.000030	0.000024	0.000026	0.000025	0.000026	0.000042	0.000034
Vanadium	mg/L	-	-	<0.005	0.0060	0.025	-	0.0022	-	0.00070	-	-	-	-	0.0010	0.0020	<0.001	<0.001	<0.001	0.0014	0.00094	0.0018	0.0016
Zinc	mg/L	0.0075 - 0.19[b]	0.033 - 0.27[b]	<0.005	0.038	**0.19**[Mn, Mx]	**0.013**[Mn]	0.015	0.028	0.0050	0.033	-	**0.024**[Mn]	**0.018**[Mn]	**0.010**[Mn]	0.0070	<0.004	<0.004	<0.004	**0.010**[Mn]	<0.003	0.0049	0.0070
Zirconium	mg/L	-	-	<0.005	-	0.00060	-	0.00050	-	0.00020	-	-	-	-	0.00070	0.00060	0.00040	0.00046	0.00053	0.00038	<0.00066	0.00060	0.00028

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-7	SW-7	SW-7	SW-7	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-08-20	2020-09-30	2021-04-22	2021-10-22	2004-07-26	2006-05-25	2007-08-08	2008-06-10	2014-07-07	2014-11-25	2015-05-26	2015-11-01	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	6.9	6.5	7.0	6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6 (Mn, Mx)	6.4 (Mn, Mx)
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	13	11	8.2	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	14
Dissolved oxygen	mg/L	8 [a]	5 [a]	4.2 (Mn, Mx)	7.3 (Mn)	11	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.1	4.9 (Mn, Mx)
Turbidity	NTU	-	-	6.4	8.7	2.7	0.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.0
Conductivity	µS/cm	-	-	133	73	63	113	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	1,229
Redox potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
pH, lab	-	6.5 - 9.0	6.5 - 9.0	7.5	7.5	7.2	6.9	6.9	7.2	7.1	6.8	6.8	6.2 (Mn, Mx)	6.0 (Mn, Mx)	6.0 (Mn, Mx)	6.0 (Mn, Mx)	6.3 (Mn, Mx)	6.2 (Mn, Mx)	5.6 (Mn, Mx)	5.9 (Mn, Mx)	-	-	7.4
Specific conductivity	µS/cm	-	-	170	100	94	180	336	227	249	143	519	262	134	144	118	148	117	123	128	-	-	-
Hardness, as $CaCO_3$	mg/L	-	-	-	-	-	-	-	-	-	-	-	59	35	38	31	47	31	25	30	-	30	246
Total alkalinity, as $CaCO_3$	mg/L	20 [a]	-	55	32	23	15 (Mn)	107	39	64	50	57	26	11 (Mn)	14 (Mn)	12 (Mn)	22	11 (Mn)	12 (Mn)	11 (Mn)	-	-	-
Total organic carbon	mg/L	-	-	26	36	22	20	-	-	-	-	28	-	-	-	42	66	40	30	38	-	-	-
Major Ions																							
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	16	12	8.3	10	-	-	-	-	40	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	150	600	18	9.3	14	42	41	47	43	25	123	57	33	35	24	31	27	27	27	29	28	436 (Mn)
Fluoride	mg/L	-	0.46 - 1.9 [d]	0.049	0.043	0.033	0.023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.1
Magnesium	mg/L	-	-	3.4	2.7	1.8	2.1	-	-	-	-	6.2	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	-	-	1.2	1.2	0.75	0.52	-	-	-	-	0.44	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	-	-	17	7.2	8.5	20	-	-	-	-	87	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	128 - 429 [b, c]	-	<0.3	<0.3	<0.3	0.70	1.7	0.90	-	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.3	<0.3	<1.5
Nutrients																							
Nitrate	mg-N/L	3.0	33	<0.005	0.0056	0.018	0.030	-	-	-	-	-	-	-	-	0.019	0.060	0.019	0.019	<0.01	0.065	0.014	<0.025
Nitrite	mg-N/L	0.020 - 0.20 [d]	0.060 - 0.60 [d]	<0.001	<0.001	0.0012	<0.001	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	0.020	0.0022	<0.001	<0.005
Total ammonia	mg-N/L	0.14 - 2.1 [e]	0.70 - 28 [f]	0.013	0.037	0.012	0.0077	0.24	-	-	-	0.040	0.030	<0.03	0.055	0.030	0.054	0.033	0.47	0.10	0.057	0.011	0.0067
Total Kjeldahl nitrogen	mg-N/L	-	-	0.84	0.87	0.61	0.61	1.7	0.76	0.83	0.65	1.1	1.8	0.98	1.1	-	-	-	-	-	-	-	-
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total phosphorus	mg-P/L	-	-	<0.05	<0.05	<0.05	<0.05	0.30	-	-	-	-	0.14	0.028	<0.02	<0.02	0.12	<0.02	<0.05	<0.05	0.10	<0.05	0.12
Dissolved phosphorus	mg-P/L	-	-	<0.05	<0.05	<0.05	<0.05	-	-	-	-	0.018	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chemical oxygen demand	mg/L	-	-	80	83	59	59	129	49	38	50	99	87	101	108	91	133	98	88	137	102	93	63
Total Metals																							
Aluminum	mg/L	-	-	0.64	0.70	0.20	0.15	5.0	0.50	0.20	0.41	-	1.8	0.29	0.29	0.19	0.86	0.24	0.19	0.24	0.31	0.24	0.050
Antimony	mg/L	0.0090	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.05 (LDL>Mn)	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00030	<0.0001	<0.0001	0.00012	<0.001	0.00012
Arsenic	mg/L	-	0.0050	0.00092	0.0010	0.00059	0.00039	<0.05 (LDL>Mx)	-	-	0.00080	-	0.0026	0.00070	0.00060	<0.0005	0.0015	0.00070	0.00053	0.00099	0.0017	0.00046	0.0015
Barium	mg/L	1.0	-	0.019	0.019	0.010	0.014	0.10	0.021	0.024	0.022	-	0.045	0.013	0.013	0.010	0.024	0.012	0.0089	0.012	0.019	0.011	0.11
Beryllium	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002 (LDL>Mn)	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001 (LDL>Mn)	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.05	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	0.029	0.021	<0.01	<0.01	0.013	0.023	-	-	-	-	0.0060	<0.004	<0.004	0.0070	0.016	<0.004	<0.004	<0.01	<0.01	<0.01
Cadmium	mg/L	-	-	0.000016	0.000013	0.0000096	0.000010	<0.002	-	-	0.000060	-	0.00012	0.000090	0.000010	0.000020	0.000040	0.00085	<0.00001	0.000023	0.000028	0.000018	0.000027
Calcium	mg/L	-	-	15	12	8.1	10	36	14	20	14	-	17	9.5	11	8.7	14	8.5	7.0	8.5	12	8.4	72
Cesium	mg/L	-	-	0.000014	0.000043	<0.00001	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000020	0.000010	<0.00001
Chromium	mg/L	0.0010 [g]	-	0.00051	0.00086	<0.0005	<0.0005	0.0070 (Mn)	-	-	0.0010	-	0.0022 (Mn)	<0.0005	0.00070	<0.0005	0.0010	0.00090	<0.0005	<0.0005	0.00051	0.00033	0.00021
Cobalt	mg/L	0.0040	0.11	0.00029	0.00035	0.00019	<0.0001	0.0050 (Mn)	-	-	0.00060	-	0.0018	0.00025	0.00041	0.00024	0.00087	0.00033	0.00038	0.00054	0.00095	0.00014	0.0032
Copper	mg/L	-	-	0.0017	0.0025	0.0016	0.0016	0.01	-	0.009	0.0034	-	0.0072	0.0018	0.0012	0.0013	0.0019	0.0032	0.0010	0.00064	0.0015	0.00096	0.00054
Iron	mg/L	-	1.0	0.78	1.0 (Mx)	0.61	0.21	10 (Mx)	0.61	0.63	0.65	-	4.7 (Mx)	0.71	1.1 (Mx)	0.65	2.3 (Mx)	0.88	0.63	0.88	1.9 (Mx)	0.51	2.7 (Mx)
Lead	mg/L	0.0035 - 0.020 [b]	0.0051 - 0.42 [b]	0.00012	0.00017	0.00010	<0.00005	<0.03 (LDL>Mn)	-	-	0.00050	-	0.0030	0.00030	0.00050	0.00030	0.0012	0.00030	0.00019	0.00029	0.00062	0.00026	0.00010
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	0.00040	0.00050	0.00030	0.00070	0.00040	0.00029	0.00030	<0.001	<0.001	0.0013
Magnesium	mg/L	-	-	3.8	2.8	1.7	2.2	7.9	3.0	4.1	3.0	-	4.0	2.7	2.7	2.4	2.9	2.4	1.8	2.1	2.7	2.2	16
Manganese	mg/L	0.77 - 2.4 [b]	0.82 - 3.4 [b]	0.077	0.066	0.039	0.0044	5.1 (Mn, Mx)	0.036	0.63	0.21	-	0.34	0.069	0.11	0.059	0.14	0.078	0.099	0.14	0.41	0.031	1.8 (Mn)
Mercury	mg/L	0.000010	-	<0.000005	0.000018 (Mn)	<0.000005	0.0000059	<0.00005 (LDL>Mn)	-	-	-	-	-	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	<0.00002 (LDL>Mn)	0.0000051	0.0000066	<0.000005
Molybdenum	mg/L	7.6	46	0.00021	0.00017	0.000078	<0.00005	<0.005	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	<0.0001	<0.0001	0.00012	<0.00005	0.000068
Nickel	mg/L	0.025 - 0.15 [b]	-	0.0016	0.0017	0.00083	0.00061	0.010	-	-	0.0020	-	0.0036	0.00070	0.0010	0.00060	0.0013	0.00070	0.00056	0.00059	0.0013	0.00058	0.0012
Potassium	mg/L	-	-	1.1	1.2	0.70	0.52	2.0	1.0	2.0	0.94	-	0.90	0.50	0.13	0.31	0.36	0.26	2.3	0.82	0.74	0.86	2.3
Rubidium	mg/L	-	-	0.00070	0.00084	0.00039	0.00025	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00071	0.00050	0.00099
Selenium	mg/L	0.0020	-	0.000076	0.00012	0.000067	<0.00005	<0.03 (LDL>Mn)	-	-	0.00010	-	-	0.00060	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000083	<0.00005	0.000056
Silicon	mg/L	-	-	3.7	4.8	1.8	3.1	<0.01	2.6	3.7	3.9	-	5.2	2.4	2.6	2.5	4.0	3.2	1.5	2.6	2.1	2.6	3.4
Silver	mg/L	0.000050 - 0.0015 [b]	0.00010 - 0.0030 [b]	<0.00001	0.000023	<0.00001	<0.00001	29 (Mn, Mx)	-	-	0.000027	-	0.000061 (Mn)	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	18	7.0	8.8	20	0.22	31	26	16	-	31	15	13	14	13	13	13	13	16	13	189
Strontium	mg/L	-	-	0.097	0.076	0.055	0.065	0.80	0.084	0.12	0.088	-	0.11	0.067	0.061	0.056	0.076	0.066	0.046	0.058	0.079	0.053	0.54
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.05	0.50	0.60	-	-	-	2.0	<1.0	<1.0	1.0	<1.0	<3.0	<3.0	<0.5	<0.5	0.55
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	0.00080	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.03 (LDL>Mn)	-	-	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.02	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	0.0098	0.0075	0.0017	0.0012	0.064	0.0030	-	0.0070	-	0.024	<0.005	<0.005	<0.005	0.012	<0.005	<0.005	<0.005	0.0039	0.0026	<0.0012
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0085	-	0.000023	0.000029	0.000014	0.000011	-	-	-	-	-	-	<0.00002	<0.00002	<0.00002	0.000030	<0.00002	<0.00002	<0.00002	0.000017	<0.00001	<0.00001
Vanadium	mg/L	-	-	0.00078	0.0013	0.00063	<0.0005	0.0080	-	-	-	-	0.0058	0.0010	0.0010	<0.001	0.0020	<0.001	<0.001	0.0011	0.0011	0.00063	<0.0005
Zinc	mg/L	0.0075 - 0.19 [b]	0.033 - 0.27 [b]	0.0035	0.0070	<0.003	<0.003	0.025 (Mn)	0.0060	0.021	0.0070	-	0.027 (Mn)	0.0060	0.0070	0.0060	0.0090 (Mn)	0.0080 (Mn)	<0.004	0.0046	0.15 (Mn, Mx)	0.0048	0.0034
Zirconium	mg/L	-	-	0.00039	0.00050	0.00033	0.00026	<0.005	-	-	0.00050	-	-	0.00020	0.00020	0.00010	0.00020	0.00010	0.00012	0.00014	0.00021	0.00018	<0.0002

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-8	SW-8	SW-8	SW-8	SW-8	WETLAND 3	WETLAND 3	WETLAND 3	WETLAND 3
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-22	2019-07-22	2019-07-31	2019-08-07	2019-08-22
Field Measured												
pH	-	6.5 - 9.0	6.5 - 9.0	7.0	6.9	6.5	**5.8**[Mn, Mx]	**5.9**[Mn, Mx]	7.9	7.6	7.5	7.5
Specific conductivity	µS/cm	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	1.1	15	13	11	8.9	21	17	23	16
Dissolved oxygen	mg/L	8[a]	5[a]	9.1	**5.2**[Mn]	**2.5**[Mn, Mx]	**5.6**[Mn]	**6.4**[Mn]	**7.6**[Mn]	**6.3**[Mn]	**6.0**[Mn]	**6.1**[Mn]
Turbidity	NTU	-	-	3.1	-	2.4	0.42	0.48	15	-	4.9	15
Conductivity	µS/cm	-	-	72	124	100	89	74	951	900	1,027	747
Redox potential	mV	-	-	-	-	-	-	-	315	303	321	332
Conventional Parameters												
pH, lab	-	6.5 - 9.0	6.5 - 9.0	**6.3**[Mn, Mx]	**6.3**[Mn, Mx]	**6.3**[Mn, Mx]	**6.4**[Mn, Mx]	**6.3**[Mn, Mx]	8.3	8.4	8.3	8.3
Specific conductivity	µS/cm	-	-	130	148	127	118	107	-	-	1,040	-
Hardness, as $CaCO_3$	mg/L	-	-	36	-	-	-	-	391	396	401	371
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	**7.4**[Mn]	**14**[Mn]	**12**[Mn]	**7.4**[Mn]	**8.4**[Mn]	181	167	168	173
Total organic carbon	mg/L	-	-	46	58	53	39	24	13	13	14	18
Major Ions												
Bromide	mg/L	-	-	-	-	-	-	-	2.5	-	-	2.3
Calcium	mg/L	-	-	10	13	11	9.0	6.3	-	-	-	-
Chloride	mg/L	150	600	29	31	25	26	24	**217**[Mn]	**217**[Mn]	**226**[Mn]	**178**[Mn]
Fluoride	mg/L	-	0.46 - 1.9[b]	<0.02	0.024	0.036	0.028	0.026	0.12	0.11	0.12	0.11
Magnesium	mg/L	-	-	2.7	3.0	2.4	2.1	1.7	-	-	-	-
Potassium	mg/L	-	-	0.41	0.33	0.30	0.55	0.56	-	-	-	-
Sodium	mg/L	-	-	13	16	14	12	12	-	-	-	-
Sulphate	mg/L	128 - 429[b, c]	-	<0.3	<0.3	<0.3	<0.3	<0.3	22	18	21	15
Nutrients												
Nitrate	mg-N/L	3.0	33	0.0071	0.024	0.033	0.0074	0.017	0.20	0.055	<0.025	0.044
Nitrite	mg-N/L	0.020 - 0.20[d]	0.060 - 0.60[d]	<0.001	0.0031	0.0014	<0.001	0.0012	<0.005	<0.005	<0.005	<0.005
Total ammonia	mg-N/L	0.14 - 2.1[e]	0.70 - 28[f]	0.039	0.057	0.064	0.035	0.056	0.063	0.041	0.025	0.017
Total Kjeldahl nitrogen	mg-N/L	-	-	2.2	1.4	2.1	0.94	0.61	-	-	-	0.017
Total nitrogen	mg-N/L	-	-	-	-	-	-	-	-	-	0.78	1.0
Total phosphorus	mg-P/L	-	-	<0.05	0.061	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved phosphorus	mg-P/L	-	-	<0.05	0.052	0.052	<0.05	<0.05	-	-	-	-
Orthophosphate	mg-P/L	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001
Chemical oxygen demand	mg/L	-	-	114	154	138	98	65	90	35	33	91
Total Metals												
Aluminum	mg/L	-	-	0.36	0.34	0.70	0.14	0.10	0.47	0.075	0.059	0.25
Antimony	mg/L	0.0090	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00032	0.00031	0.00028	0.00025
Arsenic	mg/L	-	0.0050	0.00049	0.0011	0.0016	0.00060	0.00040	0.0011	0.00089	0.00089	0.0015
Barium	mg/L	1.0	-	0.012	0.018	0.027	0.011	0.0074	0.14	0.14	0.14	0.13
Beryllium	mg/L	0.00013	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.46	0.41	0.41	0.27
Cadmium	mg/L	-	-	0.000019	0.000024	0.000045	0.000017	0.0000092	0.000026	0.000030	0.000011	0.000019
Calcium	mg/L	-	-	10	13	11	8.5	6.1	114	118	120	110
Cesium	mg/L	-	-	0.000018	<0.00001	0.000048	<0.00001	<0.00001	0.000034	<0.00001	<0.00001	0.000025
Chromium	mg/L	0.0010[g]	-	0.00045	0.00050	0.00084	0.00037	<0.0005	0.00049	0.00024	0.00019	0.00033
Cobalt	mg/L	0.0040	0.11	0.00018	0.00043	0.0019	0.00034	0.00018	0.00034	0.00020	0.00017	0.00027
Copper	mg/L	-	-	0.0014	0.0012	0.0019	0.00059	0.00062	0.0039	0.0034	0.0031	0.0035
Iron	mg/L	-	1.0	0.63	**1.4**[MX]	**3.2**[MX]	0.83	0.42	0.37	0.078	0.092	0.39
Lead	mg/L	0.0035 - 0.020[b]	0.0051 - 0.42[b]	0.00042	0.00037	0.0024	0.00046	0.00028	0.00012	0.000050	<0.00005	0.00017
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.0024	0.0021	0.0018	0.0011
Magnesium	mg/L	-	-	2.8	2.9	2.7	2.2	1.7	25	25	25	23
Manganese	mg/L	0.77 - 2.4[b]	0.82 - 3.4[b]	0.031	0.098	0.41	0.10	0.040	0.064	0.051	0.050	0.056
Mercury	mg/L	0.000010	-	0.0000074	<0.000005	**0.000010**[Mn]	0.0000076	<0.000005	0.0000061	<0.000005	<0.000005	<0.000005
Molybdenum	mg/L	7.6	46	<0.00005	0.00013	0.00011	<0.00005	<0.00005	0.0021	0.0019	0.0018	0.0017
Nickel	mg/L	0.025 - 0.15[b]	-	0.00077	0.00071	0.0014	0.00052	<0.0005	0.0032	0.0027	0.0025	0.0027
Potassium	mg/L	-	-	0.39	0.33	0.33	0.57	0.53	6.1	5.7	5.3	4.9
Rubidium	mg/L	-	-	0.00045	0.00049	0.00072	0.00056	0.00044	0.00078	0.00055	0.00051	0.00065
Selenium	mg/L	0.0020	-	<0.00005	0.000064	0.000068	0.000071	<0.00005	0.00019	0.00015	0.00013	0.00011
Silicon	mg/L	-	-	3.3	2.5	3.0	3.0	1.8	1.4	0.81	0.82	2.5
Silver	mg/L	0.000050 - 0.0015[b]	0.00010 - 0.0030[b]	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000010
Sodium	mg/L	-	-	13	16	14	13	12	54	50	48	37
Strontium	mg/L	-	-	0.067	0.089	0.079	0.061	0.045	1.4	1.5	1.4	1.1
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	9.1	8.0	7.5	6.3
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00021	0.00033	<0.0002
Thallium	mg/L	0.00080	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Tin	mg/L	-	-	<0.0001	0.00014	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	0.0038	0.0036	0.0098	0.0015	0.00083	0.011	0.0016	0.00085	0.0032
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	0.0085	-	<0.00001	<0.00001	0.000024	<0.00001	<0.00001	0.00073	0.00065	0.00065	0.00059
Vanadium	mg/L	-	-	0.0010	0.00088	0.0023	<0.0005	<0.0005	0.0011	0.00051	<0.0005	0.00072
Zinc	mg/L	0.0075 - 0.19[b]	0.033 - 0.27[b]	0.0050	0.0058	**0.0081**[Mn]	**0.010**[Mn]	0.0047	0.0071	0.0098	0.0055	0.0085
Zirconium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-09	SW-09	SW-09	SW-09	SW-09	SW-09	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-10	SW-10
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-07-20	2021-10-26	2016-04-16	2016-07-07	2016-10-25	2017-06-14	2018-05-28	2019-04-16	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-10-22	2020-06-24	2020-08-20
Dissolved Metals																							
Aluminum	mg/L	0.0068 - 0.050[(b)]	0.023 - 0.10[(b)]	**0.13**[(Mn, Mx)]	**0.22**[(Mn, Mx)]	**0.47**[(Mn, Mx)]	0.027	0.018	0.0081	-	-	-	-	-	-	**0.76**[(Mn, Mx)]	**0.10**[(Mn, Mx)]	**0.18**[(Mn, Mx)]	**0.34**[(Mn, Mx)]	**0.16**[(Mn, Mx)]	**0.20**[(Mn, Mx)]	**0.77**[(Mn, Mx)]	**1.1**[(Mn, Mx)]
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	0.00013	0.00014	<0.0001	-	-	-	-	-	-	0.00018	<0.0001	0.00010	<0.0001	<0.0001	<0.0001	<0.0001	0.00010
Arsenic	mg/L	-	-	0.0019	0.0014	0.00097	0.00066	0.0011	0.00061	-	-	-	-	-	-	0.00064	0.00035	0.00074	0.00059	0.00040	0.00094	0.0010	0.0012
Barium	mg/L	-	-	0.024	0.017	0.016	0.046	0.043	0.044	-	-	-	-	-	-	0.013	0.012	0.012	0.014	0.0090	0.013	0.026	0.028
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	<0.01	<0.01	<0.01	0.29	0.41	0.27	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	0.000011	0.000024	0.0000098	0.0000075	0.000045	<0.000005	-	-	-	-	-	-	0.000046	0.000024	0.000038	0.000015	0.000015	0.000023	0.000063	0.000056
Cesium	mg/L	-	-	<0.00001	<0.00001	<0.00001	0.000017	<0.00001	<0.00001	-	-	-	-	-	-	0.000030	<0.00001	<0.00001	<0.00001	<0.00001	0.000014	0.000014	0.000026
Chromium	mg/L	-	-	0.00042	0.00050	0.00069	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	0.00089	0.00034	0.00042	0.00052	<0.0005	<0.0005	0.0010	0.0017
Cobalt	mg/L	-	-	0.0012	0.00046	0.00020	0.00029	0.00015	0.00010	-	-	-	-	-	-	0.00034	0.00014	0.00030	0.00030	0.00018	0.00070	0.00087	0.00080
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	**0.00091**[(Mn, Mx)]	**0.0011**[(Mn, Mx)]	**0.00191**[(Mn, Mx)]	**0.00165**[(Mn, Mx)]	**0.00078**[(Mn, Mx)]	**0.00054**[(Mn, Mx)]	-	-	-	-	-	-	**0.006**[(Mn, Mx)]	**0.00078**[(Mn, Mx)]	**0.00192**[(Mn, Mx)]	**0.00272**[(Mn, Mx)]	**0.00275**[(Mn, Mx)]	**0.00137**[(Mn, Mx)]	**0.00124**[(Mn, Mx)]	**0.00187**[(Mn, Mx)]
Iron	mg/L	-	0.35	**1.9**[(Mx)]	**1.5**[(Mx)]	**0.91**[(Mx)]	0.040	0.016	0.012	-	-	-	-	-	-	**0.52**[(Mx)]	0.19	**0.37**[(Mx)]	**0.43**[(Mx)]	0.30	**0.87**[(Mx)]	**2.8**[(Mx)]	**3.2**[(Mx)]
Lead	mg/L	-	-	0.000079	0.00012	0.00013	<0.00005	<0.00005	<0.00005	-	-	-	-	-	-	0.00018	<0.00005	<0.00005	0.000073	<0.00005	0.000051	0.00059	0.00020
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	-	-	0.55	0.093	0.021	0.012	0.0035	0.0067	-	-	-	-	-	-	0.056	0.019	0.052	0.042	0.027	0.17	0.051	0.051
Mercury	mg/L	-	-	<0.000005	<0.000005	0.000022	<0.000005	<0.000005	<0.000005	-	-	-	-	-	-	0.0000093	<0.000005	<0.000005	0.000013	<0.000005	<0.000005	<0.000005	0.0000099
Molybdenum	mg/L	-	-	0.00012	0.00016	0.00014	0.00063	0.0010	0.00041	-	-	-	-	-	-	0.000089	<0.00005	0.000079	0.000054	0.000080	0.000073	0.00020	<0.00005
Nickel	mg/L	-	-	0.0013	0.0013	0.0012	0.0026	0.0033	0.0024	-	-	-	-	-	-	0.00088	0.00076	0.0011	0.0012	0.00059	0.0010	0.0020	0.0023
Rubidium	mg/L	-	-	0.00057	0.00061	0.00071	0.0013	0.0015	0.00087	-	-	-	-	-	-	0.00094	0.00059	0.0011	0.0011	0.00059	0.0027	0.0011	0.0015
Selenium	mg/L	-	-	0.00011	0.000093	0.00013	0.000071	0.000095	0.00055	-	-	-	-	-	-	0.00010	<0.00005	0.000097	0.000085	<0.00005	0.000085	0.00013	0.00025
Silicon	mg/L	-	-	1.7	2.9	3.7	3.3	4.6	3.0	-	-	-	-	-	-	5.1	2.3	4.5	4.2	2.9	4.3	4.1	6.2
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	0.000016	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000018
Strontium	mg/L	-	-	0.12	0.095	0.068	0.46	0.50	0.41	-	-	-	-	-	-	0.034	0.038	0.050	0.053	0.036	0.057	0.075	0.075
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	2.6	1.5	2.7	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00016
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	0.0019	0.0029	0.013	0.00051	<0.0003	<0.0003	-	-	-	-	-	-	0.017	0.00066	0.0025	0.0043	0.0022	0.0028	0.011	0.018
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Uranium	mg/L	-	-	0.000011	0.000012	0.000019	0.00040	0.00055	0.00038	-	-	-	-	-	-	0.000029	<0.00001	<0.00001	0.000018	<0.00001	<0.00001	0.000031	0.00021
Vanadium	mg/L	-	-	<0.0005	<0.0005	0.00082	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0022
Zinc	mg/L	-	-	0.0098	0.010	0.0089	<0.001	<0.001	<0.001	-	-	-	-	-	-	0.0063	0.0086	0.0051	0.0047	0.0048	0.0066	0.0052	0.0059
Zirconium	mg/L	-	-	0.00036	0.00042	0.00055	<0.0002	<0.0002	0.00024	-	-	-	-	-	-	0.0011	0.00025	0.00045	0.00050	0.00036	0.00049	0.00064	0.0016
Volatile Organics																							
Benzene	µg/L	40	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	200	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.50	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	**1.3**[(Mn)]	**0.55**[(Mn)]	**14**[(Mn)]
Xylenes	µg/L	30	-	<0.75	<0.75	<0.75	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.75	<0.75	<0.75	<0.5	<0.5	<0.75	<0.75
m,p-Xylenes	µg/L	-	-	<0.5	<0.5	<0.5	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.4	<0.4	<0.5	<0.5
o-Xylene	µg/L	-	-	<0.5	<0.5	<0.5	<0.3	<0.3	<0.3	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.3	<0.3	<0.5	<0.5
Styrene	µg/L	72	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl tert-butyl ether	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hydrocarbons																							
EPH (C10-C19)	mg/L	-	-	<0.25	<0.25	0.081	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
EPH (C10-C32)	mg/L	-	-	<0.25	<0.25	0.095	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Total EPH (C10-C30)	mg/L	-	-	<0.25	<0.25	-	-	-	-	-	-	-	-	-	-	-	<0.25	<0.25	-	-	-	<0.25	<0.25

Table Notes:
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F)
[(a)] = guideline is a minimum value.
[(b)] = guideline is hardness dependent.
[(c)] = for some samples, water hardness was greater than 250 mg/L.
[(d)] = guideline is chloride dependent.
[(e)] & [(f)] = the ammonia guideline is pH and temperature dependent.
[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[(Mn)] = Exceeds BC WQG long-term chronic (30-day mean)
[(Mx)] = Exceeds BC WQG short-term acute (maximum)
[(DL>Mn)] = Detection Limit exceeds BC WQG 30-day mean
[(DL>Mx)] = Detection Limit exceeds BC WQG maximum
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-10	SW-10	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-2	SW-5	SW-5	SW-5	SW-5	SW-5
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-09-30	2021-04-21	2016-04-16	2016-07-07	2016-10-25	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-10-22	2004-07-26	2006-05-25	2007-08-08	2008-06-10	2009-08-25
Dissolved Metals																							
Aluminum	mg/L	0.0068 - 0.050[b]	0.023 - 0.10[b]	**1.2**[(Mn, Mx)]	**0.42**[(Mn, Mx)]	-	-	-	-	-	-	-	**0.10**[(Mn, Mx)]	**0.019**[(Mn)]	0.016	**0.050**[(Mn, Mx)]	**0.15**[(Mn, Mx)]	**0.21**[(Mn, Mx)]	-	-	-	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	-	-	-	-	-
Arsenic	mg/L	-	-	0.0010	0.00040	-	-	-	-	-	-	-	0.00055	0.00039	0.00035	0.00042	0.00026	0.0031	-	-	-	-	-
Barium	mg/L	-	-	0.022	0.0087	-	-	-	-	-	-	-	0.0078	0.0068	0.0057	0.0073	0.0096	0.018	-	-	-	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	-	-	-	-	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-	-
Boron	mg/L	-	-	<0.01	<0.01	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-
Cadmium	mg/L	0.000043 - 0.00046[b]	0.000063 - 0.0025[b]	0.000046	0.000019	-	-	-	-	-	-	-	**0.000089**[(Mn, Mx)]	0.000039	0.000028	0.000022	0.0000066	0.000087	-	-	-	-	-
Cesium	mg/L	-	-	0.000029	0.000021	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-
Chromium	mg/L	-	-	0.0013	<0.0005	-	-	-	-	-	-	-	0.00023	0.00011	<0.0001	0.00018	<0.0005	<0.0005	-	-	-	-	-
Cobalt	mg/L	-	-	0.00076	0.00027	-	-	-	-	-	-	-	0.00021	0.00014	0.00012	0.00012	<0.0001	0.00082	-	-	-	-	-
Copper	mg/L	0.0002[i]	0.00020 - 0.00131[i]	**0.00198**[(Mn, Mx)]	**0.00291**[(Mn, Mx)]	-	-	-	-	-	-	-	**0.00095**[(Mn, Mx)]	**0.00066**[(Mn, Mx)]	**0.00033**[(Mn, Mx)]	**0.00026**[(Mn, Mx)]	**0.00088**[(Mn, Mx)]	**0.00274**[(Mn, Mx)]	-	-	-	-	-
Iron	mg/L	-	0.35	**2.0**[(Mx)]	**0.95**[(Mx)]	-	-	-	-	-	-	-	0.34	0.21	**0.35**[(Mx)]	0.28	0.17	**1.3**[(Mx)]	-	-	-	-	-
Lead	mg/L	-	-	0.00039	0.00013	-	-	-	-	-	-	-	0.00010	<0.00005	0.00019	<0.00005	<0.00005	0.00011	-	-	-	-	-
Lithium	mg/L	-	-	<0.001	<0.001	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-
Manganese	mg/L	-	-	0.066	0.029	-	-	-	-	-	-	-	0.18	0.040	0.039	0.037	0.0075	0.23	-	-	-	-	-
Mercury	mg/L	-	-	0.000018	0.0000057	-	-	-	-	-	-	-	<0.000005	<0.000005	<0.000005	0.0000060	<0.000005	<0.000005	-	-	-	-	-
Molybdenum	mg/L	-	-	0.000060	<0.00005	-	-	-	-	-	-	-	0.00012	0.000068	0.00013	0.00013	<0.00005	<0.00005	-	-	-	-	-
Nickel	mg/L	-	-	0.0019	0.00059	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00096	-	-	-	-	-
Rubidium	mg/L	-	-	0.0018	0.0010	-	-	-	-	-	-	-	0.0014	0.00022	0.00069	0.0016	<0.0002	0.0016	-	-	-	-	-
Selenium	mg/L	-	-	0.00015	0.000079	-	-	-	-	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	0.000053	0.000076	-	-	-	-	-
Silicon	mg/L	-	-	5.0	2.8	-	-	-	-	-	-	-	1.1	1.00	0.97	1.4	4.1	3.6	-	-	-	-	-
Silver	mg/L	-	-	0.000014	0.000012	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000016	-	-	-	-	-
Strontium	mg/L	-	-	0.055	0.023	-	-	-	-	-	-	-	0.024	0.024	0.030	0.032	0.070	0.087	-	-	-	-	-
Sulphur	mg/L	-	-	<0.5	<0.5	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-
Thallium	mg/L	-	-	<0.00001	<0.00001	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-
Thorium	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Titanium	mg/L	-	-	0.023	0.0081	-	-	-	-	-	-	-	0.0040	0.00044	0.00038	0.0014	0.0026	0.0046	-	-	-	-	-
Tungsten	mg/L	-	-	<0.0001	<0.0001	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-
Uranium	mg/L	-	-	0.000062	0.000033	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000053	-	-	-	-	-
Vanadium	mg/L	-	-	0.0021	0.00076	-	-	-	-	-	-	-	0.00063	<0.0005	<0.0005	<0.0005	<0.0005	0.00071	-	-	-	-	-
Zinc	mg/L	-	-	0.0071	0.0040	-	-	-	-	-	-	-	0.014	0.011	0.014	0.017	0.0013	0.018	-	-	-	-	-
Zirconium	mg/L	-	-	0.0010	0.00060	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0004	0.00032	-	-	-	-	-
Volatile Organics																							
Benzene	µg/L	40	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
Ethylbenzene	µg/L	200	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
Toluene	µg/L	0.50	-	**0.73**[(Mn)]	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	**6.4**[(Mn)]	-	-	-	-	-
Xylenes	µg/L	30	-	<0.75	-	-	-	-	-	-	-	-	-	<0.75	<0.75	<0.75	-	<0.5	-	-	-	-	-
m,p-Xylenes	µg/L	-	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.4	-	-	-	-	-
o-Xylene	µg/L	-	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.3	-	-	-	-	-
Styrene	µg/L	72	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	1.5	-	-	-	-	-
Methyl tert-butyl ether	µg/L	-	-	<0.5	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	-	<0.5	-	-	-	-	-
Hydrocarbons																							
EPH (C10-C19)	mg/L	-	-	<0.25	-	-	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	-	<0.25	-	-	-	-	-
EPH (C10-C32)	mg/L	-	-	<0.25	-	-	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	-	<0.25	-	-	-	-	-
Total EPH (C10-C30)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	-	-	-	-	-	-	-	-	-

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[e] & [f] = the ammonia guideline is pH and temperature dependent.
[g] = guideline is for chromium VI.
[h] = guideline is pH dependent.
[i] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[Mn] = Exceeds BC WQG long-term chronic (30-day mean)
[Mx] = Exceeds BC WQG short-term acute (maximum)
[DL>Mn] = Detection Limit exceeds BC WQG 30-day mean
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< Indicates parameter was below laboratory equipment detection limit.
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Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-5
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2010-03-16	2010-06-22	2010-09-30	2012-02-28	2012-08-14	2012-10-04	2013-03-27	2013-10-17	2014-07-07	2014-11-25	2015-05-26	2015-11-01	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21
Dissolved Metals																								
Aluminum	mg/L	0.0068 - 0.050[(h)]	0.023 - 0.10[(h)]	-	-	-	-	-	-	-	-	**0.092**[(Mn)]	-	-	-	-	-	-	-	-	-	-	-	**0.45**[(Mn, Mx)]
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	0.00073	-	-	-	-	-	-	-	-	-	-	-	0.00058
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	0.016	-	-	-	-	-	-	-	-	-	-	-	0.016
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00005
Boron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000013
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001
Chromium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00054
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00019
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	-	-	-	-	-	-	-	-	**0.00083**[(Mn, Mx)]	-	-	-	-	-	-	-	-	-	-	-	**0.00233**[(Mn, Mx)]
Iron	mg/L	-	0.35	-	-	-	-	-	-	-	-	**0.60**[(Mx)]	-	-	-	-	-	-	-	-	-	-	-	**0.71**[(Mx)]
Lead	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00015
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	0.061	-	-	-	-	-	-	-	-	-	-	-	0.025
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000080
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000067
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00065
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00042
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000091
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	0.48	-	-	-	-	-	-	-	-	-	-	-	3.7
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000011
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	0.092	-	-	-	-	-	-	-	-	-	-	-	0.067
Sulphur	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.52
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0067
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001
Uranium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000023
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00083
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	0.0053	-	-	-	-	-	-	-	-	-	-	-	0.011
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00065
Volatile Organics																								
Benzene	µg/L	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	µg/L	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																								
EPH (C10-C19)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH (C10-C32)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total EPH (C10-C30)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table Notes:
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F)
[(a)] = guideline is a minimum value.
[(b)] = guideline is hardness dependent.
[(c)] = for some samples, water hardness was greater than 250 mg/L.
[(d)] = guideline is chloride dependent.
[(e) & (f)] = the ammonia guideline is pH and temperature dependent.
[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[(Mn)] = Exceeds BC WQG long-term chronic (30-day mean)
[(Mx)] = Exceeds BC WQG short-term acute (maximum)
[(DL>Mn)] = Detection Limit exceeds BC WQG 30-day mean
[(DL>Mx)] = Detection Limit exceeds BC WQG maximum
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-5	SW-5	SW-5	SW-5	SW-5	SW-5	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-06-24	2020-08-20	2020-09-30	2021-04-21	2021-07-20	2021-10-22	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-22	2021-07-20
Dissolved Metals																							
Aluminum	mg/L	0.0068 - 0.050[(h)]	0.023 - 0.10[(h)]	**0.17**[(Mn, Mx)]	**0.20**[(Mn, Mx)]	**0.43**[(Mn, Mx)]	**0.20**[(Mn, Mx)]	**0.057**[(Mn)]	**0.21**[(Mn, Mx)]	-	-	-	-	-	-	-	-	**0.64**[(Mn, Mx)]	**0.29**[(Mn, Mx)]	**0.24**[(Mn, Mx)]	**0.44**[(Mn, Mx)]	**0.20**[(Mn, Mx)]	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	<0.0001	0.00023	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic	mg/L	-	-	0.00082	0.00090	0.00074	0.00051	0.00080	0.00070	-	-	-	-	-	-	-	-	0.00052	0.0010	0.00088	0.00084	0.00041	-
Barium	mg/L	-	-	0.022	0.018	0.016	0.010	0.016	0.017	-	-	-	-	-	-	-	-	0.015	0.024	0.015	0.016	0.0092	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-	-	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-
Boron	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	0.000097	0.0000052	0.000011	0.000010	0.000012	0.0000062	-	-	-	-	-	-	-	-	0.000020	0.000026	0.000018	0.000019	0.000014	-
Cesium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Chromium	mg/L	-	-	0.00038	0.00050	0.00062	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	0.00081	0.00053	0.00039	0.00088	<0.0005	-
Cobalt	mg/L	-	-	0.00019	0.00038	0.00018	0.00016	0.00018	0.00032	-	-	-	-	-	-	-	-	0.00017	0.00044	0.00056	0.00021	0.00016	-
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	**0.00073**[(Mn, Mx)]	**0.00072**[(Mn, Mx)]	**0.00182**[(Mn, Mx)]	**0.00145**[(Mn, Mx)]	**0.00038**[(Mn, Mx)]	**0.00099**[(Mn, Mx)]	-	-	-	-	-	-	-	-	**0.00356**[(Mn, Mx)]	**0.00165**[(Mn, Mx)]	**0.00092**[(Mn, Mx)]	**0.00241**[(Mn, Mx)]	**0.00116**[(Mn, Mx)]	-
Iron	mg/L	-	0.35	**0.51**[(Mx)]	**0.89**[(Mx)]	**0.75**[(Mx)]	**0.41**[(Mx)]	**0.44**[(Mx)]	**0.84**[(Mx)]	-	-	-	-	-	-	-	-	**0.47**[(Mx)]	**1.1**[(Mx)]	**1.2**[(Mx)]	**0.71**[(Mx)]	**0.40**[(Mx)]	-
Lead	mg/L	-	-	0.000052	0.00010	0.00017	0.000097	0.000054	0.000070	-	-	-	-	-	-	-	-	0.00012	0.00019	0.00047	0.00015	0.00012	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-
Manganese	mg/L	-	-	0.030	0.072	0.018	0.028	0.037	0.066	-	-	-	-	-	-	-	-	0.019	0.15	0.14	0.037	0.032	-
Mercury	mg/L	-	-	<0.000005	<0.000005	0.000019	<0.000005	<0.000005	<0.000005	-	-	-	-	-	-	-	-	0.000017	<0.000005	<0.000005	0.000020	<0.000005	-
Molybdenum	mg/L	-	-	<0.00005	0.00014	0.000085	0.00035	<0.00005	<0.00005	-	-	-	-	-	-	-	-	0.000058	0.00011	0.00027	0.00017	0.000072	-
Nickel	mg/L	-	-	0.0011	0.0012	0.0012	0.00061	0.00066	0.00088	-	-	-	-	-	-	-	-	0.0010	0.0014	0.00082	0.0015	0.00064	-
Rubidium	mg/L	-	-	<0.0002	0.00028	0.00069	0.00047	<0.0002	0.00040	-	-	-	-	-	-	-	-	0.00033	0.00047	0.00049	0.00089	0.00052	-
Selenium	mg/L	-	-	<0.00005	0.000080	0.00014	0.000070	0.000063	0.000069	-	-	-	-	-	-	-	-	0.00014	0.00015	0.000060	0.00014	0.000089	-
Silicon	mg/L	-	-	0.93	2.7	3.5	1.2	0.47	2.9	-	-	-	-	-	-	-	-	4.6	2.5	2.7	4.4	2.5	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	0.000018	<0.00001	<0.00001	0.000020	<0.00001	-
Strontium	mg/L	-	-	0.096	0.089	0.067	0.046	0.10	0.086	-	-	-	-	-	-	-	-	0.052	0.11	0.081	0.066	0.046	-
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	0.51	<0.5	<0.5	<0.5	<0.5	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Titanium	mg/L	-	-	0.0011	0.0016	0.0068	0.0022	0.00044	0.0021	-	-	-	-	-	-	-	-	0.0085	0.0027	0.0030	0.0060	0.0020	-
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-
Uranium	mg/L	-	-	<0.00001	<0.00001	0.000016	0.000011	<0.00001	<0.00001	-	-	-	-	-	-	-	-	0.000037	0.000017	<0.00001	0.000026	0.000013	-
Vanadium	mg/L	-	-	<0.0005	<0.0005	0.00073	<0.0005	<0.0005	<0.0005	-	-	-	-	-	-	-	-	0.00092	0.00058	0.00059	0.00092	<0.0005	-
Zinc	mg/L	-	-	0.0056	0.0095	0.0090	0.0046	0.0032	0.0086	-	-	-	-	-	-	-	-	0.0061	0.073	0.011	0.0042	0.0022	-
Zirconium	mg/L	-	-	0.00026	0.00033	0.00049	0.00041	<0.0002	0.00023	-	-	-	-	-	-	-	-	0.0011	0.00053	0.00025	0.00089	0.00041	-
Volatile Organics																							
Benzene	µg/L	40	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Ethylbenzene	µg/L	200	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Toluene	µg/L	0.50	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Xylenes	µg/L	30	-	<0.75	<0.75	<0.75	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.75	-	<0.75	-	-
m,p-Xylenes	µg/L	-	-	<0.5	<0.5	<0.5	<0.4	<0.4	<0.4	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
o-Xylene	µg/L	-	-	<0.5	<0.5	<0.5	<0.3	<0.3	<0.3	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Styrene	µg/L	72	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Methyl tert-butyl ether	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	<0.5	-	<0.5	-	-
Hydrocarbons																							
EPH (C10-C19)	mg/L	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	-	-
EPH (C10-C32)	mg/L	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	-	-	<0.25	<0.25	<0.25	-	-
Total EPH (C10-C30)	mg/L	-	-	<0.25	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25	<0.25	-	-	-

Table Notes:
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[(a)] = guideline is a minimum value.
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[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[(Mn)] = Exceeds BC WQG long-term chronic (30-day mean)
[(Mx)] = Exceeds BC WQG short-term acute (maximum)
[(DL>Mn)] = Detection Limit exceeds BC WQG 30-day mean
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< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7	SW-7
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2004-07-26	2007-08-08	2009-08-25	2010-03-16	2010-06-22	2010-09-30	2012-02-28	2012-08-14	2012-10-04	2013-03-27	2013-10-17	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-11-21	2020-06-24
Dissolved Metals																							
Aluminum	mg/L	0.0068 - 0.050[(h)]	0.023 - 0.10[(h)]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.81[(Mn, Mx)]	0.11[(Mn, Mx)]
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00010	<0.0001
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00057	0.00049
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.017	0.020
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Boron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.026	0.039
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000098	<0.000005
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000029	<0.00001
Chromium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00085	0.00027
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00021	0.00021
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00304[(Mn, Mx)]	0.00127[(Mn, Mx)]
Iron	mg/L	-	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.56[(Mx)]	0.14
Lead	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00012	<0.00005
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0083	0.073
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000097	<0.000005
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000084	0.000069
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0011	0.0011
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00056	0.00046
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000097	0.00012
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	4.0
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000016	<0.00001
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.068	0.12
Sulphur	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	<0.5
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.016	0.0011
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Uranium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000039	0.000014
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0014	<0.0005
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0026	0.0015
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0013	0.00034
Volatile Organics																							
Benzene	µg/L	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Ethylbenzene	µg/L	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Toluene	µg/L	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Xylenes	µg/L	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.75
m,p-Xylenes	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
o-Xylene	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Styrene	µg/L	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Methyl tert-butyl ether	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5
Hydrocarbons																							
EPH (C10-C19)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
EPH (C10-C32)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25
Total EPH (C10-C30)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.25

Table Notes:
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F)
[(a)] = guideline is a minimum value.
[(b)] = guideline is hardness dependent.
[(c)] = for some samples, water hardness was greater than 250 mg/L.
[(d)] = guideline is chloride dependent.
[(e) & (f)] = the ammonia guideline is pH and temperature dependent.
[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[(Mn)] = Exceeds BC WQG long-term chronic (30-day mean)
[(Mx)] = Exceeds BC WQG short-term acute (maximum)
[(DL>Mn)] = Detection Limit exceeds BC WQG 30-day mean
[(DL>Mx)] = Detection Limit exceeds BC WQG maximum
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-7	SW-7	SW-7	SW-7	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8	SW-8
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2020-08-20	2020-09-30	2021-04-22	2021-10-22	2004-07-26	2006-05-25	2007-08-08	2008-06-10	2014-07-07	2014-11-25	2015-05-26	2015-11-01	2016-04-16	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2018-05-28	2019-04-16	2019-08-13
Dissolved Metals																							
Aluminum	mg/L	0.0068 - 0.050[(h)]	0.023 - 0.10[(h)]	**0.32**[(Mn, Mx)]	**0.29**[(Mn, Mx)]	**0.21**[(Mn, Mx)]	**0.13**[(Mn, Mx)]	-	-	-	-	**0.13**[(Mn, Mx)]	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	0.00093	0.00076	0.00063	0.00034	-	-	-	-	0.0013	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	-	-	0.019	0.015	0.0100	0.014	-	-	-	-	0.067	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	0.030	0.019	<0.01	<0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	0.000010	0.0000097	0.000011	0.0000054	-	-	-	-	0.000021	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	-	-	0.000026	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	0.00050	0.00047	<0.0005	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	-	-	0.00027	0.00018	0.00015	<0.0001	-	-	-	-	0.0015	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	**0.00171**[(Mn, Mx)]	**0.00191**[(Mn, Mx)]	**0.00135**[(Mn, Mx)]	**0.00166**[(Mn, Mx)]	-	-	-	-	**0.0009**[(Mn, Mx)]	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	0.35	**0.78**[(Mx)]	**0.51**[(Mx)]	**0.57**[(Mx)]	0.17	-	-	-	-	**2.0**[(Mx)]	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	-	-	0.000078	0.000077	0.000070	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	-	-	0.046	0.032	0.029	0.0030	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	<0.000005	0.000015	<0.000005	<0.000005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	0.00023	0.00014	0.00090	<0.00005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	0.0016	0.0012	0.00069	0.00060	-	-	-	-	0.0012	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	-	-	0.00074	0.00049	0.00047	0.00022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	0.00015	0.00012	0.000062	0.000080	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	mg/L	-	-	4.2	4.1	1.8	3.0	-	-	-	-	3.2	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	0.000013	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	-	-	0.10	0.078	0.051	0.070	-	-	-	-	0.27	-	-	-	-	-	-	-	-	-	-	-
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	0.0054	0.0028	0.0028	0.00088	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	-	-	0.000028	0.000023	0.000014	<0.00001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	0.0011	0.00056	0.00059	<0.0005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	0.0027	0.0053	0.0024	<0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L	-	-	0.0011	<0.0006	0.00039	0.00024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organics																							
Benzene	µg/L	40	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	200	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	µg/L	0.50	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	µg/L	30	-	<0.75	<0.75	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylenes	µg/L	-	-	<0.5	<0.5	<0.4	<0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	µg/L	-	-	<0.5	<0.5	<0.3	<0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	µg/L	72	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	µg/L	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbons																							
EPH (C10-C19)	mg/L	-	-	<0.25	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPH (C10-C32)	mg/L	-	-	<0.25	<0.25	<0.25	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total EPH (C10-C30)	mg/L	-	-	<0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table Notes:
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F)
[(a)] = guideline is a minimum value.
[(b)] = guideline is hardness dependent.
[(c)] = for some samples, water hardness was greater than 250 mg/L.
[(d)] = guideline is chloride dependent.
[(e) & (f)] = the ammonia guideline is pH and temperature dependent.
[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
[(Mn)] = Exceeds BC WQG long-term chronic (30-day mean)
[(Mx)] = Exceeds BC WQG short-term acute (maximum)
[(DL>Mn)] = Detection Limit exceeds BC WQG 30-day mean
[(DL>Mx)] = Detection Limit exceeds BC WQG maximum
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

Appendix C
Results of Surface Water Analyses
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name		SW-8	SW-8	SW-8	SW-8	SW-8	WETLAND 3	WETLAND 3	WETLAND 3	WETLAND 3
		BC WQG AW-F 30-day mean (Chronic)	BC WQG AW-F Maximum (Acute)	2019-11-21	2020-06-24	2020-08-20	2020-09-30	2021-04-22	2019-07-22	2019-07-31	2019-08-07	2019-08-22
Dissolved Metals												
Aluminum	mg/L	0.0068 - 0.050[(h)]	0.023 - 0.10[(h)]	**0.25**[(Mn, Mx)]	**0.32**[(Mn, Mx)]	**0.25**[(Mn, Mx)]	**0.14**[(Mn, Mx)]	**0.10**[(Mn, Mx)]	-	-	-	-
Antimony	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-
Arsenic	mg/L	-	-	0.00048	0.0011	0.00086	0.00048	0.00036	-	-	-	-
Barium	mg/L	-	-	0.011	0.017	0.014	0.011	0.0078	-	-	-	-
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-
Bismuth	mg/L	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	-	-	-	-
Boron	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	-	-	-
Cadmium	mg/L	0.000043 - 0.00046[(b)]	0.000063 - 0.0025[(b)]	0.000014	0.0000094	0.000018	0.000018	0.0000084	-	-	-	-
Cesium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-
Chromium	mg/L	-	-	0.00031	0.00043	0.00037	0.00028	<0.0005	-	-	-	-
Cobalt	mg/L	-	-	0.00013	0.00039	0.00060	0.00034	0.00018	-	-	-	-
Copper	mg/L	0.0002[(i)]	0.00020 - 0.00131[(i)]	**0.00101**[(Mn, Mx)]	**0.00105**[(Mn, Mx)]	**0.0008**[(Mn, Mx)]	**0.00051**[(Mn, Mx)]	**0.00031**[(Mn, Mx)]	-	-	-	-
Iron	mg/L	-	0.35	**0.53**[(Mx)]	**1.2**[(Mx)]	**1.2**[(Mx)]	**0.79**[(Mx)]	**0.39**[(Mx)]	-	-	-	-
Lead	mg/L	-	-	0.00024	0.00029	0.00051	0.00044	0.00024	-	-	-	-
Lithium	mg/L	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	-	-
Manganese	mg/L	-	-	0.026	0.084	0.15	0.096	0.040	-	-	-	-
Mercury	mg/L	-	-	0.0000068	<0.000005	<0.000005	0.000017	0.0000050	-	-	-	-
Molybdenum	mg/L	-	-	<0.00005	0.000076	0.000093	<0.00005	<0.00005	-	-	-	-
Nickel	mg/L	-	-	<0.0005	0.00098	0.00082	0.00054	<0.0005	-	-	-	-
Rubidium	mg/L	-	-	0.00034	0.00047	0.00050	0.00058	0.00050	-	-	-	-
Selenium	mg/L	-	-	0.000058	0.000090	0.000062	0.000057	<0.00005	-	-	-	-
Silicon	mg/L	-	-	3.1	2.5	2.6	2.7	1.7	-	-	-	-
Silver	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-
Strontium	mg/L	-	-	0.065	0.088	0.076	0.067	0.044	-	-	-	-
Sulphur	mg/L	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-
Tellurium	mg/L	-	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	-	-	-
Thallium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-
Thorium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-
Tin	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-
Titanium	mg/L	-	-	0.0024	0.0030	0.0030	0.0016	0.00097	-	-	-	-
Tungsten	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	-
Uranium	mg/L	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	-	-	-	-
Vanadium	mg/L	-	-	0.00077	0.00078	0.00054	<0.0005	<0.0005	-	-	-	-
Zinc	mg/L	-	-	0.0043	0.0061	0.0038	0.0069	0.0029	-	-	-	-
Zirconium	mg/L	-	-	0.00021	0.00026	0.00024	<0.0002	<0.0002	-	-	-	-
Volatile Organics												
Benzene	µg/L	40	-	-	<0.5	<0.5	<0.5	-	<0.0005	-	-	-
Ethylbenzene	µg/L	200	-	-	<0.5	<0.5	<0.5	-	<0.0005	-	-	-
Toluene	µg/L	0.50	-	-	<0.5	<0.5	<0.5	-	<0.00045	-	-	-
Xylenes	µg/L	30	-	-	<0.75	<0.75	<0.75	-	-	-	-	-
m,p-Xylenes	µg/L	-	-	-	<0.5	<0.5	<0.5	-	<0.00075	-	-	-
o-Xylene	µg/L	-	-	-	<0.5	<0.5	<0.5	-	-	-	-	-
Styrene	µg/L	72	-	-	<0.5	<0.5	<0.5	-	<0.0005	-	-	-
Methyl tert-butyl ether	µg/L	-	-	-	<0.5	<0.5	<0.5	-	<0.0005	-	-	-
Hydrocarbons												
EPH (C10-C19)	mg/L	-	-	-	<0.25	<0.25	<0.25	-	-	-	-	-
EPH (C10-C32)	mg/L	-	-	-	<0.25	<0.25	<0.25	-	-	-	-	-
Total EPH (C10-C30)	mg/L	-	-	-	<0.25	<0.25	-	-	-	-	-	-

Table Notes:
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F)
[(a)] = guideline is a minimum value.
[(b)] = guideline is hardness dependent.
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[(d)] = guideline is chloride dependent.
[(e) & (f)] = the ammonia guideline is pH and temperature dependent.
[(g)] = guideline is for chromium VI.
[(h)] = guideline is pH dependent.
[(i)] = guideline for dissolved copper is pH, hardness, and dissolved organic carbon dependent.
(Mn) = Exceeds BC WQG long-term chronic (30-day mean)
(Mx) = Exceeds BC WQG short-term acute (maximum)
(DL>Mn) = Detection Limit exceeds BC WQG 30-day mean
(DL>Mx) = Detection Limit exceeds BC WQG maximum
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined

2 - Groundwater Data

Appendix C
Results of Groundwater Analyses - BH-A
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-A Laboratory ID: WG_BH-A_43354_N Sample Date: 2018-09-11 QA/QC:
Anions + Nutrients			
Alkalinity, Total as CaCO3		ug/L	277000
Chloride (Cl)	250000	ug/L	< 2500
Nitrate (as N)	10000	ug/L	458
Nitrite (as N)	1000	ug/L	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L	< 463
Ammonia (as N)		ug/L	< 5
Sulfate (SO4)	500000	ug/L	142000
Phosphorus		ug/L	<50
Field + Physical			
Hardness, Calcium Carbonate (Dissolved)		mg/L	203
Chemical Oxygen Demand		mg/L	< 20
pH, lab		pH	8.36
Metals, Dissolved			
Aluminum	9500	ug/L	1.8
Antimony	6	ug/L	0.21
Arsenic	10	ug/L	0.46
Barium	1000	ug/L	75.3
Beryllium	8	ug/L	< 0.1
Bismuth		ug/L	< 0.05
Boron	5000	ug/L	51
Cadmium	5	ug/L	0.0495
Calcium		ug/L	53100
Chromium	50	ug/L	< 0.1
Cobalt	1	ug/L	< 0.1
Copper	1500	ug/L	2.25
Iron	6500	ug/L	< 10
Lead	10	ug/L	0.063
Lithium	8	ug/L	1.2
Magnesium		ug/L	17000
Manganese	1500	ug/L	0.5
Mercury	1	ug/L	< 0.005
Molybdenum	250	ug/L	3.29
Nickel	80	ug/L	0.57
Potassium		ug/L	1580
Selenium	10	ug/L	1.39
Silicon		ug/L	3800
Silver	20	ug/L	< 0.01
Sodium	200000	ug/L	91100
Strontium	2500	ug/L	795
Sulphur (S)		ug/L	47300
Tellurium		ug/L	< 0.2
Thallium		ug/L	0.011
Thorium-232		ug/L	< 0.1
Tin	2500	ug/L	< 0.1
Titanium		ug/L	< 0.3
Uranium	20	ug/L	3.31
Vanadium	20	ug/L	< 0.5
Zinc	3000	ug/L	4.1
Zirconium		ug/L	< 0.06
Cesium		ug/L	< 0.01
Rubidium		ug/L	0.29
Tungsten	3	ug/L	< 0.1

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-B Laboratory ID: WG_BH-B_42849_N Sample Date: 2017-04-24 QA/QC
Anions + Nutrients			
Alkalinity, Total as CaCO3		ug/L	380000
Chloride (Cl)	250000	ug/L	171000
Nitrate (as N)	10000	ug/L	< 10
Nitrite (as N)	1000	ug/L	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L	< 10
Ammonia (as N)		ug/L	900
Sulfate (SO4)	500000	ug/L	5900
Phosphorus		ug/L	<50
Field + Physical			
Conductivity		uS/cm	1170
Hardness, Calcium Carbonate (Dissolved)		mg/L	421
Chemical Oxygen Demand		mg/L	304
pH, lab		pH	6.5
Metals, Dissolved			
Aluminum	9500	ug/L	17.7
Antimony	6	ug/L	0.18
Arsenic	10	ug/L	2.15
Barium	1000	ug/L	217
Beryllium	8	ug/L	< 0.1
Bismuth		ug/L	< 0.1
Boron	5000	ug/L	205
Cadmium	5	ug/L	0.174
Calcium		ug/L	105000
Chromium	50	ug/L	< 0.5
Cobalt	1	ug/L	**4.05**
Copper	1500	ug/L	544
Iron	6500	ug/L	170
Lead	10	ug/L	0.14
Lithium	8	ug/L	4.36
Magnesium		ug/L	38900
Manganese	1500	ug/L	**2190**
Mercury	1	ug/L	< 0.02
Molybdenum	250	ug/L	0.33
Nickel	80	ug/L	4.7
Potassium		ug/L	5370
Selenium	10	ug/L	< 0.5
Silicon		ug/L	5400
Silver	20	ug/L	< 0.05
Sodium	200000	ug/L	61600
Strontium	2500	ug/L	802
Sulphur (S)		ug/L	< 3000
Tellurium		ug/L	< 0.2
Thallium		ug/L	< 0.02
Thorium-232		ug/L	< 0.1
Tin	2500	ug/L	< 0.2
Titanium		ug/L	< 5
Uranium	20	ug/L	1.85
Vanadium	20	ug/L	< 1
Zinc	3000	ug/L	33.6
Zirconium		ug/L	0.19

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-C
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-C Laboratory ID: WG_BH-C_42849_N Sample Date: 2017-04-24 QA/QC
Anions + Nutrients			
Alkalinity, Total as CaCO3		ug/L	170000
Chloride (Cl)	250000	ug/L	28500
Nitrate (as N)	10000	ug/L	< 10
Nitrite (as N)	1000	ug/L	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L	< 10
Ammonia (as N)		ug/L	510
Sulfate (SO4)	500000	ug/L	3000
Phosphorus		ug/L	150
Field + Physical			
Conductivity		uS/cm	410
Hardness, Calcium Carbonate (Dissolved)		mg/L	171
Chemical Oxygen Demand		mg/L	178
pH, lab		pH	6.4
Metals, Dissolved			
Aluminum	9500	ug/L	89.4
Antimony	6	ug/L	0.11
Arsenic	10	ug/L	1.64
Barium	1000	ug/L	39.3
Beryllium	8	ug/L	< 0.1
Bismuth		ug/L	< 0.1
Boron	5000	ug/L	57
Cadmium	5	ug/L	0.195
Calcium		ug/L	47600
Chromium	50	ug/L	< 0.5
Cobalt	**1**	ug/L	**2.06**
Copper	1500	ug/L	2.14
Iron	6500	ug/L	112
Lead	10	ug/L	< 0.1
Lithium	8	ug/L	0.54
Magnesium		ug/L	12600
Manganese	1500	ug/L	733
Mercury	1	ug/L	< 0.02
Molybdenum	250	ug/L	0.15
Nickel	80	ug/L	2.58
Potassium		ug/L	3860
Selenium	10	ug/L	< 0.5
Silicon		ug/L	4700
Silver	20	ug/L	< 0.05
Sodium	200000	ug/L	17400
Strontium	2500	ug/L	268
Sulphur (S)		ug/L	< 3000
Tellurium		ug/L	< 0.2
Thallium		ug/L	< 0.02
Thorium-232		ug/L	< 0.1
Tin	2500	ug/L	< 0.2
Titanium		ug/L	< 5
Uranium	20	ug/L	0.135
Vanadium	20	ug/L	< 1
Zinc	3000	ug/L	7.4
Zirconium		ug/L	0.26

Table Notes:

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QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-1	BH-1	BH-1	BH-1	BH-1
			Laboratory ID	WG_E251512_41	WG_E251512_42	WG_E251512_42	WG_E251512_42	WG_E251512_42
				827_N	150_N	324_N	476_N	558_N
			Sample Date	2014-07-07	2015-05-26	2015-11-16	2016-04-16	2016-07-07
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		1250000	210000	210000	220000	220000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		< 1000	2200	5500	3300	3500
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		33	40	370	210	460
Nitrite (as N)	1000	ug/L		< 10	< 10	< 10	14	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	41	373	224	219
Ammonia (as N)		ug/L		70	< 30	64	80	< 30
Total Kjeldahl Nitrogen		mg/L		-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L		607	< 500	370	-	-
Sulfate (SO4)	500000	ug/L		9430	< 1000	< 1000	< 1000	< 1000
Cyanide	200	ug/L		-	< 10	< 10	-	-
Cyanide (SAD)		ug/L		< 5	-	-	-	-
Phosphorus, dissolved		ug/L		11	<20	50	70	40
Phosphorus, total		ug/L		21900	200	200	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	-	-	-	-
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		7.9	8.1	8.1	8.2	8.1
Temperature, field measured		deg c		-	-	-	-	-
Conductivity		uS/cm		464	387	404	394	396
Total Dissolved Solids		mg/L		289	190	220	-	-
Total Suspended Solids		mg/L		43000	72	72	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		0.69	1	2.6	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	171	154
Hardness, Calcium Carbonate (Dissolved)		mg/L		148	158	165	-	-
Chemical Oxygen Demand		mg/L		471	33	< 20	< 20	< 20
Depth to Water		mbtoc		-	-	-	-	-
Metals, Dissolved								
Aluminum	9500	ug/L		19	5	< 5	15	7
Antimony	6	ug/L		0.58	0.6	< 0.1	0.1	0.1
Arsenic	10	ug/L		0.53	1.8	1.6	2.1	1.6
Barium	1000	ug/L		320	212	262	242	218
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L		66	69	65	69	76
Cadmium	5	ug/L		< 0.01	0.2	0.68	0.03	0.9
Calcium		ug/L		17600	18400	19500	20400	19500
Chromium	50	ug/L		< 1	< 0.5	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L		***< 5***	< 0.05	0.11	< 0.05	< 0.05
Copper	1500	ug/L		< 5	2.4	2.3	1.4	2.9
Iron	6500	ug/L		< 10	< 10	< 10	19	< 10
Lead	10	ug/L		< 0.2	< 0.1	< 0.1	0.2	< 0.1
Lithium	8	ug/L		< 5	0.3	0.3	0.3	0.4
Magnesium		ug/L		25300	27300	28400	29100	25500
Manganese	1500	ug/L		36.3	128	2.6	99.9	0.9
Mercury	1	ug/L		< 0.01	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L		9.5	2.7	10	10	10
Nickel	80	ug/L		< 1	1.6	1.2	0.4	1.8
Potassium		ug/L		1830	3500	2490	2050	2030
Selenium	10	ug/L		< 0.1	0.9	< 0.5	< 0.5	< 0.5
Silicon		ug/L		1220	9300	1100	1300	1200
Silver	20	ug/L		< 0.02	< 0.05	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L		27200	32000	35600	33000	30300
Strontium	2500	ug/L		709	672	682	705	642
Sulphur (S)		ug/L		< 3000	2000	< 1000	< 1000	2000
Tellurium		ug/L		-	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.05	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232		ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		< 5	< 0.2	< 0.2	< 0.2	0.2
Titanium		ug/L		< 5	< 5	< 5	< 5	< 5
Uranium	20	ug/L		0.27	0.04	0.04	0.05	0.05
Vanadium	20	ug/L		< 5	< 1	< 1	< 1	< 1
Zinc	3000	ug/L		< 5	4	27	< 4	< 4
Zirconium		ug/L		< 0.5	< 0.1	< 0.1	< 0.1	< 0.1
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		< 0.5	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		< 2	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		< 0.5	-	-	-	-
Benzene	5	ug/L		< 0.4	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		< 0.4	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		< 1	-	-	-	-

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Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-1	BH-1	BH-1	BH-1	BH-1
			Laboratory ID	WG_E251512_42	WG_E251512_42	WG_E251512_42	WG_E251512_42	WG_E251512_43
				668_N	849_N	900_N	978_N	250_N
			Sample Date	2016-10-25	2017-04-24	2017-06-14	2017-08-31	2018-05-30
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		220000	220000	220000	-	276000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		14700	3500	2400	-	690
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		220	189	18	-	< 5
Nitrite (as N)	1000	ug/L		10	< 10	< 10	-	< 1
Nitrogen, Nitrate-Nitrite	10000	ug/L		230	189	18	-	< 6
Ammonia (as N)		ug/L		< 30	< 30	< 30	-	426
Total Kjeldahl Nitrogen		mg/L		-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		< 1000	1000	< 1000	-	15400
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		60	<50	<50	-	<50
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	395	397	400	383
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	7.8	8	7.7	-
pH, lab		pH		8.2	8.1	8.4	-	-
Temperature, field measured		deg c		-	6.7	7	7.4	6.4
Conductivity		uS/cm		428	404	400	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		175	149	158	-	266
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		< 20	< 20	< 20	-	605
Depth to Water		mbtoc		-	21.08	21.98	21.07	21.1
Metals, Dissolved								
Aluminum	9500	ug/L		15	< 5	7.5	-	4.9
Antimony	6	ug/L		0.3	< 0.1	0.21	-	0.16
Arsenic	10	ug/L		2	1.6	1.81	-	9.27
Barium	1000	ug/L		243	197	237	-	113
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	-	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	-	< 0.05
Boron	5000	ug/L		72	73	65	-	84
Cadmium	5	ug/L		0.99	0.239	0.365	-	0.0058
Calcium		ug/L		19700	18300	19800	-	46800
Chromium	50	ug/L		0.6	< 0.5	< 0.5	-	< 0.1
Cobalt	1	ug/L		0.1	< 0.1	< 0.1	-	0.21
Copper	1500	ug/L		4.8	2.13	1.37	-	2.04
Iron	6500	ug/L		< 10	< 10	21	-	217
Lead	10	ug/L		< 0.1	< 0.1	< 0.1	-	< 0.05
Lithium	8	ug/L		0.4	0.5	0.3	-	1.4
Magnesium		ug/L		30600	25200	26300	-	36100
Manganese	1500	ug/L		6.9	1.45	92.6	-	131
Mercury	1	ug/L		< 0.02	< 0.02	< 0.02	-	< 0.005
Molybdenum	250	ug/L		10.7	9.66	9.46	-	6.04
Nickel	80	ug/L		4.7	0.53	0.84	-	< 0.5
Potassium		ug/L		2400	2010	2020	-	2010
Selenium	10	ug/L		< 0.5	< 0.5	< 0.5	-	< 0.05
Silicon		ug/L		1300	1200	1300	-	4230
Silver	20	ug/L		0.23	< 0.05	< 0.05	-	< 0.01
Sodium	200000	ug/L		41200	30500	30000	-	31500
Strontium	2500	ug/L		761	609	694	-	1120
Sulphur (S)		ug/L		< 1000	< 3000	< 3000	-	5120
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	-	< 0.2
Thallium		ug/L		< 0.02	< 0.02	< 0.02	-	< 0.01
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	-	< 0.1
Tin	2500	ug/L		0.2	< 0.2	< 0.2	-	< 0.1
Titanium		ug/L		< 5	< 5	< 5	-	< 0.3
Uranium	20	ug/L		0.05	0.055	0.055	-	0.511
Vanadium	20	ug/L		< 1	< 1	< 1	-	< 0.5
Zinc	3000	ug/L		27	< 4	10.8	-	< 1
Zirconium		ug/L		< 0.1	< 0.1	< 0.1	-	< 0.06
Cesium		ug/L		-	-	-	-	< 0.01
Rubidium		ug/L		-	-	-	-	0.4
Tungsten	3	ug/L		-	-	-	-	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	< 0.001
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	< 0.005
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	< 0.0004
Benzene	5	ug/L		-	-	-	-	< 0.0005
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	0.00058
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-1	BH-1	BH-1	BH-1	BH-1
			Laboratory ID	WG_E251512_43	WG_E251512_43	WG_E251512_43	WG_E251512_43	WG_E251512_43
				292_N	354_N	572_N	690_N	690_FD
			Sample Date	2018-07-11	2018-09-11	2019-04-17	2019-08-13	2019-08-13
			QA/QC				FDA	FD
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		379000	392000	392000	326000	309000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		620	< 2500	< 500	< 50	< 500
Fluoride (F)	1.5	mg/L		-	-	0.083	0.074	0.075
Nitrate (as N)	10000	ug/L		24.6	< 25	< 5	< 5	< 5
Nitrite (as N)	1000	ug/L		2.6	< 5	< 1	< 1	< 1
Nitrogen, Nitrate-Nitrite	10000	ug/L		27.6	< 30	-	-	-
Ammonia (as N)		ug/L		314	297	365	276	271
Total Kjeldahl Nitrogen		mg/L		-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		18200	27700	13900	14400	14700
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	<50	67	<50	759
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	3	5.4	5.4
Conductivity, field measured		uS/cm		526	463	472	455	455
Oxidation Reduction Potential, field measured		mV		-	-	335.4	271.1	271.1
pH, field measured		pH units		-	-	7.89	7.32	7.32
pH, lab		pH		-	8.36	-	8.38	8.37
Temperature, field measured		deg c		6.5	6.5	6.3	6.8	6.8
Conductivity		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	3.61	64.4	1.22
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		270	329	266	265	318
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		366	< 20	64	148	134
Depth to Water		mbtoc		21.05	21.05	22.72	21.17	21.17
Metals, Dissolved								
Aluminum	9500	ug/L		288	94.2	899	2.2	5600
Antimony	6	ug/L		0.18	< 0.1	0.21	< 0.1	0.11
Arsenic	10	ug/L		6.91	**16.5**	8.45	8.35	9.77
Barium	1000	ug/L		181	192	138	194	289
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	0.17
Bismuth		ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	5000	ug/L		83	110	82	89	100
Cadmium	5	ug/L		0.0162	0.0063	0.017	< 0.005	0.243
Calcium		ug/L		44600	57800	46000	40700	57700
Chromium	50	ug/L		0.31	0.13	0.87	< 0.1	6.47
Cobalt	1	ug/L		0.42	0.17	0.56	0.11	**5.39**
Copper	1500	ug/L		0.73	0.94	1.78	< 0.2	22.7
Iron	6500	ug/L		395	858	903	99	**9450**
Lead	10	ug/L		0.104	0.091	0.345	< 0.05	3.73
Lithium	8	ug/L		1.5	2	1.7	1.2	5.6
Magnesium		ug/L		38400	44900	36600	39600	42200
Manganese	1500	ug/L		159	175	169	135	728
Mercury	1	ug/L		0.0131	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum	250	ug/L		4.67	3.39	3.45	3.51	1.76
Nickel	80	ug/L		0.85	< 0.5	1.13	< 0.5	11.7
Potassium		ug/L		2320	1970	2170	2100	2340
Selenium	10	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Silicon		ug/L		4600	6480	5520	3770	12000
Silver	20	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	0.021
Sodium	200000	ug/L		30900	29800	30800	30700	30100
Strontium	2500	ug/L		1080	1370	1190	1150	1300
Sulphur (S)		ug/L		6570	9330	5280	4810	5000
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.01	< 0.01	< 0.01	< 0.01	0.025
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	0.57
Tin	2500	ug/L		0.35	< 0.1	< 0.1	< 0.1	0.16
Titanium		ug/L		< 6.3	1.64	31.9	< 0.3	64.2
Uranium	20	ug/L		0.751	1.05	0.782	0.657	0.785
Vanadium	20	ug/L		0.84	< 0.5	2.04	< 0.5	12.5
Zinc	3000	ug/L		2	2.6	3.8	< 1	39.2
Zirconium		ug/L		0.157	< 0.06	< 0.72	< 0.2	< 1.4
Cesium		ug/L		0.023	0.016	0.073	< 0.01	0.355
Rubidium		ug/L		0.61	0.43	0.84	0.4	1.79
Tungsten	3	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

		Sample Name	BH-1	BH-1	BH-1	BH-1	BH-1
		Laboratory ID	WG_E251512_43	WG_E251512_43	WG_E251512_44	WG_E251512_44	WG_E251512_44
			789_N	921_N	004_N	035_N	068_N
		Sample Date	2019-11-20	2020-03-31	2020-06-22	2020-07-23	2020-08-25
		QA/QC					
Parameter	CSR DW	Unit					
Anions + Nutrients							
Alkalinity, Total as CaCO3		ug/L	325000	2180000	322000	-	376000
Bromide (Br)		ug/L	< 50	-	< 50	-	< 250
Chloride (Cl)	250000	ug/L	74	< 500	< 500	-	< 2500
Fluoride (F)	1.5	mg/L	0.0092	0.063	0.057	-	< 0.1
Nitrate (as N)	10000	ug/L	30.6	10	< 5	-	< 25
Nitrite (as N)	1000	ug/L	22.7	4.4	< 1	-	8.1
Nitrogen, Nitrate-Nitrite	10000	ug/L	-	-	-	-	-
Ammonia (as N)		ug/L	720	574	616	-	291
Total Kjeldahl Nitrogen		mg/L	6..5	-	-	-	-
Total Kjeldahl Nitrogen		ug/L	-	40200	113000	-	324
Sulfate (SO4)	500000	ug/L	13500	15700	18100	-	24700
Cyanide	200	ug/L	-	-	-	-	-
Cyanide (SAD)		ug/L	-	-	-	-	-
Phosphorus, dissolved		ug/L	<50	<50	<50	-	<50
Phosphorus, total		ug/L	-	-	-	-	-
Field + Physical							
Dissolved Oxygen, field measured		mg/L	2	1.4	3.2	-	3.9
Conductivity, field measured		uS/cm	358.8	396.6	242.6	524	495
Oxidation Reduction Potential, field measured		mV	443.6	222.6	175.3	-	322.1
pH, field measured		pH units	7.05	7.8	7.6	-	7.31
pH, lab		pH	8.4	8.14	8.04	-	8.07
Temperature, field measured		deg c	6.4	6.2	6.7	7.1	6.4
Conductivity		uS/cm	537	580	609	-	687
Total Dissolved Solids		mg/L	-	-	390	-	-
Total Suspended Solids		mg/L	-	-	-	-	-
Total Organic Carbon		mg/L	737	404	1200	-	126
Dissolved Organic Carbon		mg/L	-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L	260	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L	-	267	308	-	338
Chemical Oxygen Demand		mg/L	309	1370	5180	-	29
Depth to Water		mbtoc	21.07	21.17	21.45	21.39	21.41
Metals, Dissolved							
Aluminum	9500	ug/L	4.7	1.5	29	-	8
Antimony	6	ug/L	0.22	0.34	< 0.1	-	< 0.1
Arsenic	10	ug/L	6.92	5.86	**12.1**	-	9.25
Barium	1000	ug/L	140	159	356	-	243
Beryllium	8	ug/L	< 0.1	< 0.1	< 0.1	-	< 0.1
Bismuth		ug/L	< 0.05	< 0.05	< 0.05	-	< 0.05
Boron	5000	ug/L	80	91	101	-	115
Cadmium	5	ug/L	0.0282	< 0.005	< 0.005	-	0.0053
Calcium		ug/L	43900	41900	48700	-	62400
Chromium	50	ug/L	< 0.1	< 0.1	< 0.1	-	< 0.1
Cobalt	1	ug/L	0.28	0.14	0.13	-	0.13
Copper	1500	ug/L	0.47	< 0.2	0.61	-	< 0.2
Iron	6500	ug/L	196	175	1020	-	237
Lead	10	ug/L	< 0.05	< 0.05	< 0.05	-	< 0.05
Lithium	8	ug/L	1.2	2.1	1.5	-	1.8
Magnesium		ug/L	36400	39400	45400	-	44200
Manganese	1500	ug/L	470	112	207	-	109
Mercury	1	ug/L	< 0.005	< 0.005	< 0.005	-	< 0.005
Molybdenum	250	ug/L	3.82	3.77	3.12	-	3.15
Nickel	80	ug/L	< 0.5	< 0.5	< 0.5	-	< 0.5
Potassium		ug/L	1830	2060	2330	-	2050
Selenium	10	ug/L	< 0.05	< 0.05	< 0.05	-	< 0.05
Silicon		ug/L	3780	3350	5170	-	5710
Silver	20	ug/L	< 0.01	< 0.01	< 0.01	-	< 0.01
Sodium	200000	ug/L	29800	30100	30800	-	29900
Strontium	2500	ug/L	1050	1140	1330	-	1450
Sulphur (S)		ug/L	4480	3450	6700	-	8170
Tellurium		ug/L	< 0.2	< 0.2	< 0.2	-	< 0.2
Thallium		ug/L	< 0.01	< 0.01	< 0.01	-	< 0.01
Thorium-232		ug/L	< 0.1	< 0.1	< 0.1	-	< 0.1
Tin	2500	ug/L	< 0.1	< 0.1	< 0.1	-	< 0.1
Titanium		ug/L	< 0.3	< 0.3	0.45	-	< 0.3
Uranium	20	ug/L	0.612	0.463	0.267	-	1.13
Vanadium	20	ug/L	< 0.5	< 0.5	< 0.5	-	< 0.5
Zinc	3000	ug/L	< 1	< 1	1.1	-	1.2
Zirconium		ug/L	< 0.2	< 0.2	< 0.2	-	< 0.2
Cesium		ug/L	< 0.01	< 0.01	< 0.01	-	< 0.01
Rubidium		ug/L	0.33	0.33	0.52	-	0.31
Tungsten	3	ug/L	< 0.1	< 0.1	< 0.1	-	< 0.1
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L	-	-	< 250	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L	-	-	< 250	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L	-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L	-	-	< 250	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L	-	-	< 100	-	< 100
Volatile Petroleum Hydrocarbons		ug/L	-	-	< 100	-	< 100
VOCs + BTEX							
1,4-Difluorobenzene		ug/L	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	-	-	-	-	-
Benzene	5	ug/L	-	-	< 0.5	-	< 0.5
Ethylbenzene	140	ug/L	-	-	< 0.5	-	< 0.5
Styrene	800	ug/L	-	-	< 0.5	-	< 0.5
Toluene	60	ug/L	-	-	< 0.5	-	< 0.5
Xylenes, Total	90	ug/L	-	-	< 0.75	-	< 0.75
o-Xylene		ug/L	-	-	< 0.5	-	< 0.5
m,p-Xylenes		ug/L	-	-	< 0.5	-	< 0.5
Methyl tert-Butyl Ether	95	ug/L	-	-	< 0.5	-	< 0.5
Phenols, Non-Chlorinated							
Phenol	1000	ug/L	-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-1	BH-1	BH-1	BH-1	BH-1
			Laboratory ID	WG_E251512_44	WG_E251512_44	WG_E251512_44	WG_E251512_44	WG_E251512_44
				083_N	125_N	147_N	181_N	215_N
			Sample Date	2020-09-09	2020-10-21	2020-11-12	2020-12-16	2021-01-19
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		-	362000	-	-	-
Bromide (Br)		ug/L		-	< 50	-	-	-
Chloride (Cl)	250000	ug/L		-	< 500	-	-	-
Fluoride (F)	1.5	mg/L		-	0.044	-	-	-
Nitrate (as N)	10000	ug/L		-	11.8	-	-	-
Nitrite (as N)	1000	ug/L		-	< 1	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		-	345	-	-	-
Total Kjeldahl Nitrogen		mg/L		-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L		-	2680	-	-	-
Sulfate (SO4)	500000	ug/L		-	19000	-	-	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		-	<50	-	-	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	1.3	-	-	-
Conductivity, field measured		uS/cm		495	403.5	615	720	710
Oxidation Reduction Potential, field measured		mV		-	242.6	-	-	-
pH, field measured		pH units		-	7.52	-	-	-
pH, lab		pH		-	7.99	-	-	-
Temperature, field measured		deg c		6.4	6.3	6.3	6.3	6.5
Conductivity		uS/cm		-	658	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	263	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	334	-	-	-
Chemical Oxygen Demand		mg/L		-	274	-	-	-
Depth to Water		mbtoc		21.39	21.18	21.2	21.17	20.99
Metals, Dissolved								
Aluminum	9500	ug/L		-	5.1	-	-	-
Antimony	6	ug/L		-	0.41	-	-	-
Arsenic	10	ug/L		-	5.61	-	-	-
Barium	1000	ug/L		-	254	-	-	-
Beryllium	8	ug/L		-	< 0.1	-	-	-
Bismuth		ug/L		-	< 0.05	-	-	-
Boron	5000	ug/L		-	113	-	-	-
Cadmium	5	ug/L		-	< 0.005	-	-	-
Calcium		ug/L		-	58100	-	-	-
Chromium	50	ug/L		-	< 0.1	-	-	-
Cobalt	1	ug/L		-	0.42	-	-	-
Copper	1500	ug/L		-	< 0.2	-	-	-
Iron	6500	ug/L		-	26	-	-	-
Lead	10	ug/L		-	< 0.05	-	-	-
Lithium	8	ug/L		-	2.1	-	-	-
Magnesium		ug/L		-	45800	-	-	-
Manganese	1500	ug/L		-	135	-	-	-
Mercury	1	ug/L		-	< 0.005	-	-	-
Molybdenum	250	ug/L		-	3.58	-	-	-
Nickel	80	ug/L		-	2.03	-	-	-
Potassium		ug/L		-	2320	-	-	-
Selenium	10	ug/L		-	< 0.05	-	-	-
Silicon		ug/L		-	6150	-	-	-
Silver	20	ug/L		-	< 0.01	-	-	-
Sodium	200000	ug/L		-	29800	-	-	-
Strontium	2500	ug/L		-	1410	-	-	-
Sulphur (S)		ug/L		-	9630	-	-	-
Tellurium		ug/L		-	< 0.2	-	-	-
Thallium		ug/L		-	< 0.01	-	-	-
Thorium-232		ug/L		-	< 0.1	-	-	-
Tin	2500	ug/L		-	< 0.1	-	-	-
Titanium		ug/L		-	< 0.3	-	-	-
Uranium	20	ug/L		-	1.3	-	-	-
Vanadium	20	ug/L		-	< 0.5	-	-	-
Zinc	3000	ug/L		-	< 1	-	-	-
Zirconium		ug/L		-	< 0.2	-	-	-
Cesium		ug/L		-	< 0.01	-	-	-
Rubidium		ug/L		-	0.5	-	-	-
Tungsten	3	ug/L		-	< 0.1	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	< 250	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	< 250	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	< 100	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	< 100	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	< 0.5	-	-	-
Ethylbenzene	140	ug/L		-	< 0.5	-	-	-
Styrene	800	ug/L		-	< 0.5	-	-	-
Toluene	60	ug/L		-	< 0.5	-	-	-
Xylenes, Total	90	ug/L		-	< 0.75	-	-	-
o-Xylene		ug/L		-	< 0.5	-	-	-
m,p-Xylenes		ug/L		-	< 0.5	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	< 0.5	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

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Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-1	BH-1	BH-1
			Laboratory ID	WG_E251512_44	WG_E251512_44	WG_E251512_44
				307_N	393_N	487_N
			Sample Date	2021-04-21	2021-07-16	2021-10-18
			QA/QC			
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L		-	-	300000
Bromide (Br)		ug/L		-	-	< 50000
Chloride (Cl)	250000	ug/L		-	-	< 500
Fluoride (F)	1.5	mg/L		-	-	0.064
Nitrate (as N)	10000	ug/L		-	-	< 5
Nitrite (as N)	1000	ug/L		-	-	< 1
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-
Ammonia (as N)		ug/L		-	-	< 5
Total Kjeldahl Nitrogen		mg/L		-	-	-
Total Kjeldahl Nitrogen		ug/L		-	-	< 50
Sulfate (SO4)	500000	ug/L		-	-	1250
Cyanide	200	ug/L		-	-	-
Cyanide (SAD)		ug/L		-	-	-
Phosphorus, dissolved		ug/L		-	-	<50
Phosphorus, total		ug/L		-	-	-
Field + Physical						
Dissolved Oxygen, field measured		mg/L		-	-	2.1
Conductivity, field measured		uS/cm		522	545	539
Oxidation Reduction Potential, field measured		mV		-	-	264.9
pH, field measured		pH units		-	-	8.26
pH, lab		pH		-	-	-
Temperature, field measured		deg c		6.5	6.5	6.4
Conductivity		uS/cm		-	-	-
Total Dissolved Solids		mg/L		-	-	-
Total Suspended Solids		mg/L		-	-	-
Total Organic Carbon		mg/L		-	-	0.8
Dissolved Organic Carbon		mg/L		-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	245
Chemical Oxygen Demand		mg/L		-	-	< 20
Depth to Water		mbtoc		21.98	20.97	20.91
Metals, Dissolved						
Aluminum	9500	ug/L		-	-	2.6
Antimony	6	ug/L		-	-	< 0.1
Arsenic	10	ug/L		-	-	1.47
Barium	1000	ug/L		-	-	467
Beryllium	8	ug/L		-	-	< 0.1
Bismuth		ug/L		-	-	< 0.05
Boron	5000	ug/L		-	-	97
Cadmium	5	ug/L		-	-	0.0478
Calcium		ug/L		-	-	29100
Chromium	50	ug/L		-	-	< 0.5
Cobalt	1	ug/L		-	-	< 0.1
Copper	1500	ug/L		-	-	0.55
Iron	6500	ug/L		-	-	< 10
Lead	10	ug/L		-	-	< 0.05
Lithium	8	ug/L		-	-	1.1
Magnesium		ug/L		-	-	41900
Manganese	1500	ug/L		-	-	2.02
Mercury	1	ug/L		-	-	< 0.005
Molybdenum	250	ug/L		-	-	2.26
Nickel	80	ug/L		-	-	< 0.5
Potassium		ug/L		-	-	2080
Selenium	10	ug/L		-	-	< 0.05
Silicon		ug/L		-	-	1750
Silver	20	ug/L		-	-	< 0.01
Sodium	200000	ug/L		-	-	29500
Strontium	2500	ug/L		-	-	1040
Sulphur (S)		ug/L		-	-	< 500
Tellurium		ug/L		-	-	< 0.2
Thallium		ug/L		-	-	< 0.01
Thorium-232		ug/L		-	-	< 0.1
Tin	2500	ug/L		-	-	0.14
Titanium		ug/L		-	-	< 0.3
Uranium	20	ug/L		-	-	0.328
Vanadium	20	ug/L		-	-	< 0.5
Zinc	3000	ug/L		-	-	1.4
Zirconium		ug/L		-	-	< 0.2
Cesium		ug/L		-	-	< 0.01
Rubidium		ug/L		-	-	0.24
Tungsten	3	ug/L		-	-	< 0.1
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	< 400
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L		-	-	< 100
VOCs + BTEX						
1,4-Difluorobenzene		ug/L		-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-
Benzene	5	ug/L		-	-	< 0.5
Ethylbenzene	140	ug/L		-	-	< 0.5
Styrene	800	ug/L		-	-	< 0.5
Toluene	60	ug/L		-	-	2.28
Xylenes, Total	90	ug/L		-	-	< 0.5
o-Xylene		ug/L		-	-	< 0.3
m,p-Xylenes		ug/L		-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L		-	-	< 0.5
Phenols, Non-Chlorinated						
Phenol	1000	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-2	BH-2	BH-2	BH-2	BH-2
			Laboratory ID	WG_E251513_41	WG_E251513_42	WG_E251513_42	WG_E251513_42	WG_E251513_42
				827_N	150_N	324_N	476_N	558_N
			Sample Date	2014-07-07	2015-05-26	2015-11-16	2016-04-16	2016-07-07
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		1095000	530000	930000	500000	490000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		1000	2000	< 1000	1500	1900
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		119	250	60	460	290
Nitrite (as N)	1000	ug/L		10	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	253	55	459	286
Ammonia (as N)		ug/L		70	68	460	< 30	33
Total Kjeldahl Nitrogen		ug/L		502	1350	2680	-	-
Sulfate (SO4)	500000	ug/L		69500	63000	55100	59800	60300
Cyanide	200	ug/L		-	< 10	< 10	-	-
Cyanide (SAD)		ug/L		< 5	-	-	-	-
Phosphorus, dissolved		ug/L		<10	<20	<20	<20	<20
Phosphorus, total		ug/L		3160	3830	10300	-	-
Carbons								
Dissolved Organic Carbon		mg/L		< 0.5	1.8	4.3	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	-	-	-	-
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		7.5	7.8	7.6	7.5	7.5
Temperature, field measured		deg c		-	-	-	-	-
Conductivity		uS/cm		938	947	941	949	944
Total Dissolved Solids		mg/L		591	1.8	570	-	-
Total Suspended Solids		mg/L		11000	2900	7000	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		< 0.5	1.8	4.3	-	-
Hardness, Calcium Carbonate		mg/L		-	-	-	548	503
Hardness, Calcium Carbonate (Dissolved)		mg/L		485	521	533	-	-
Chemical Oxygen Demand		mg/L		123	136	242	25	< 20
Depth to Water		mbtoc		-	-	-	-	-
Metals, Dissolved								
Aluminum	9500	ug/L		3	< 5	< 5	< 5	< 5
Antimony	6	ug/L		< 5	0.5	< 0.1	0.3	< 0.1
Arsenic	10	ug/L		0.88	1.3	1.2	0.7	0.7
Barium	1000	ug/L		66.5	147	65	60	64
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L		79	107	78	97	100
Cadmium	5	ug/L		0.18	0.22	0.08	0.24	2.63
Calcium		ug/L		83400	86700	90900	91600	85900
Chromium	50	ug/L		< 1	< 0.5	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L		0.53	0.63	0.58	< 0.05	< 0.05
Copper	1500	ug/L		1.32	22.2	1.7	2.3	3.2
Iron	6500	ug/L		< 10	< 10	< 10	< 10	< 10
Lead	10	ug/L		< 0.2	0.2	< 0.1	0.3	< 0.1
Lithium	8	ug/L		< 5	4.3	4.2	4.6	4.6
Magnesium		ug/L		67200	73900	74300	77500	70100
Manganese	1500	ug/L		131	128	158	6.7	31.2
Mercury	1	ug/L		< 0.01	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L		2.7	2.7	2.5	2.4	2.6
Nickel	80	ug/L		1.3	1.6	0.9	0.7	3.2
Potassium		ug/L		2700	3500	2870	3270	2650
Selenium	10	ug/L		0.13	0.9	< 0.5	< 0.5	< 0.5
Silicon		ug/L		7720	9300	7700	9000	8400
Silver	20	ug/L		< 0.02	< 0.05	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L		25100	28800	27200	29300	26000
Strontium	2500	ug/L		2060	1870	1960	2050	1880
Sulphur (S)		ug/L		20000	25000	21000	23000	21000
Tellurium		ug/L		-	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.05	< 0.02	< 0.02	< 0.02	< 0.02
Thorium-232		ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		< 5	< 0.2	< 0.2	0.3	0.4
Titanium		ug/L		< 5	< 5	< 5	< 5	< 5
Uranium	20	ug/L		1.25	1.18	1.18	1.1	1.16
Vanadium	20	ug/L		< 5	< 1	< 1	< 1	< 1
Zinc	3000	ug/L		< 5	29	< 4	4	8
Zirconium		ug/L		< 0.5	< 0.1	< 0.1	< 0.1	< 0.1
Hardness, Calcium Carbonate		mg/L		485	521	533	-	-
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		< 0.5	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		< 2	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		< 0.5	-	-	-	-
Benzene	5	ug/L		< 0.4	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		< 0.4	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		< 1	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-2	BH-2	BH-2	BH-2	BH-2
			Laboratory ID	WG_E251513_42	WG_E251513_42	WG_E251513_42	WG_E251513_43	WG_E251513_43
				668_N	849_N	900_N	250_N	292_N
			Sample Date	2016-10-25	2017-04-24	2017-06-14	2018-05-30	2018-07-11
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		500000	480000	490000	355000	462000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		1200	1500	1100	< 2500	< 2500
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		150	153	67	< 25	139
Nitrite (as N)	1000	ug/L		< 10	< 10	< 10	< 5	5.6
Nitrogen, Nitrate-Nitrite	10000	ug/L		146	153	67	< 30	144.6
Ammonia (as N)		ug/L		36	< 30	< 30	199	51.3
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		59300	64100	66500	59700	59500
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<20	<50	<50	<50	<50
Phosphorus, total		ug/L		-	-	-	-	-
Carbons								
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	884	894	837	752
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	7	7.6	-	-
pH, lab		pH		7.8	7.4	7.5	-	-
Temperature, field measured		deg c		-	6.2	6.2	6.4	6.2
Conductivity		uS/cm		947	936	946	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate		mg/L		550	497	508	482	479
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		< 20	< 20	< 20	162	< 20
Depth to Water		mbtoc		-	21.08	20.96	22.06	23.38
Metals, Dissolved								
Aluminum	9500	ug/L		< 5	< 5	< 5	4.2	2.3
Antimony	6	ug/L		0.2	< 0.1	0.3	< 0.1	< 0.1
Arsenic	10	ug/L		0.8	0.76	0.78	0.88	0.73
Barium	1000	ug/L		68	52	59.1	63.5	68.1
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.05	< 0.05
Boron	5000	ug/L		98	99	91	79	74
Cadmium	5	ug/L		0.02	0.539	0.456	0.0174	0.643
Calcium		ug/L		86800	85100	87700	84000	78200
Chromium	50	ug/L		< 0.5	< 0.5	< 0.5	< 0.1	< 0.1
Cobalt	1	ug/L		0.45	< 0.1	< 0.1	0.6	< 0.1
Copper	1500	ug/L		0.4	3.45	1.71	2.51	4.28
Iron	6500	ug/L		< 10	< 10	< 10	58	< 10
Lead	10	ug/L		< 0.1	< 0.1	< 0.1	0.124	< 0.05
Lithium	8	ug/L		4.4	4.34	4.28	4	3.9
Magnesium		ug/L		80900	69000	70000	66200	69000
Manganese	1500	ug/L		119	5.78	3.27	166	107
Mercury	1	ug/L		< 0.02	< 0.02	< 0.02	< 0.005	< 0.005
Molybdenum	250	ug/L		2.6	2.38	2.3	2.32	2.19
Nickel	80	ug/L		2	0.92	0.95	0.86	1.77
Potassium		ug/L		2870	2670	2830	2580	2680
Selenium	10	ug/L		< 0.5	< 0.5	< 0.5	< 0.05	0.271
Silicon		ug/L		8900	8200	9200	7960	8070
Silver	20	ug/L		0.11	< 0.05	< 0.05	< 0.01	< 0.01
Sodium	200000	ug/L		28200	25500	25300	23700	24700
Strontium	2500	ug/L		2190	1750	1980	1950	1750
Sulphur (S)		ug/L		23000	19500	21300	22500	22500
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.02	< 0.02	< 0.02	< 0.01	0.015
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		< 0.2	< 0.2	0.27	< 0.1	< 0.1
Titanium		ug/L		< 5	< 5	< 5	< 0.3	< 0.3
Uranium	20	ug/L		1.13	1.12	1.14	1.13	1.01
Vanadium	20	ug/L		< 1	< 1	< 1	< 0.5	0.87
Zinc	3000	ug/L		10	14.7	11.2	2.8	3.5
Zirconium		ug/L		< 0.1	< 0.1	< 0.1	0.066	0.095
Hardness, Calcium Carbonate		mg/L		-	-	-	-	-
Cesium		ug/L		-	-	-	< 0.01	< 0.01
Rubidium		ug/L		-	-	-	0.54	0.5
Tungsten	3	ug/L		-	-	-	< 0.1	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	< 0.001	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	< 0.005	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	< 0.0004	-
Benzene	5	ug/L		-	-	-	< 0.0005	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	0.00057	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:
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QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-2	BH-2	BH-2	BH-2	BH-2
			Laboratory ID	WG_E251513_43	WG_E251513_43	WG_E251513_43	WG_E251513_43	WG_E251513_43
				354_N	572_N	690_N	789_N	921_N
			Sample Date	2018-09-11	2019-04-17	2019-08-13	2019-11-20	2020-03-31
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		501000	511000	429000	476000	504000
Bromide (Br)		ug/L		-	-	-	< 250	-
Chloride (Cl)	250000	ug/L		< 2500	< 2500	< 2500	< 2500	< 2500
Fluoride (F)	1.5	mg/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Nitrate (as N)	10000	ug/L		< 25	128	50	33	44.3
Nitrite (as N)	1000	ug/L		< 5	< 5	14.7	< 5	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L		< 30	-	-	-	-
Ammonia (as N)		ug/L		159	103	202	734	187
Total Kjeldahl Nitrogen		ug/L		-	-	-	734	9840
Sulfate (SO4)	500000	ug/L		65800	13900	64300	62400	59600
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	<50	<50	<50	42
Phosphorus, total		ug/L		-	-	-	-	-
Carbons								
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	1.6	3.8	3.4	5.8
Conductivity, field measured		uS/cm		704	736	670	561	566
Oxidation Reduction Potential, field measured		mV		-	331.6	307.8	346.1	236.9
pH, field measured		pH units		-	7.25	7.16	7.31	7.54
pH, lab		pH		8.19	-	8.12	8.11	8.14
Temperature, field measured		deg c		6.2	6.2	6.5	6	5.3
Conductivity		uS/cm		-	-	-	812	804
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	7.83	14.1	83.2	2.54
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate		mg/L		481	482	457	812	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	505
Chemical Oxygen Demand		mg/L		< 20	38	96	40	132
Depth to Water		mbtoc		21.05	20.89	21.1	21.02	20.94
Metals, Dissolved								
Aluminum	9500	ug/L		6.7	2.6	12.8	2.4	1300
Antimony	6	ug/L		0.13	0.16	0.11	< 0.1	< 0.1
Arsenic	10	ug/L		0.78	0.75	1	1.86	1.85
Barium	1000	ug/L		57.6	80.4	68.3	56.8	90.8
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	5000	ug/L		87	77	81	78	78
Cadmium	5	ug/L		0.0442	0.0097	0.0232	0.0463	0.104
Calcium		ug/L		79600	83700	76500	81600	86300
Chromium	50	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	1.43
Cobalt	1	ug/L		0.5	0.72	0.45	0.47	**1.98**
Copper	1500	ug/L		0.53	0.7	0.78	< 0.2	7.24
Iron	6500	ug/L		77	19	71	195	2170
Lead	10	ug/L		< 0.05	< 0.05	0.064	< 0.05	1
Lithium	8	ug/L		4.2	3.4	4	3.6	4.7
Magnesium		ug/L		68500	66300	64600	66500	70300
Manganese	1500	ug/L		155	194	176	145	402
Mercury	1	ug/L		< 0.005	< 0.005	< 0.005	< 0.005	0.0425
Molybdenum	250	ug/L		2.33	2.36	2.29	2.21	1.75
Nickel	80	ug/L		1.11	1.64	1.09	< 0.5	3.97
Potassium		ug/L		2670	2840	2560	2460	2790
Selenium	10	ug/L		0.114	0.06	0.056	< 0.05	0.061
Silicon		ug/L		7430	6940	7710	8170	10200
Silver	20	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	0.014
Sodium	200000	ug/L		23700	25000	23700	24000	23600
Strontium	2500	ug/L		1890	2030	1820	1870	1990
Sulphur (S)		ug/L		21200	21000	21200	22800	21300
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.01	< 0.01	< 0.01	< 0.01	0.011
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	0.19
Tin	2500	ug/L		< 0.1	< 0.1	0.11	< 0.1	< 0.1
Titanium		ug/L		< 0.3	< 0.3	< 0.3	< 0.3	23.4
Uranium	20	ug/L		1.14	1.42	1.15	1.05	1
Vanadium	20	ug/L		< 0.5	< 0.5	< 0.5	< 0.5	3.28
Zinc	3000	ug/L		< 1	4.6	3.6	1.2	14
Zirconium		ug/L		< 0.06	0.088	< 0.2	< 0.2	0.49
Hardness, Calcium Carbonate		mg/L		-	-	-	-	505
Cesium		ug/L		0.017	< 0.01	0.013	0.012	0.109
Rubidium		ug/L		0.44	0.55	0.44	0.49	1
Tungsten	3	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-2	BH-2	BH-2	BH-2	BH-2
			Laboratory ID	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44
				007_N	007_FD	035_N	068_N	083_N
			Sample Date	2020-06-25	2020-06-25	2020-07-23	2020-08-25	2020-09-09
			QA/QC	FDA	FD			
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		473000	-	-	472000	-
Bromide (Br)		ug/L		< 250	< 250	-	< 250	-
Chloride (Cl)	250000	ug/L		< 2500	< 2500	-	< 2500	-
Fluoride (F)	1.5	mg/L		< 0.1	< 0.1	-	< 0.1	-
Nitrate (as N)	10000	ug/L		134	167	-	189	-
Nitrite (as N)	1000	ug/L		< 5	< 5	-	< 5	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		126	125	-	53.3	-
Total Kjeldahl Nitrogen		ug/L		894	1070	-	236	-
Sulfate (SO4)	500000	ug/L		60000	60100	-	76000	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	<50	-	<50	-
Phosphorus, total		ug/L		-	-	-	-	-
Carbons								
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		6.4	6.4	-	4.2	-
Conductivity, field measured		uS/cm		642	642	639	614	614
Oxidation Reduction Potential, field measured		mV		343.2	343.2	-	322	-
pH, field measured		pH units		7.06	7.06	-	7.21	-
pH, lab		pH		7.54	-	-	7.88	-
Temperature, field measured		deg c		6.9	6.9	6.3	6.1	6.1
Conductivity		uS/cm		921	913	-	921	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		13.3	14.4	-	4.11	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate		mg/L		-	501	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		499	-	-	52	-
Chemical Oxygen Demand		mg/L		91	63	-	34	-
Depth to Water		mbtoc		23.68	23.68	21.04	21.12	21.08
Metals, Dissolved								
Aluminum	9500	ug/L		2.5	1.8	-	1.3	-
Antimony	6	ug/L		0.26	0.25	-	0.32	-
Arsenic	10	ug/L		1.1	1.1	-	0.62	-
Barium	1000	ug/L		63.3	60.4	-	66.4	-
Beryllium	8	ug/L		< 0.1	< 0.1	-	< 0.1	-
Bismuth		ug/L		< 0.05	< 0.05	-	< 0.05	-
Boron	5000	ug/L		87	93	-	86	-
Cadmium	5	ug/L		0.0778	0.0607	-	0.0654	-
Calcium		ug/L		86100	88800	-	93900	-
Chromium	50	ug/L		< 0.1	< 0.1	-	< 0.1	-
Cobalt	1	ug/L		0.4	0.41	-	0.16	-
Copper	1500	ug/L		4.14	0.7	-	0.53	-
Iron	6500	ug/L		< 10	< 10	-	< 10	-
Lead	10	ug/L		0.068	< 0.05	-	< 0.05	-
Lithium	8	ug/L		4.4	4.5	-	4.4	-
Magnesium		ug/L		69000	67800	-	69900	-
Manganese	1500	ug/L		79.3	81.8	-	29.3	-
Mercury	1	ug/L		< 0.005	< 0.005	-	< 0.005	-
Molybdenum	250	ug/L		2.82	2.72	-	2.32	-
Nickel	80	ug/L		1.24	1.24	-	1.6	-
Potassium		ug/L		2580	2560	-	2560	-
Selenium	10	ug/L		0.312	0.198	-	0.275	-
Silicon		ug/L		8090	8430	-	7520	-
Silver	20	ug/L		< 0.01	< 0.01	-	< 0.01	-
Sodium	200000	ug/L		25500	25300	-	23500	-
Strontium	2500	ug/L		2030	1980	-	2070	-
Sulphur (S)		ug/L		23600	24700	-	26800	-
Tellurium		ug/L		< 0.2	< 0.2	-	< 0.2	-
Thallium		ug/L		< 0.01	< 0.01	-	< 0.01	-
Thorium-232		ug/L		< 0.1	< 0.1	-	< 0.1	-
Tin	2500	ug/L		0.15	0.14	-	< 0.1	-
Titanium		ug/L		< 0.3	< 0.3	-	< 0.3	-
Uranium	20	ug/L		1.09	1.14	-	1.33	-
Vanadium	20	ug/L		< 0.5	< 0.5	-	< 0.5	-
Zinc	3000	ug/L		3.4	1.7	-	1.2	-
Zirconium		ug/L		< 0.2	< 0.2	-	< 0.2	-
Hardness, Calcium Carbonate		mg/L		499	-	-	52	-
Cesium		ug/L		< 0.01	< 0.01	-	< 0.01	-
Rubidium		ug/L		0.45	0.46	-	0.42	-
Tungsten	3	ug/L		< 0.1	< 0.1	-	< 0.1	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		< 250	< 250	-	< 250	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		< 250	< 250	-	< 250	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		< 250	< 250	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		< 100	< 100	-	< 100	-
Volatile Petroleum Hydrocarbons		ug/L		< 100	< 100	-	< 100	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		< 0.5	< 0.5	-	< 0.5	-
Ethylbenzene	140	ug/L		< 0.5	< 0.5	-	< 0.5	-
Styrene	800	ug/L		< 0.5	< 0.5	-	< 0.5	-
Toluene	60	ug/L		< 0.5	< 0.5	-	3.32	-
Xylenes, Total	90	ug/L		< 0.75	< 0.75	-	< 0.75	-
o-Xylene		ug/L		< 0.5	< 0.5	-	< 0.5	-
m,p-Xylenes		ug/L		< 0.5	< 0.5	-	< 0.5	-
Methyl tert-Butyl Ether	95	ug/L		< 0.5	< 0.5	-	< 0.5	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field
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- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-2	BH-2	BH-2	BH-2	BH-2	BH-2	BH-2
			Laboratory ID	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44	WG_E251513_44
				125_N	147_N	181_N	215_N	308_N	393_N	487_N
			Sample Date	2020-10-21	2020-11-12	2020-12-16	2021-01-19	2021-04-22	2021-07-16	2021-10-18
			QA/QC							
Anions + Nutrients										
Alkalinity, Total as CaCO3		ug/L		471000	-	-	-	-	-	490000
Bromide (Br)		ug/L		< 250	-	-	-	-	-	-
Chloride (Cl)	250000	ug/L		< 2500	-	-	-	-	-	< 2500
Fluoride (F)	1.5	mg/L		< 0.1	-	-	-	-	-	< 0.1
Nitrate (as N)	10000	ug/L		96	-	-	-	-	-	< 25
Nitrite (as N)	1000	ug/L		5.5	-	-	-	-	-	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-	-	-
Ammonia (as N)		ug/L		48.5	-	-	-	-	-	94
Total Kjeldahl Nitrogen		ug/L		482	-	-	-	-	-	936
Sulfate (SO4)	500000	ug/L		72100	-	-	-	-	-	64000
Cyanide	200	ug/L		-	-	-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	-	-	-	-	-	<50
Phosphorus, total		ug/L		-	-	-	-	-	-	-
Carbons										
Dissolved Organic Carbon		mg/L		-	-	-	-	-	-	-
Field + Physical										
Dissolved Oxygen, field measured		mg/L		1.3	-	-	-	-	-	6.8
Conductivity, field measured		uS/cm		403.5	708	868	866	822	545	624
Oxidation Reduction Potential, field measured		mV		242.6	-	-	-	-	-	243.8
pH, field measured		pH units		7.52	-	-	-	-	-	7.34
pH, lab		pH		7.7	-	-	-	-	-	7.79
Temperature, field measured		deg c		6.3	6.1	6.1	6	6.2	6.5	6.3
Conductivity		uS/cm		931	-	-	-	-	-	921
Total Dissolved Solids		mg/L		-	-	-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-	-	-
Total Organic Carbon		mg/L		9.11	-	-	-	-	-	1.26
Dissolved Organic Carbon		mg/L		-	-	-	-	-	-	-
Hardness, Calcium Carbonate		mg/L		-	-	-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		499	-	-	-	-	-	489
Chemical Oxygen Demand		mg/L		< 20	-	-	-	-	-	46
Depth to Water		mbtoc		21.18	20.92	20.96	20.91	20.88	20.97	20.66
Metals, Dissolved										
Aluminum	9500	ug/L		44.2	-	-	-	-	-	3.3
Antimony	6	ug/L		0.15	-	-	-	-	-	0.2
Arsenic	10	ug/L		0.54	-	-	-	-	-	0.54
Barium	1000	ug/L		61.6	-	-	-	-	-	65.6
Beryllium	8	ug/L		< 0.1	-	-	-	-	-	< 0.1
Bismuth		ug/L		< 0.05	-	-	-	-	-	< 0.05
Boron	5000	ug/L		80	-	-	-	-	-	80
Cadmium	5	ug/L		0.0757	-	-	-	-	-	0.0332
Calcium		ug/L		85400	-	-	-	-	-	84300
Chromium	50	ug/L		< 0.1	-	-	-	-	-	< 0.5
Cobalt	1	ug/L		0.25	-	-	-	-	-	0.2
Copper	1500	ug/L		0.66	-	-	-	-	-	< 0.2
Iron	6500	ug/L		103	-	-	-	-	-	< 10
Lead	10	ug/L		< 0.05	-	-	-	-	-	< 0.05
Lithium	8	ug/L		4.5	-	-	-	-	-	4.5
Magnesium		ug/L		69400	-	-	-	-	-	67700
Manganese	1500	ug/L		73.1	-	-	-	-	-	96.4
Mercury	1	ug/L		< 0.005	-	-	-	-	-	< 0.005
Molybdenum	250	ug/L		2.31	-	-	-	-	-	2.26
Nickel	80	ug/L		1.79	-	-	-	-	-	2.2
Potassium		ug/L		2740	-	-	-	-	-	2760
Selenium	10	ug/L		0.144	-	-	-	-	-	0.144
Silicon		ug/L		7870	-	-	-	-	-	7130
Silver	20	ug/L		< 0.01	-	-	-	-	-	< 0.01
Sodium	200000	ug/L		24000	-	-	-	-	-	25200
Strontium	2500	ug/L		1930	-	-	-	-	-	1910
Sulphur (S)		ug/L		27300	-	-	-	-	-	22200
Tellurium		ug/L		< 0.2	-	-	-	-	-	< 0.2
Thallium		ug/L		0.01	-	-	-	-	-	0.014
Thorium-232		ug/L		< 0.1	-	-	-	-	-	< 0.1
Tin	2500	ug/L		< 0.1	-	-	-	-	-	< 0.1
Titanium		ug/L		< 0.3	-	-	-	-	-	< 0.3
Uranium	20	ug/L		1.17	-	-	-	-	-	1.24
Vanadium	20	ug/L		< 0.5	-	-	-	-	-	< 0.5
Zinc	3000	ug/L		1.8	-	-	-	-	-	1.4
Zirconium		ug/L		< 0.2	-	-	-	-	-	< 0.2
Hardness, Calcium Carbonate		mg/L		499	-	-	-	-	-	489
Cesium		ug/L		< 0.01	-	-	-	-	-	< 0.01
Rubidium		ug/L		0.46	-	-	-	-	-	0.67
Tungsten	3	ug/L		< 0.1	-	-	-	-	-	< 0.1
Hydrocarbons										
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		< 250	-	-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		< 250	-	-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-	-	< 400
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		< 100	-	-	-	-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L		< 100	-	-	-	-	-	< 100
VOCs + BTEX										
1,4-Difluorobenzene		ug/L		-	-	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-	-	-
Benzene	5	ug/L		< 0.5	-	-	-	-	-	< 0.5
Ethylbenzene	140	ug/L		< 0.5	-	-	-	-	-	< 0.5
Styrene	800	ug/L		< 0.5	-	-	-	-	-	< 0.5
Toluene	60	ug/L		1.88	-	-	-	-	-	1.01
Xylenes, Total	90	ug/L		< 0.75	-	-	-	-	-	< 0.5
o-Xylene		ug/L		< 0.5	-	-	-	-	-	< 0.3
m,p-Xylenes		ug/L		< 0.5	-	-	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L		< 0.5	-	-	-	-	-	< 0.5
Phenols, Non-Chlorinated										
Phenol	1000	ug/L		-	-	-	-	-	-	-

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Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_41 827_N	WG_E251514_42 150_N	WG_E251514_42 324_N	WG_E251514_42 476_N	WG_E251514_42 668_N
			Sample Date	2014-07-07	2015-05-26	2015-11-16	2016-04-16	2016-10-25
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		265000	240000	-	250000	250000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		2800	3900	-	3700	3400
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		404	310	320	320	250
Nitrite (as N)	1000	ug/L		< 10	< 10	-	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	311	320	319	254
Ammonia (as N)		ug/L		70	37	36	< 30	< 30
Total Kjeldahl Nitrogen		ug/L		176	370	100	-	-
Sulfate (SO4)	500000	ug/L		176000	180000	-	184000	181000
Cyanide	200	ug/L		-	< 10	< 10	-	-
Cyanide (SAD)		ug/L		< 5	-	-	-	-
Phosphorus, dissolved		ug/L		35	<20	<20	20	30
Phosphorus, total		ug/L		150	320	< 100	-	-
Field + Physical								
Conductivity, field measured		uS/cm		-	-	-	-	-
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		7.9	7.7	-	7.7	7.8
Temperature, field measured		deg c		-	-	-	-	-
Conductivity		uS/cm		837	817	-	829	819
Total Dissolved Solids		mg/L		542	1.3	-	-	-
Total Suspended Solids		mg/L		300	170	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		< 0.5	1.3	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	247	236
Hardness, Calcium Carbonate (Dissolved)		mg/L		216	557	239	-	-
Chemical Oxygen Demand		mg/L		< 20	< 20	< 20	< 20	< 20
Depth to Water		mbtoc		-	-	-	-	-
Metals, Dissolved								
Aluminum	9500	ug/L		5.8	< 5	< 5	< 5	< 5
Antimony	6	ug/L		< 5	0.5	0.1	0.5	0.5
Arsenic	10	ug/L		0.48	2.1	< 0.5	< 0.5	< 0.5
Barium	1000	ug/L		34.7	386	32	32	35
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L		56	40	59	72	73
Cadmium	5	ug/L		0.055	0.07	0.15	0.23	0.32
Calcium		ug/L		64100	141000	70900	71800	67400
Chromium	50	ug/L		< 1	< 0.5	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L		***< 5***	**7.83**	< 0.05	0.09	< 0.05
Copper	1500	ug/L		1.28	5.2	3.5	2.7	2.3
Iron	6500	ug/L		< 10	30	< 10	< 10	< 10
Lead	10	ug/L		< 0.2	< 0.1	< 0.1	0.4	< 0.1
Lithium	8	ug/L		< 5	2	1.7	1.9	2.5
Magnesium		ug/L		13700	49900	15100	16300	16300
Manganese	1500	ug/L		2	**3970**	1.1	43.9	4.6
Mercury	1	ug/L		< 0.01	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L		7.1	1.2	5.1	5.9	6
Nickel	80	ug/L		< 1	12.6	1	1.6	2.1
Potassium		ug/L		2130	3560	2150	2250	2310
Selenium	10	ug/L		0.33	0.8	0.5	0.6	0.5
Silicon		ug/L		4010	10200	3700	4400	4100
Silver	20	ug/L		< 0.02	< 0.05	< 0.05	< 0.05	0.08
Sodium	200000	ug/L		113000	86500	100000	107000	103000
Strontium	2500	ug/L		912	1030	893	949	1010
Sulphur (S)		ug/L		57100	7000	63000	71000	68000
Tellurium		ug/L		-	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.05	< 0.02	< 0.02	0.02	0.03
Thorium-232		ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		< 5	< 0.2	0.6	0.4	< 0.2
Titanium		ug/L		< 5	< 5	< 5	< 5	< 5
Uranium	20	ug/L		2.45	0.71	2.31	2.39	2.39
Vanadium	20	ug/L		< 5	< 1	< 1	< 1	< 1
Zinc	3000	ug/L		< 5	37	6	< 4	45
Zirconium		ug/L		< 0.5	0.2	< 0.1	< 0.1	< 0.1
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		< 0.5	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		< 2	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		< 0.5	-	-	-	-
Benzene	5	ug/L		< 0.4	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		< 0.4	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		< 1	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_42	WG_E251514_42	WG_E251514_42	WG_E251514_43	WG_E251514_43
				849_N	900_N	978_N	248_N	250_N
			Sample Date	2017-04-24	2017-06-14	2017-08-31	2018-05-28	2018-05-30
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		240000	240000	-	-	207000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		2700	2500	-	-	1750
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		246	130	-	-	288
Nitrite (as N)	1000	ug/L		< 10	< 10	-	-	< 1
Nitrogen, Nitrate-Nitrite	10000	ug/L		246	128	-	-	< 289
Ammonia (as N)		ug/L		< 30	< 30	-	-	5.6
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		184000	223000	-	-	185000
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	<50	-	-	<50
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Conductivity, field measured		uS/cm		790	791	819	837	-
pH, field measured		pH units		7.6	7.3	7.6	-	-
pH, lab		pH		8	7.6	-	-	-
Temperature, field measured		deg c		6.5	7.2	7.8	6.4	-
Conductivity		uS/cm		813	831	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		220	242	-	-	228
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		36	< 20	-	-	< 20
Depth to Water		mbtoc		57	57.59	57	22.06	-
Metals, Dissolved								
Aluminum	9500	ug/L		< 5	5.9	-	-	7.4
Antimony	6	ug/L		0.29	0.63	-	-	0.43
Arsenic	10	ug/L		< 0.5	< 0.5	-	-	0.4
Barium	1000	ug/L		28.1	32.7	-	-	35.9
Beryllium	8	ug/L		< 0.1	< 0.1	-	-	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	-	-	< 0.05
Boron	5000	ug/L		69	70	-	-	61
Cadmium	5	ug/L		0.141	0.186	-	-	0.115
Calcium		ug/L		65200	72100	-	-	68100
Chromium	50	ug/L		< 0.5	< 0.5	-	-	< 0.1
Cobalt	1	ug/L		< 0.1	< 0.1	-	-	0.12
Copper	1500	ug/L		0.69	3.76	-	-	1.62
Iron	6500	ug/L		< 10	< 10	-	-	< 10
Lead	10	ug/L		< 0.1	< 0.1	-	-	0.056
Lithium	8	ug/L		1.61	1.91	-	-	1.8
Magnesium		ug/L		14000	15000	-	-	14100
Manganese	1500	ug/L		1.43	3.52	-	-	31.8
Mercury	1	ug/L		< 0.02	< 0.02	-	-	< 0.005
Molybdenum	250	ug/L		5.68	6.04	-	-	5.34
Nickel	80	ug/L		0.41	0.73	-	-	0.77
Potassium		ug/L		1980	2230	-	-	2080
Selenium	10	ug/L		< 0.5	0.5	-	-	0.526
Silicon		ug/L		3900	4600	-	-	3960
Silver	20	ug/L		< 0.05	< 0.05	-	-	< 0.01
Sodium	200000	ug/L		94400	99600	-	-	92600
Strontium	2500	ug/L		829	956	-	-	912
Sulphur (S)		ug/L		59300	69700	-	-	69500
Tellurium		ug/L		< 0.2	< 0.2	-	-	< 0.2
Thallium		ug/L		< 0.02	< 0.02	-	-	< 0.01
Thorium-232		ug/L		< 0.1	< 0.1	-	-	< 0.1
Tin	2500	ug/L		< 0.2	< 0.2	-	-	7.34
Titanium		ug/L		< 5	< 5	-	-	< 0.3
Uranium	20	ug/L		2.33	2.5	-	-	2.38
Vanadium	20	ug/L		< 1	< 1	-	-	< 0.5
Zinc	3000	ug/L		< 4	6	-	-	2.7
Zirconium		ug/L		< 0.1	< 0.1	-	-	< 0.06
Cesium		ug/L		-	-	-	-	< 0.01
Rubidium		ug/L		-	-	-	-	0.49
Tungsten	3	ug/L		-	-	-	-	0.19
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	< 0.001
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	< 0.005
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	< 0.0004
Benzene	5	ug/L		-	-	-	-	< 0.0005
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	0.0112
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_43	WG_E251514_43	WG_E251514_43	WG_E251514_43	WG_E251514_43
				291_N	354_N	395_N	572_N	690_N
			Sample Date	2018-07-10	2018-09-11	2018-10-22	2019-04-17	2019-08-13
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		-	200000	-	-	-
Bromide (Br)		ug/L		-	< 250	-	-	-
Chloride (Cl)	250000	ug/L		-	< 2500	-	-	-
Fluoride (F)	1.5	mg/L		-	< 0.1	-	-	-
Nitrate (as N)	10000	ug/L		-	< 25	-	-	-
Nitrite (as N)	1000	ug/L		-	< 5	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	< 30	-	-	-
Ammonia (as N)		ug/L		-	6.7	-	-	-
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		-	199000	-	-	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		-	<50	-	-	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Conductivity, field measured		uS/cm		-	-	638	686	647
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		-	8.25	-	-	-
Temperature, field measured		deg c		-	-	6.9	7	7.5
Conductivity		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	177	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		-	< 20	-	-	-
Depth to Water		mbtoc		58	-	57.4	57.06	51.22
Metals, Dissolved								
Aluminum	9500	ug/L		-	6	-	-	-
Antimony	6	ug/L		-	0.36	-	-	-
Arsenic	10	ug/L		-	0.32	-	-	-
Barium	1000	ug/L		-	30.9	-	-	-
Beryllium	8	ug/L		-	< 0.1	-	-	-
Bismuth		ug/L		-	< 0.05	-	-	-
Boron	5000	ug/L		-	67	-	-	-
Cadmium	5	ug/L		-	0.117	-	-	-
Calcium		ug/L		-	47700	-	-	-
Chromium	50	ug/L		-	< 0.1	-	-	-
Cobalt	1	ug/L		-	< 0.1	-	-	-
Copper	1500	ug/L		-	1.09	-	-	-
Iron	6500	ug/L		-	< 10	-	-	-
Lead	10	ug/L		-	< 0.05	-	-	-
Lithium	8	ug/L		-	1.8	-	-	-
Magnesium		ug/L		-	14100	-	-	-
Manganese	1500	ug/L		-	23.1	-	-	-
Mercury	1	ug/L		-	< 0.005	-	-	-
Molybdenum	250	ug/L		-	5.13	-	-	-
Nickel	80	ug/L		-	0.55	-	-	-
Potassium		ug/L		-	1900	-	-	-
Selenium	10	ug/L		-	0.585	-	-	-
Silicon		ug/L		-	3690	-	-	-
Silver	20	ug/L		-	< 0.01	-	-	-
Sodium	200000	ug/L		-	93900	-	-	-
Strontium	2500	ug/L		-	846	-	-	-
Sulphur (S)		ug/L		-	66400	-	-	-
Tellurium		ug/L		-	< 0.2	-	-	-
Thallium		ug/L		-	0.01	-	-	-
Thorium-232		ug/L		-	< 0.1	-	-	-
Tin	2500	ug/L		-	< 0.1	-	-	-
Titanium		ug/L		-	< 0.3	-	-	-
Uranium	20	ug/L		-	2.15	-	-	-
Vanadium	20	ug/L		-	< 0.5	-	-	-
Zinc	3000	ug/L		-	1.5	-	-	-
Zirconium		ug/L		-	< 0.06	-	-	-
Cesium		ug/L		-	< 0.01	-	-	-
Rubidium		ug/L		-	0.51	-	-	-
Tungsten	3	ug/L		-	0.31	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_43	WG_E251514_44	WG_E251514_44	WG_E251514_44	WG_E251514_44
				789_N	004_N	035_N	068_N	083_N
			Sample Date	2019-11-20	2020-06-22	2020-07-23	2020-08-25	2020-09-09
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		-	-	-	-	-
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		-	-	-	-	-
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		-	-	-	-	-
Nitrite (as N)	1000	ug/L		-	-	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		-	-	-	-	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		-	-	-	-	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Conductivity, field measured		uS/cm		632	624	614	584	598
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		-	-	-	-	-
Temperature, field measured		deg c		6.8	6.8	7.1	7	7
Conductivity		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		-	-	-	-	-
Depth to Water		mbtoc		57.12	57	56.84	57.87	56.85
Metals, Dissolved								
Aluminum	9500	ug/L		-	-	-	-	-
Antimony	6	ug/L		-	-	-	-	-
Arsenic	10	ug/L		-	-	-	-	-
Barium	1000	ug/L		-	-	-	-	-
Beryllium	8	ug/L		-	-	-	-	-
Bismuth		ug/L		-	-	-	-	-
Boron	5000	ug/L		-	-	-	-	-
Cadmium	5	ug/L		-	-	-	-	-
Calcium		ug/L		-	-	-	-	-
Chromium	50	ug/L		-	-	-	-	-
Cobalt	1	ug/L		-	-	-	-	-
Copper	1500	ug/L		-	-	-	-	-
Iron	6500	ug/L		-	-	-	-	-
Lead	10	ug/L		-	-	-	-	-
Lithium	8	ug/L		-	-	-	-	-
Magnesium		ug/L		-	-	-	-	-
Manganese	1500	ug/L		-	-	-	-	-
Mercury	1	ug/L		-	-	-	-	-
Molybdenum	250	ug/L		-	-	-	-	-
Nickel	80	ug/L		-	-	-	-	-
Potassium		ug/L		-	-	-	-	-
Selenium	10	ug/L		-	-	-	-	-
Silicon		ug/L		-	-	-	-	-
Silver	20	ug/L		-	-	-	-	-
Sodium	200000	ug/L		-	-	-	-	-
Strontium	2500	ug/L		-	-	-	-	-
Sulphur (S)		ug/L		-	-	-	-	-
Tellurium		ug/L		-	-	-	-	-
Thallium		ug/L		-	-	-	-	-
Thorium-232		ug/L		-	-	-	-	-
Tin	2500	ug/L		-	-	-	-	-
Titanium		ug/L		-	-	-	-	-
Uranium	20	ug/L		-	-	-	-	-
Vanadium	20	ug/L		-	-	-	-	-
Zinc	3000	ug/L		-	-	-	-	-
Zirconium		ug/L		-	-	-	-	-
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_44 125_N	WG_E251514_44 147_N	WG_E251514_44 181_N	WG_E251514_44 187_N	VA21A1321-001
			Sample Date	2020-10-21	2020-11-12	2020-12-16	2020-12-22	2021-01-21
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		-	-	-	-	257000
Bromide (Br)		ug/L		-	-	-	-	< 250
Chloride (Cl)	250000	ug/L		-	-	-	-	< 2500
Fluoride (F)	1.5	mg/L		-	-	-	-	< 0.1
Nitrate (as N)	10000	ug/L		-	-	-	-	132
Nitrite (as N)	1000	ug/L		-	-	-	-	29.3
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		-	-	-	-	< 5
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	404
Sulfate (SO4)	500000	ug/L		-	-	-	-	193000
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		-	-	-	-	<50
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Conductivity, field measured		uS/cm		702	687	843	878	819
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		-	-	-	-	8.48
Temperature, field measured		deg c		6.9	6.9	6.9	6.9	6.9
Conductivity		uS/cm		-	-	-	-	843
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	30.5
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	243
Chemical Oxygen Demand		mg/L		-	-	-	-	136
Depth to Water		mbtoc		36.88	56.76	56.76	56.76	57
Metals, Dissolved								
Aluminum	9500	ug/L		-	-	-	-	4
Antimony	6	ug/L		-	-	-	-	**9.14**
Arsenic	10	ug/L		-	-	-	-	0.44
Barium	1000	ug/L		-	-	-	-	29
Beryllium	8	ug/L		-	-	-	-	< 0.1
Bismuth		ug/L		-	-	-	-	< 0.05
Boron	5000	ug/L		-	-	-	-	70
Cadmium	5	ug/L		-	-	-	-	0.167
Calcium		ug/L		-	-	-	-	70800
Chromium	50	ug/L		-	-	-	-	< 0.1
Cobalt	1	ug/L		-	-	-	-	< 0.1
Copper	1500	ug/L		-	-	-	-	0.78
Iron	6500	ug/L		-	-	-	-	< 10
Lead	10	ug/L		-	-	-	-	< 0.05
Lithium	8	ug/L		-	-	-	-	1.7
Magnesium		ug/L		-	-	-	-	16000
Manganese	1500	ug/L		-	-	-	-	1.64
Mercury	1	ug/L		-	-	-	-	< 0.005
Molybdenum	250	ug/L		-	-	-	-	4.35
Nickel	80	ug/L		-	-	-	-	< 0.5
Potassium		ug/L		-	-	-	-	2230
Selenium	10	ug/L		-	-	-	-	0.424
Silicon		ug/L		-	-	-	-	3860
Silver	20	ug/L		-	-	-	-	< 0.01
Sodium	200000	ug/L		-	-	-	-	95700
Strontium	2500	ug/L		-	-	-	-	956
Sulphur (S)		ug/L		-	-	-	-	70500
Tellurium		ug/L		-	-	-	-	< 0.2
Thallium		ug/L		-	-	-	-	< 0.01
Thorium-232		ug/L		-	-	-	-	< 0.1
Tin	2500	ug/L		-	-	-	-	0.2
Titanium		ug/L		-	-	-	-	0.39
Uranium	20	ug/L		-	-	-	-	2.26
Vanadium	20	ug/L		-	-	-	-	< 0.5
Zinc	3000	ug/L		-	-	-	-	5.1
Zirconium		ug/L		-	-	-	-	< 0.2
Cesium		ug/L		-	-	-	-	< 0.01
Rubidium		ug/L		-	-	-	-	0.44
Tungsten	3	ug/L		-	-	-	-	0.14
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	630
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	1800
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	< 100
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	< 0.5
Ethylbenzene	140	ug/L		-	-	-	-	< 0.5
Styrene	800	ug/L		-	-	-	-	< 0.5
Toluene	60	ug/L		-	-	-	-	< 0.5
Xylenes, Total	90	ug/L		-	-	-	-	< 0.5
o-Xylene		ug/L		-	-	-	-	< 0.3
m,p-Xylenes		ug/L		-	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	< 0.5
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-3	BH-3	BH-3
			Laboratory ID	WG_E251514_44	WG_E251514_44	WG_E251514_44
				307_N	393_N	491_N
			Sample Date	2021-04-21	2021-07-16	2021-10-22
			QA/QC			
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L		-	-	255000
Bromide (Br)		ug/L		-	-	-
Chloride (Cl)	250000	ug/L		-	-	< 2500
Fluoride (F)	1.5	mg/L		-	-	< 0.1
Nitrate (as N)	10000	ug/L		-	-	217
Nitrite (as N)	1000	ug/L		-	-	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-
Ammonia (as N)		ug/L		-	-	< 5
Total Kjeldahl Nitrogen		ug/L		-	-	54
Sulfate (SO4)	500000	ug/L		-	-	186000
Cyanide	200	ug/L		-	-	-
Cyanide (SAD)		ug/L		-	-	-
Phosphorus, dissolved		ug/L		-	-	<50
Phosphorus, total		ug/L		-	-	-
Field + Physical						
Conductivity, field measured		uS/cm		727	810	814
pH, field measured		pH units		-	-	-
pH, lab		pH		-	-	8.13
Temperature, field measured		deg c		7.1	7.2	7
Conductivity		uS/cm		-	-	815
Total Dissolved Solids		mg/L		-	-	-
Total Suspended Solids		mg/L		-	-	-
Total Organic Carbon		mg/L		-	-	0.87
Dissolved Organic Carbon		mg/L		-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	231
Chemical Oxygen Demand		mg/L		-	-	< 20
Depth to Water		mbtoc		56.84	56.76	57.87
Metals, Dissolved						
Aluminum	9500	ug/L		-	-	4
Antimony	6	ug/L		-	-	0.37
Arsenic	10	ug/L		-	-	0.34
Barium	1000	ug/L		-	-	28.8
Beryllium	8	ug/L		-	-	< 0.1
Bismuth		ug/L		-	-	< 0.05
Boron	5000	ug/L		-	-	59
Cadmium	5	ug/L		-	-	0.135
Calcium		ug/L		-	-	68000
Chromium	50	ug/L		-	-	< 0.5
Cobalt	1	ug/L		-	-	< 0.1
Copper	1500	ug/L		-	-	0.53
Iron	6500	ug/L		-	-	< 10
Lead	10	ug/L		-	-	< 0.05
Lithium	8	ug/L		-	-	2
Magnesium		ug/L		-	-	14800
Manganese	1500	ug/L		-	-	3.88
Mercury	1	ug/L		-	-	< 0.005
Molybdenum	250	ug/L		-	-	5.2
Nickel	80	ug/L		-	-	< 0.5
Potassium		ug/L		-	-	2040
Selenium	10	ug/L		-	-	0.447
Silicon		ug/L		-	-	3680
Silver	20	ug/L		-	-	< 0.01
Sodium	200000	ug/L		-	-	96900
Strontium	2500	ug/L		-	-	900
Sulphur (S)		ug/L		-	-	61900
Tellurium		ug/L		-	-	< 0.2
Thallium		ug/L		-	-	0.013
Thorium-232		ug/L		-	-	< 0.1
Tin	2500	ug/L		-	-	0.13
Titanium		ug/L		-	-	< 0.3
Uranium	20	ug/L		-	-	2.13
Vanadium	20	ug/L		-	-	< 0.5
Zinc	3000	ug/L		-	-	2.5
Zirconium		ug/L		-	-	< 0.2
Cesium		ug/L		-	-	< 0.01
Rubidium		ug/L		-	-	0.5
Tungsten	3	ug/L		-	-	0.15
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	< 400
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L		-	-	< 100
VOCs + BTEX						
1,4-Difluorobenzene		ug/L		-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-
Benzene	5	ug/L		-	-	< 0.5
Ethylbenzene	140	ug/L		-	-	< 0.5
Styrene	800	ug/L		-	-	< 0.5
Toluene	60	ug/L		-	-	< 0.5
Xylenes, Total	90	ug/L		-	-	< 0.5
o-Xylene		ug/L		-	-	< 0.3
m,p-Xylenes		ug/L		-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L		-	-	< 0.5
Phenols, Non-Chlorinated						
Phenol	1000	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
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- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4A
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-4A	BH-4A	BH-4A	BH-4A
		Laboratory ID:	WG_BH-4A_41827_N	WG_BH-4A_42150_N	WG_BH-4A_42324_N	WG_BH-4A_42476_N
		Sample Date:	2014-07-07	2015-05-26	2015-11-16	2016-04-16
		QA/QC				
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L	273000	270000	270000	270000
Chloride (Cl)	250000	ug/L	1600	2500	1200	1600
Nitrate (as N)	10000	ug/L	528	420	560	520
Nitrite (as N)	1000	ug/L	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L	-	424	555	523
Ammonia (as N)		ug/L	50	< 30	< 30	< 30
Total Kjeldahl Nitrogen		ug/L	136	330	260	-
Sulfate (SO4)	500000	ug/L	147000	141000	142000	135000
Cyanide	200	ug/L	-	< 10	< 10	-
Cyanide (SAD)		ug/L	< 5	-	-	-
Phosphorus, dissolved		ug/L	35	<20	<20	40
Phosphorus, total		ug/L	140	130	200	-
Field + Physical						
Conductivity, field measured		uS/cm	-	-	-	-
Temperature, field measured		deg c	-	-	-	-
pH, lab		pH	7.7	7.6	7.9	7.7
Conductivity		uS/cm	751	773	756	762
Total Dissolved Solids		mg/L	481	2	480	-
Total Suspended Solids		mg/L	18	38	23	-
Dissolved Organic Carbon		mg/L	0.82	2	1.8	-
Hardness, Calcium Carbonate (Total)		mg/L	-	-	-	225
Hardness, Calcium Carbonate (Dissolved)		mg/L	210	103	217	-
Chemical Oxygen Demand		mg/L	< 20	< 20	< 20	< 20
Depth to Water		mbtoc	-	-	-	-
Metals, Dissolved						
Aluminum	9500	ug/L	5.4	8	< 5	< 5
Antimony	6	ug/L	< 5	0.3	< 0.1	0.2
Arsenic	10	ug/L	0.48	0.7	0.6	0.5
Barium	1000	ug/L	62.9	131	71	67
Beryllium	8	ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L	< 50	20	51	62
Cadmium	5	ug/L	0.164	0.05	0.09	0.05
Calcium		ug/L	56800	29200	58100	58800
Chromium	50	ug/L	< 1	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L	***< 5***	**14.1**	0.19	< 0.05
Copper	1500	ug/L	0.6	4.9	0.9	1.4
Iron	6500	ug/L	< 10	4250	< 10	< 10
Lead	10	ug/L	< 0.2	< 0.1	< 0.1	0.2
Lithium	8	ug/L	< 5	2.6	1.2	1.3
Magnesium		ug/L	16600	7250	17500	18900
Manganese	1500	ug/L	1.1	**3170**	51.2	0.3
Mercury	1	ug/L	< 0.01	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L	4.3	0.7	3.6	3.7
Nickel	80	ug/L	< 1	18.1	0.9	0.6
Potassium		ug/L	1740	1850	1760	1850
Selenium	10	ug/L	0.86	0.6	1.2	1.7
Silicon		ug/L	4000	8700	3600	4400
Silver	20	ug/L	< 0.02	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L	89000	7530	98500	106000
Strontium	2500	ug/L	821	133	750	792
Sulphur (S)		ug/L	40400	2000	46000	53000
Tellurium		ug/L	-	< 0.2	< 0.2	< 0.2
Thallium		ug/L	< 0.05	< 0.02	< 0.02	< 0.02
Thorium-232		ug/L	-	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L	< 5	< 0.2	< 0.2	< 0.2
Titanium		ug/L	< 5	< 5	< 5	< 5
Uranium	20	ug/L	3.7	0.07	3.51	3.38
Vanadium	20	ug/L	< 5	< 1	< 1	< 1
Zinc	3000	ug/L	< 5	24	< 4	< 4
Zirconium		ug/L	< 0.5	0.1	< 0.1	< 0.1
VOCs + BTEX						
1,4-Difluorobenzene		ug/L	< 0.5	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	< 2	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	< 0.5	-	-	-
Benzene	5	ug/L	< 0.4	-	-	-
Toluene	60	ug/L	< 0.4	-	-	-
Phenols, Non-Chlorinated						
Phenol	1000	ug/L	1.1	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4A
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name / Laboratory ID / Sample Date / QA/QC			
			BH-4A WG_BH-4A_42558_N 2016-07-07	BH-4A WG_BH-4A_42668_N 2016-10-25	BH-4A WG_BH-4A_42849_N 2017-04-24	BH-4A WG_BH-4A_42900_N 2017-06-14
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L	270000	270000	270000	260000
Chloride (Cl)	250000	ug/L	2000	1600	1700	1500
Nitrate (as N)	10000	ug/L	220	340	462	160
Nitrite (as N)	1000	ug/L	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L	464	341	462	157
Ammonia (as N)		ug/L	< 30	< 30	< 30	< 30
Total Kjeldahl Nitrogen		ug/L	-	-	-	-
Sulfate (SO4)	500000	ug/L	133000	129000	139000	148000
Cyanide	200	ug/L	-	-	-	-
Cyanide (SAD)		ug/L	-	-	-	-
Phosphorus, dissolved		ug/L	30	40	<50	<50
Phosphorus, total		ug/L	-	-	-	-
Field + Physical						
Conductivity, field measured		uS/cm	-	-	-	-
Temperature, field measured		deg c	-	-	-	-
pH, lab		pH	7.8	8	7.7	7.8
Conductivity		uS/cm	760	760	760	765
Total Dissolved Solids		mg/L	-	-	-	-
Total Suspended Solids		mg/L	-	-	-	-
Dissolved Organic Carbon		mg/L	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L	208	222	202	207
Hardness, Calcium Carbonate (Dissolved)		mg/L	-	-	-	-
Chemical Oxygen Demand		mg/L	< 20	< 20	< 20	< 20
Depth to Water		mbtoc	-	-	-	-
Metals, Dissolved						
Aluminum	9500	ug/L	< 5	19	< 5	6.6
Antimony	6	ug/L	0.2	0.4	0.21	0.36
Arsenic	10	ug/L	< 0.5	0.6	< 0.5	< 0.5
Barium	1000	ug/L	67	71	57.5	65.3
Beryllium	8	ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L	62	65	60	55
Cadmium	5	ug/L	0.11	0.07	0.066	0.066
Calcium		ug/L	55800	56800	54000	55300
Chromium	50	ug/L	< 0.5	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L	< 0.05	< 0.05	< 0.1	< 0.1
Copper	1500	ug/L	0.9	0.9	0.75	0.65
Iron	6500	ug/L	< 10	< 10	< 10	< 10
Lead	10	ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Lithium	8	ug/L	1.2	1.3	1.09	1.21
Magnesium		ug/L	16800	19300	16200	16800
Manganese	1500	ug/L	3.4	0.9	0.42	5.13
Mercury	1	ug/L	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L	3.7	3.5	3.43	3.31
Nickel	80	ug/L	0.4	1.3	0.52	5.96
Potassium		ug/L	1630	1860	1710	1850
Selenium	10	ug/L	1.3	1.6	1.42	1.55
Silicon		ug/L	4400	4300	4100	4600
Silver	20	ug/L	< 0.05	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L	95700	106000	94200	94900
Strontium	2500	ug/L	751	868	702	797
Sulphur (S)		ug/L	46000	54000	44800	49500
Tellurium		ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L	< 0.02	0.02	< 0.02	< 0.02
Thorium-232		ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Titanium		ug/L	< 5	< 5	< 5	< 5
Uranium	20	ug/L	3.63	3.57	3.38	3.46
Vanadium	20	ug/L	< 1	< 1	< 1	< 1
Zinc	3000	ug/L	< 4	< 4	< 4	< 4
Zirconium		ug/L	< 0.1	< 0.1	< 0.1	< 0.1
VOCs + BTEX						
1,4-Difluorobenzene		ug/L	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	-	-	-	-
Benzene	5	ug/L	-	-	-	-
Toluene	60	ug/L	-	-	-	-
Phenols, Non-Chlorinated						
Phenol	1000	ug/L	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4A
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-4A	BH-4A	BH-4A	BH-4A
		Laboratory ID:	WG_BH-4A_44035_N	WG_BH-4A_44068_N	WG_BH-4A_44125_N	WG_BH-4A_44147_N
		Sample Date:	2020-07-23	2020-08-25	2020-10-21	2020-11-12
		QA/QC:				
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L	-	-	-	-
Chloride (Cl)	250000	ug/L	-	-	-	-
Nitrate (as N)	10000	ug/L	-	-	-	-
Nitrite (as N)	1000	ug/L	-	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L	-	-	-	-
Ammonia (as N)		ug/L	-	-	-	-
Total Kjeldahl Nitrogen		ug/L	-	-	-	-
Sulfate (SO4)	500000	ug/L	-	-	-	-
Cyanide	200	ug/L	-	-	-	-
Cyanide (SAD)		ug/L	-	-	-	-
Phosphorus, dissolved		ug/L	-	-	-	-
Phosphorus, total		ug/L	-	-	-	-
Field + Physical						
Conductivity, field measured		uS/cm	570	556	669	648
Temperature, field measured		deg c	6.1	5.9	5.8	5.8
pH, lab		pH	-	-	-	-
Conductivity		uS/cm	-	-	-	-
Total Dissolved Solids		mg/L	-	-	-	-
Total Suspended Solids		mg/L	-	-	-	-
Dissolved Organic Carbon		mg/L	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L	-	-	-	-
Chemical Oxygen Demand		mg/L	-	-	-	-
Depth to Water		mbtoc	16.42	16.3	16.12	15.98
Metals, Dissolved						
Aluminum	9500	ug/L	-	-	-	-
Antimony	6	ug/L	-	-	-	-
Arsenic	10	ug/L	-	-	-	-
Barium	1000	ug/L	-	-	-	-
Beryllium	8	ug/L	-	-	-	-
Bismuth		ug/L	-	-	-	-
Boron	5000	ug/L	-	-	-	-
Cadmium	5	ug/L	-	-	-	-
Calcium		ug/L	-	-	-	-
Chromium	50	ug/L	-	-	-	-
Cobalt	1	ug/L	-	-	-	-
Copper	1500	ug/L	-	-	-	-
Iron	6500	ug/L	-	-	-	-
Lead	10	ug/L	-	-	-	-
Lithium	8	ug/L	-	-	-	-
Magnesium		ug/L	-	-	-	-
Manganese	1500	ug/L	-	-	-	-
Mercury	1	ug/L	-	-	-	-
Molybdenum	250	ug/L	-	-	-	-
Nickel	80	ug/L	-	-	-	-
Potassium		ug/L	-	-	-	-
Selenium	10	ug/L	-	-	-	-
Silicon		ug/L	-	-	-	-
Silver	20	ug/L	-	-	-	-
Sodium	200000	ug/L	-	-	-	-
Strontium	2500	ug/L	-	-	-	-
Sulphur (S)		ug/L	-	-	-	-
Tellurium		ug/L	-	-	-	-
Thallium		ug/L	-	-	-	-
Thorium-232		ug/L	-	-	-	-
Tin	2500	ug/L	-	-	-	-
Titanium		ug/L	-	-	-	-
Uranium	20	ug/L	-	-	-	-
Vanadium	20	ug/L	-	-	-	-
Zinc	3000	ug/L	-	-	-	-
Zirconium		ug/L	-	-	-	-
VOCs + BTEX						
1,4-Difluorobenzene		ug/L	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	-	-	-	-
Benzene	5	ug/L	-	-	-	-
Toluene	60	ug/L	-	-	-	-
Phenols, Non-Chlorinated						
Phenol	1000	ug/L	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4A
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-4A	BH-4A	BH-4A	BH-4A	BH-4A
		Laboratory ID:	WG_BH-4A_44181_N	WG_BH-4A_44216_N	WG_BH-4A_44308_N	WG_BH-4A_44393_N	WG_BH-4A_44491_N
		Sample Date:	2020-12-16	2021-01-20	2021-04-22	2021-07-16	2021-10-22
		QA/QC					
Anions + Nutrients							
Alkalinity, Total as CaCO3		ug/L	-	-	-	-	-
Chloride (Cl)	250000	ug/L	-	-	-	-	-
Nitrate (as N)	10000	ug/L	-	-	-	-	-
Nitrite (as N)	1000	ug/L	-	-	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L	-	-	-	-	-
Ammonia (as N)		ug/L	-	-	-	-	-
Total Kjeldahl Nitrogen		ug/L	-	-	-	-	-
Sulfate (SO4)	500000	ug/L	-	-	-	-	-
Cyanide	200	ug/L	-	-	-	-	-
Cyanide (SAD)		ug/L	-	-	-	-	-
Phosphorus, dissolved		ug/L	-	-	-	-	-
Phosphorus, total		ug/L	-	-	-	-	-
Field + Physical							
Conductivity, field measured		uS/cm	794	825	676	752	766
Temperature, field measured		deg c	5.8	5.8	6	6	6
pH, lab		pH	-	-	-	-	-
Conductivity		uS/cm	-	-	-	-	-
Total Dissolved Solids		mg/L	-	-	-	-	-
Total Suspended Solids		mg/L	-	-	-	-	-
Dissolved Organic Carbon		mg/L	-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L	-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L	-	-	-	-	-
Chemical Oxygen Demand		mg/L	-	-	-	-	-
Depth to Water		mbtoc	15.87	15.78	15.52	15.43	15.22
Metals, Dissolved							
Aluminum	9500	ug/L	-	-	-	-	-
Antimony	6	ug/L	-	-	-	-	-
Arsenic	10	ug/L	-	-	-	-	-
Barium	1000	ug/L	-	-	-	-	-
Beryllium	8	ug/L	-	-	-	-	-
Bismuth		ug/L	-	-	-	-	-
Boron	5000	ug/L	-	-	-	-	-
Cadmium	5	ug/L	-	-	-	-	-
Calcium		ug/L	-	-	-	-	-
Chromium	50	ug/L	-	-	-	-	-
Cobalt	1	ug/L	-	-	-	-	-
Copper	1500	ug/L	-	-	-	-	-
Iron	6500	ug/L	-	-	-	-	-
Lead	10	ug/L	-	-	-	-	-
Lithium	8	ug/L	-	-	-	-	-
Magnesium		ug/L	-	-	-	-	-
Manganese	1500	ug/L	-	-	-	-	-
Mercury	1	ug/L	-	-	-	-	-
Molybdenum	250	ug/L	-	-	-	-	-
Nickel	80	ug/L	-	-	-	-	-
Potassium		ug/L	-	-	-	-	-
Selenium	10	ug/L	-	-	-	-	-
Silicon		ug/L	-	-	-	-	-
Silver	20	ug/L	-	-	-	-	-
Sodium	200000	ug/L	-	-	-	-	-
Strontium	2500	ug/L	-	-	-	-	-
Sulphur (S)		ug/L	-	-	-	-	-
Tellurium		ug/L	-	-	-	-	-
Thallium		ug/L	-	-	-	-	-
Thorium-232		ug/L	-	-	-	-	-
Tin	2500	ug/L	-	-	-	-	-
Titanium		ug/L	-	-	-	-	-
Uranium	20	ug/L	-	-	-	-	-
Vanadium	20	ug/L	-	-	-	-	-
Zinc	3000	ug/L	-	-	-	-	-
Zirconium		ug/L	-	-	-	-	-
VOCs + BTEX							
1,4-Difluorobenzene		ug/L	-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	-	-	-	-	-
Benzene	5	ug/L	-	-	-	-	-
Toluene	60	ug/L	-	-	-	-	-
Phenols, Non-Chlorinated							
Phenol	1000	ug/L	-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-4B	BH-4B	BH-4B	BH-4B	BH-4B
			Laboratory ID	WG_E252313_42	WG_E252313_42	WG_E252313_42	WG_E252313_42	WG_E252313_42
				150_N	476_N	558_N	668_N	849_N
			Sample Date	2015-05-26	2016-04-16	2016-07-07	2016-10-25	2017-04-24
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		120000	63000	190000	84000	19000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		1100	< 1000	1200	1100	< 1000
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		< 10	12	450	< 10	23
Nitrite (as N)	1000	ug/L		< 10	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L		< 10	12	37	< 10	23
Ammonia (as N)		ug/L		< 30	30	59	< 30	< 30
Total Kjeldahl Nitrogen		ug/L		1020	-	-	-	-
Sulfate (SO4)	500000	ug/L		< 1000	< 1000	< 1000	1300	1900
Cyanide	200	ug/L		< 10	-	-	-	-
Phosphorus, dissolved		ug/L		20	30	<20	60	<50
Phosphorus, total		ug/L		340	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	-	-	-	-
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		6.7	6.4	6.7	6.7	5.7
Temperature, field measured		deg c		-	-	-	-	-
Conductivity		uS/cm		228	122	352	170	43.1
Total Dissolved Solids		mg/L		11.4	-	-	-	-
Total Suspended Solids		mg/L		200	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		11.4	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	47.1	163	69.6	8.97
Hardness, Calcium Carbonate (Dissolved)		mg/L		223	-	-	-	-
Chemical Oxygen Demand		mg/L		63	64	59	65	< 20
Depth to Water		mbtoc		-	-	-	-	-
Metals, Dissolved								
Aluminum	9500	ug/L		6	41	6	167	60.6
Antimony	6	ug/L		0.5	0.1	0.2	0.4	< 0.1
Arsenic	10	ug/L		< 0.5	1.3	0.6	2.9	< 0.5
Barium	1000	ug/L		67	29	70	238	69.4
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L		59	5	11	33	20
Cadmium	5	ug/L		0.29	0.28	0.96	0.43	0.439
Calcium		ug/L		57500	13100	48400	19300	2730
Chromium	50	ug/L		< 0.5	< 0.5	0.6	0.9	< 0.5
Cobalt	1	ug/L		< 0.05	**11.3**	**9.73**	**11.9**	0.77
Copper	1500	ug/L		2.5	3.7	4.1	40.2	22.6
Iron	6500	ug/L		< 10	4510	103	**10900**	214
Lead	10	ug/L		< 0.1	0.5	< 0.1	1.2	0.16
Lithium	8	ug/L		1.7	3.8	3.4	5.6	3.19
Magnesium		ug/L		19400	3500	10100	5190	522
Manganese	1500	ug/L		7	**2060**	**3360**	1490	167
Mercury	1	ug/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L		4.2	0.2	0.8	0.3	< 0.1
Nickel	80	ug/L		0.9	19.3	19.5	40.5	7.07
Potassium		ug/L		2260	620	1850	1350	250
Selenium	10	ug/L		2.1	< 0.5	< 0.5	< 0.5	< 0.5
Silicon		ug/L		4700	7700	8700	7900	5100
Silver	20	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L		105000	6990	8810	11200	6100
Strontium	2500	ug/L		820	64	237	112	20.8
Sulphur (S)		ug/L		56000	< 1000	2000	< 1000	< 3000
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.02	0.02	0.05	0.02	< 0.02
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	0.3	< 0.1
Tin	2500	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Titanium		ug/L		< 5	< 5	< 5	< 5	< 5
Uranium	20	ug/L		3.52	0.09	0.46	0.4	0.059
Vanadium	20	ug/L		< 1	< 1	< 1	2	< 1
Zinc	3000	ug/L		5	7	7	120	81.9
Zirconium		ug/L		< 0.1	0.7	0.2	1.2	0.4
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-4B	BH-4B	BH-4B	BH-4B	BH-4B
			Laboratory ID	WG_E252313_42	WG_E252313_43	WG_E252313_43	WG_E252313_43	WG_E252313_43
				900_N	250_N	292_N	572_N	690_N
			Sample Date	2017-06-14	2018-05-30	2018-07-11	2019-04-17	2019-08-13
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		120000	290000	404000	32100	271000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		1000	620	1180	610	< 2500
Fluoride (F)	1.5	mg/L		-	-	-	0.226	< 0.1
Nitrate (as N)	10000	ug/L		12	20.8	18	15	460
Nitrite (as N)	1000	ug/L		< 10	< 1	< 1	1	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L		12	< 22	< 19	-	-
Ammonia (as N)		ug/L		240	13.6	48	49.1	< 5
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		< 1000	780	1960	1070	137000
Cyanide	200	ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<50	<50	<50	198	55
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	5.7	14.5
Conductivity, field measured		uS/cm		-	-	-	38	597
Oxidation Reduction Potential, field measured		mV		-	-	-	341.2	344.7
pH, field measured		pH units		-	-	-	6.35	7
pH, lab		pH		6.3	-	-	-	8.53
Temperature, field measured		deg c		-	-	-	3.7	5.9
Conductivity		uS/cm		240	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	21	2.53
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		103	354	355	19.7	190
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		61	53	81	73	< 20
Depth to Water		mbtoc		-	-	-	1.37	14.43
Metals, Dissolved								
Aluminum	9500	ug/L		140	32	12.5	423	72.8
Antimony	6	ug/L		0.87	0.27	0.21	0.12	0.2
Arsenic	10	ug/L		2.57	3.72	2.81	2.88	0.74
Barium	1000	ug/L		50.1	105	112	17	82.1
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.1	< 0.05	< 0.05	< 0.05	< 0.05
Boron	5000	ug/L		6	< 10	< 10	< 10	52
Cadmium	5	ug/L		0.356	0.124	0.709	0.139	0.193
Calcium		ug/L		31100	109000	109000	5680	50300
Chromium	50	ug/L		0.57	0.11	< 0.1	0.88	0.16
Cobalt	1	ug/L		**15.8**	**8.87**	**7.31**	**4.33**	0.52
Copper	1500	ug/L		7	2.43	2.56	6.93	1.64
Iron	6500	ug/L		**10100**	5510	3860	**11400**	251
Lead	10	ug/L		0.51	0.181	0.053	0.846	0.265
Lithium	8	ug/L		3.4	2.4	2.4	3.2	1.3
Magnesium		ug/L		6190	20100	20200	1350	15700
Manganese	1500	ug/L		**2930**	**3190**	**3630**	672	45.4
Mercury	1	ug/L		< 0.02	< 0.005	< 0.005	0.0086	< 0.005
Molybdenum	250	ug/L		0.34	0.625	0.704	0.432	2.84
Nickel	80	ug/L		45.7	22.7	15.4	13.3	1.25
Potassium		ug/L		1200	2050	2800	410	1590
Selenium	10	ug/L		< 0.5	0.113	0.109	0.152	1.13
Silicon		ug/L		8600	6130	5990	5860	4000
Silver	20	ug/L		< 0.05	0.02	< 0.01	< 0.01	< 0.01
Sodium	200000	ug/L		10100	11200	12300	7570	87300
Strontium	2500	ug/L		161	483	532	33.7	725
Sulphur (S)		ug/L		< 3000	< 500	750	< 500	45200
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		0.031	0.018	0.021	< 0.01	0.011
Thorium-232		ug/L		0.18	< 0.1	< 0.1	0.44	< 0.1
Tin	2500	ug/L		< 0.2	2.45	1.49	0.11	0.16
Titanium		ug/L		< 5	< 3	0.35	19.1	2.43
Uranium	20	ug/L		0.442	2.47	1.77	0.598	3.37
Vanadium	20	ug/L		1.3	1.41	0.8	2.82	0.68
Zinc	3000	ug/L		13.2	4.8	12.4	5.1	6.8
Zirconium		ug/L		0.99	0.864	0.481	2.02	< 0.2
Cesium		ug/L		-	< 0.01	< 0.01	< 0.01	< 0.01
Rubidium		ug/L		-	0.96	1.23	0.39	0.35
Tungsten	3	ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	< 0.001	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	< 0.005	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	< 0.0004	-	-	-
Benzene	5	ug/L		-	< 0.0005	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	< 0.00045	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-4B	BH-4B	BH-4B	BH-4B	BH-4B
			Laboratory ID	WG_E252313_43	WG_E252313_43	WG_E252313_43	WG_E252313_44	WG_E252313_44
				789_N	921_N	962_N	147_N	181_N
			Sample Date	2019-11-20	2020-03-31	2020-05-11	2020-11-12	2020-12-16
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		40400	91500	-	-	-
Bromide (Br)		ug/L		< 50	-	-	-	-
Chloride (Cl)	250000	ug/L		600	< 500	-	-	-
Fluoride (F)	1.5	mg/L		0.187	0.234	-	-	-
Nitrate (as N)	10000	ug/L		15	< 5	-	-	-
Nitrite (as N)	1000	ug/L		< 1	< 1	-	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		58	19.8	-	-	-
Total Kjeldahl Nitrogen		ug/L		2410	884	-	-	-
Sulfate (SO4)	500000	ug/L		1890	< 300	-	-	-
Cyanide	200	ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		67	104	-	-	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		5	5.4	-	-	-
Conductivity, field measured		uS/cm		74.6	76	77	251	575
Oxidation Reduction Potential, field measured		mV		170.5	198.8	-	-	-
pH, field measured		pH units		6.83	6.4	-	-	-
pH, lab		pH		7.33	7.6	-	-	-
Temperature, field measured		deg c		5.3	1.3	4.6	6.2	4.6
Conductivity		uS/cm		76.5	166	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		35.3	21.2	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		23.9	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	84	-	-	-
Chemical Oxygen Demand		mg/L		80	72	-	-	-
Depth to Water		mbtoc		1.32	1.5	2.54	2.98	2.79
Metals, Dissolved								
Aluminum	9500	ug/L		440	115	-	-	-
Antimony	6	ug/L		0.15	0.13	-	-	-
Arsenic	10	ug/L		1.98	6.19	-	-	-
Barium	1000	ug/L		20.9	34.9	-	-	-
Beryllium	8	ug/L		0.12	< 0.1	-	-	-
Bismuth		ug/L		< 0.05	< 0.05	-	-	-
Boron	5000	ug/L		< 10	< 10	-	-	-
Cadmium	5	ug/L		2.07	0.0215	-	-	-
Calcium		ug/L		6870	25400	-	-	-
Chromium	50	ug/L		0.81	0.75	-	-	-
Cobalt	1	ug/L		**4.88**	**9.89**	-	-	-
Copper	1500	ug/L		21.3	1.62	-	-	-
Iron	6500	ug/L		3640	**15900**	-	-	-
Lead	10	ug/L		0.97	0.365	-	-	-
Lithium	8	ug/L		4	2.8	-	-	-
Magnesium		ug/L		1650	5010	-	-	-
Manganese	1500	ug/L		525	1440	-	-	-
Mercury	1	ug/L		0.0103	< 0.005	-	-	-
Molybdenum	250	ug/L		0.184	0.359	-	-	-
Nickel	80	ug/L		20.2	20.2	-	-	-
Potassium		ug/L		741	856	-	-	-
Selenium	10	ug/L		0.158	0.166	-	-	-
Silicon		ug/L		7450	6620	-	-	-
Silver	20	ug/L		0.057	< 0.01	-	-	-
Sodium	200000	ug/L		9710	10100	-	-	-
Strontium	2500	ug/L		39.8	123	-	-	-
Sulphur (S)		ug/L		1000	< 500	-	-	-
Tellurium		ug/L		< 0.2	< 0.2	-	-	-
Thallium		ug/L		0.015	< 0.01	-	-	-
Thorium-232		ug/L		0.79	0.23	-	-	-
Tin	2500	ug/L		0.13	< 0.1	-	-	-
Titanium		ug/L		8.88	3.65	-	-	-
Uranium	20	ug/L		0.72	0.163	-	-	-
Vanadium	20	ug/L		2.42	3.74	-	-	-
Zinc	3000	ug/L		10.3	2.9	-	-	-
Zirconium		ug/L		1.53	1.81	-	-	-
Cesium		ug/L		< 0.01	< 0.01	-	-	-
Rubidium		ug/L		0.58	0.38	-	-	-
Tungsten	3	ug/L		< 0.1	< 0.1	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-4B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name: BH-4B	BH-4B	BH-4B	BH-4B
Laboratory ID:			WG_E252313_44	WG_E252313_44	WG_E252313_44	WG_E252313_44
			216_N	308_N	393_N	491_N
Sample Date:			2021-01-20	2021-04-22	2021-07-16	2021-10-22
QA/QC:						
Anions + Nutrients						
Alkalinity, Total as CaCO3		ug/L	-	-	-	69400
Bromide (Br)		ug/L	-	-	-	-
Chloride (Cl)	250000	ug/L	-	-	-	< 500
Fluoride (F)	1.5	mg/L	-	-	-	0.191
Nitrate (as N)	10000	ug/L	-	-	-	< 5
Nitrite (as N)	1000	ug/L	-	-	-	< 1
Nitrogen, Nitrate-Nitrite	10000	ug/L	-	-	-	-
Ammonia (as N)		ug/L	-	-	-	18.5
Total Kjeldahl Nitrogen		ug/L	-	-	-	1510
Sulfate (SO4)	500000	ug/L	-	-	-	1860
Cyanide	200	ug/L	-	-	-	-
Phosphorus, dissolved		ug/L	-	-	-	<50
Phosphorus, total		ug/L	-	-	-	-
Field + Physical						
Dissolved Oxygen, field measured		mg/L	-	-	-	4.2
Conductivity, field measured		uS/cm	751	415	1032	101
Oxidation Reduction Potential, field measured		mV	-	-	-	230.9
pH, field measured		pH units	-	-	-	6.4
pH, lab		pH	-	-	-	6.88
Temperature, field measured		deg c	3.8	3	8.8	7.8
Conductivity		uS/cm	-	-	-	141
Total Dissolved Solids		mg/L	-	-	-	-
Total Suspended Solids		mg/L	-	-	-	-
Total Organic Carbon		mg/L	-	-	-	26.9
Dissolved Organic Carbon		mg/L	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L	-	-	-	45.7
Chemical Oxygen Demand		mg/L	-	-	-	99
Depth to Water		mbtoc	2.46	2.07	3	1.3
Metals, Dissolved						
Aluminum	9500	ug/L	-	-	-	724
Antimony	6	ug/L	-	-	-	0.19
Arsenic	10	ug/L	-	-	-	1.99
Barium	1000	ug/L	-	-	-	27.6
Beryllium	8	ug/L	-	-	-	0.119
Bismuth		ug/L	-	-	-	< 0.05
Boron	5000	ug/L	-	-	-	< 10
Cadmium	5	ug/L	-	-	-	0.527
Calcium		ug/L	-	-	-	13900
Chromium	50	ug/L	-	-	-	1.11
Cobalt	1	ug/L	-	-	-	**3.9**
Copper	1500	ug/L	-	-	-	18.3
Iron	6500	ug/L	-	-	-	2900
Lead	10	ug/L	-	-	-	1.47
Lithium	8	ug/L	-	-	-	5.2
Magnesium		ug/L	-	-	-	2680
Manganese	1500	ug/L	-	-	-	546
Mercury	1	ug/L	-	-	-	0.0067
Molybdenum	250	ug/L	-	-	-	0.149
Nickel	80	ug/L	-	-	-	15.9
Potassium		ug/L	-	-	-	427
Selenium	10	ug/L	-	-	-	0.104
Silicon		ug/L	-	-	-	6360
Silver	20	ug/L	-	-	-	0.015
Sodium	200000	ug/L	-	-	-	12000
Strontium	2500	ug/L	-	-	-	71.4
Sulphur (S)		ug/L	-	-	-	< 500
Tellurium		ug/L	-	-	-	< 0.2
Thallium		ug/L	-	-	-	0.019
Thorium-232		ug/L	-	-	-	0.28
Tin	2500	ug/L	-	-	-	0.13
Titanium		ug/L	-	-	-	12.5
Uranium	20	ug/L	-	-	-	0.721
Vanadium	20	ug/L	-	-	-	2.77
Zinc	3000	ug/L	-	-	-	9.2
Zirconium		ug/L	-	-	-	1.05
Cesium		ug/L	-	-	-	0.036
Rubidium		ug/L	-	-	-	0.82
Tungsten	3	ug/L	-	-	-	< 0.1
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L	-	-	-	< 400
Volatile Hydrocarbons (C6-C10)	15000	ug/L	-	-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L	-	-	-	< 100
VOCs + BTEX						
1,4-Difluorobenzene		ug/L	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L	-	-	-	-
Benzene	5	ug/L	-	-	-	< 0.5
Ethylbenzene	140	ug/L	-	-	-	< 0.5
Styrene	800	ug/L	-	-	-	< 0.5
Toluene	60	ug/L	-	-	-	4.2
Xylenes, Total	90	ug/L	-	-	-	< 0.5
o-Xylene		ug/L	-	-	-	< 0.3
m,p-Xylenes		ug/L	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L	-	-	-	< 0.5

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- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard **744**
Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_37	WG_E252314_41	WG_E252314_42	WG_E252314_42	WG_E252314_42
				701_N	827_N	150_N	324_N	476_N
			Sample Date	2003-03-21	2014-07-07	2015-05-26	2015-11-16	2016-04-16
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		471000	784000	540000	800000	710000
Bromide (Br)		ug/L		< 100	-	-	-	-
Chloride (Cl)	250000	ug/L		98000	140000	114000	177000	204000
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		-	< 20	10	< 10	14
Nitrite (as N)	1000	ug/L		< 2	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	ug/L		3	-	13	< 10	14
Ammonia (as N)		ug/L		30	290	< 30	290	< 30
Total Kjeldahl Nitrogen		ug/L		350	1060	580	2630	-
Total Phosphorus		ug/L		330	420	350	3200	-
Sulfate (SO4)	500000	ug/L		46400	3510	5500	10400	2000
Cyanide	200	ug/L		-	-	< 10	< 10	-
Cyanide (SAD)		ug/L		-	< 5	-	-	-
Phosphorus, dissolved		ug/L		-	<10	30	<20	<20
Phosphorus, total		ug/L		330	420	350	3200	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	-	-	-	-
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	-	-	-	-
pH, lab		pH		-	7.1	6.9	7.3	6.8
Temperature, field measured		deg c		-	-	-	-	-
Conductivity		uS/cm		-	1700	128	1880	1740
Specific Conductance		uS/cm		1170	-	-	-	-
Total Dissolved Solids		mg/L		-	928	16.4	1000	-
Total Suspended Solids		mg/L		-	340	200	430	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	10.8	16.4	21.3	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-	885
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	756	239	853	-
Chemical Oxygen Demand		mg/L		35	62	59	164	58
Depth to Water		mbtoc		-	-	-	-	-
Metals, Dissolved								
Aluminum	9500	ug/L		4.2	< 3	< 5	< 5	< 5
Antimony	6	ug/L		0.175	< 5	0.5	0.2	0.3
Arsenic	10	ug/L		0.5	3.46	< 0.5	**10.2**	4.1
Barium	1000	ug/L		134	179	32	336	196
Beryllium	8	ug/L		< 0.02	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.02	< 0.1	< 0.1	< 0.1	< 0.1
Boron	5000	ug/L		-	< 50	70	24	14
Cadmium	5	ug/L		0.42	0.041	0.32	0.02	0.01
Calcium		ug/L		-	205000	70100	220000	228000
Chromium	50	ug/L		< 0.2	< 1	< 0.5	< 0.5	< 0.5
Cobalt	1	ug/L		**2.26**	**13.4**	< 0.05	**12.1**	**18.3**
Copper	1500	ug/L		1.64	< 5	2.7	1.4	1.4
Iron	6500	ug/L		-	109	< 10	**13000**	**15800**
Lead	10	ug/L		< 0.01	< 0.2	< 0.1	< 0.1	0.2
Lithium	8	ug/L		< 0.05	< 5	1.8	3.1	2.5
Magnesium		ug/L		-	59000	15600	74100	76500
Manganese	1500	ug/L		1320	**4570**	13.5	**5350**	**5980**
Mercury	1	ug/L		-	< 0.01	< 0.02	< 0.02	< 0.02
Molybdenum	250	ug/L		1.72	3.6	6.3	7.3	1.9
Nickel	80	ug/L		7.53	14.1	0.8	17.3	23.3
Potassium		ug/L		-	4220	2650	5390	4390
Selenium	10	ug/L		0.3	< 0.1	1.2	< 0.5	< 0.5
Silicon		ug/L		-	8890	4600	9600	11100
Silver	20	ug/L		< 0.02	< 0.02	< 0.05	< 0.05	< 0.05
Sodium	200000	ug/L		-	77000	105000	115000	111000
Strontium	2500	ug/L		981	1610	892	1670	1680
Sulphur (S)		ug/L		-	< 3000	75000	1000	< 1000
Tellurium		ug/L		-	-	< 0.2	< 0.2	< 0.2
Thallium		ug/L		0.033	< 0.05	< 0.02	< 0.02	< 0.02
Thorium-232		ug/L		-	-	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		0.07	< 5	< 0.2	< 0.2	< 0.2
Titanium		ug/L		-	< 5	< 5	< 5	< 5
Uranium	20	ug/L		2.53	0.63	2.31	2.1	0.47
Vanadium	20	ug/L		4.11	< 5	< 1	< 1	< 1
Zinc	3000	ug/L		1.6	< 5	< 4	32	< 4
Zirconium		ug/L		-	< 0.5	< 0.1	1.1	0.2
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	< 0.5	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	< 2	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	< 0.5	-	-	-
Benzene	5	ug/L		-	< 0.4	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	< 0.4	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
BTEX+Styrene, Total		ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	6.5	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_42	WG_E252314_42	WG_E252314_42	WG_E252314_42	WG_E252314_42
				558_N	668_N	849_N	900_N	978_N
			Sample Date	2016-07-07	2016-10-25	2017-04-24	2017-06-14	2017-08-31
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		910000	330000	560000	560000	-
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		198000	**259000**	243000	236000	-
Fluoride (F)	1.5	mg/L		-	-	-	-	-
Nitrate (as N)	10000	ug/L		< 10	29	< 10	< 10	-
Nitrite (as N)	1000	ug/L		16	< 10	< 10	< 10	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		< 10	29	< 10	< 10	-
Ammonia (as N)		ug/L		< 30	42	< 30	< 30	-
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Total Phosphorus		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		2200	21600	1100	1400	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		<20	<20	<50	<50	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	-
Conductivity, field measured		uS/cm		-	-	1747	1510	194
Oxidation Reduction Potential, field measured		mV		-	-	-	-	-
pH, field measured		pH units		-	-	6.4	6.4	6.9
pH, lab		pH		6.9	7.2	6.5	6.8	-
Temperature, field measured		deg c		-	-	4.8	5.6	8.7
Conductivity		uS/cm		1990	1360	1650	1620	-
Specific Conductance		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		898	502	608	665	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		49	48	60	60	-
Depth to Water		mbtoc		-	-	2.26	2.55	4.15
Metals, Dissolved								
Aluminum	9500	ug/L		< 5	7	< 5	15.4	-
Antimony	6	ug/L		0.3	0.6	0.41	0.56	-
Arsenic	10	ug/L		2.4	4.1	2.3	3.94	-
Barium	1000	ug/L		179	639	281	155	-
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Bismuth		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Boron	5000	ug/L		15	48	27	14	-
Cadmium	5	ug/L		0.1	0.27	0.089	0.051	-
Calcium		ug/L		236000	126000	162000	180000	-
Chromium	50	ug/L		< 0.5	< 0.5	< 0.5	< 0.5	-
Cobalt	1	ug/L		**36.8**	**10.8**	**13**	**13**	-
Copper	1500	ug/L		< 0.2	13.3	26.7	0.24	-
Iron	6500	ug/L		17	2250	5100	**10700**	-
Lead	10	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Lithium	8	ug/L		3.3	2.5	2.07	2.37	-
Magnesium		ug/L		75200	45300	49500	52500	-
Manganese	1500	ug/L		**5960**	**2380**	**5070**	**5810**	-
Mercury	1	ug/L		< 0.02	< 0.02	< 0.02	< 0.02	-
Molybdenum	250	ug/L		2.5	1.6	1.59	0.38	-
Nickel	80	ug/L		30.6	28.4	18.3	19.5	-
Potassium		ug/L		4360	4780	2410	2500	-
Selenium	10	ug/L		< 0.5	< 0.5	< 0.5	< 0.5	-
Silicon		ug/L		10700	9100	9500	11300	-
Silver	20	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	-
Sodium	200000	ug/L		105000	113000	94800	94500	-
Strontium	2500	ug/L		1690	1060	1040	1230	-
Sulphur (S)		ug/L		3000	9000	< 3000	< 3000	-
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	-
Thallium		ug/L		0.04	< 0.02	< 0.02	0.021	-
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Tin	2500	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	-
Titanium		ug/L		< 5	< 5	< 5	< 5	-
Uranium	20	ug/L		0.51	2.35	0.704	1.08	-
Vanadium	20	ug/L		< 1	< 1	< 1	< 1	-
Zinc	3000	ug/L		5	211	95.3	5.4	-
Zirconium		ug/L		0.1	0.2	0.19	0.23	-
Cesium		ug/L		-	-	-	-	-
Rubidium		ug/L		-	-	-	-	-
Tungsten	3	ug/L		-	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	-	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
BTEX+Styrene, Total		ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_43	WG_E252314_43	WG_E252314_43	WG_E252314_43	WG_E252314_43
				248_N	250_N	292_N	354_N	572_N
			Sample Date	2018-05-28	2018-05-30	2018-07-11	2018-09-11	2019-04-17
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		-	232000	795000	801000	650000
Bromide (Br)		ug/L		-	-	-	-	-
Chloride (Cl)	250000	ug/L		-	21400	2440	205000	163000
Fluoride (F)	1.5	mg/L		-	-	-	-	< 0.1
Nitrate (as N)	10000	ug/L		-	< 5	< 50	< 50	< 25
Nitrite (as N)	1000	ug/L		-	< 1	< 10	< 10	< 5
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	< 6	< 60	< 60	-
Ammonia (as N)		ug/L		-	30.2	21.7	48.6	37.4
Total Kjeldahl Nitrogen		ug/L		-	-	-	-	-
Total Phosphorus		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		-	23300	< 3000	5200	37500
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		-	<50	<50	111	<50
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		-	-	-	-	2.1
Conductivity, field measured		uS/cm		780	-	1409	1154	939
Oxidation Reduction Potential, field measured		mV		-	-	-	-	317.9
pH, field measured		pH units		-	-	-	-	6.6
pH, lab		pH		-	-	-	7.73	-
Temperature, field measured		deg c		4.7	-	6	7.5	5.2
Conductivity		uS/cm		-	-	-	-	-
Specific Conductance		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		-	-	-	-	13.1
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	311	892	825	716
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	-	-
Chemical Oxygen Demand		mg/L		-	220	50	31	35
Depth to Water		mbtoc		1.12	-	3.82	4.29	2.36
Metals, Dissolved								
Aluminum	9500	ug/L		-	7.6	5.4	2.4	18
Antimony	6	ug/L		-	0.15	0.31	0.23	0.26
Arsenic	10	ug/L		-	1.11	9.18	**11.3**	5.7
Barium	1000	ug/L		-	65.8	289	288	246
Beryllium	8	ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		-	< 0.05	< 0.05	< 0.05	< 0.05
Boron	5000	ug/L		-	15	10	15	16
Cadmium	5	ug/L		-	0.019	0.117	< 0.005	0.0198
Calcium		ug/L		-	71100	229000	205000	183000
Chromium	50	ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Cobalt	1	ug/L		-	**11**	**6.45**	**3.01**	**9.58**
Copper	1500	ug/L		-	2.35	0.5	0.26	0.4
Iron	6500	ug/L		-	20	**10900**	**12400**	**7420**
Lead	10	ug/L		-	0.089	< 0.05	< 0.05	< 0.05
Lithium	8	ug/L		-	2	2.8	2.9	2.1
Magnesium		ug/L		-	32400	77600	76000	63100
Manganese	1500	ug/L		-	**1740**	**5010**	**4510**	**1830**
Mercury	1	ug/L		-	0.0082	< 0.005	< 0.005	< 0.005
Molybdenum	250	ug/L		-	4.7	1.05	1.08	0.93
Nickel	80	ug/L		-	3.81	8.11	5.13	14.1
Potassium		ug/L		-	2130	3580	3370	3260
Selenium	10	ug/L		-	0.109	0.106	0.091	0.401
Silicon		ug/L		-	3210	10100	8750	6730
Silver	20	ug/L		-	< 0.01	< 0.01	0.028	< 0.01
Sodium	200000	ug/L		-	12400	106000	95700	89900
Strontium	2500	ug/L		-	713	1680	1700	1550
Sulphur (S)		ug/L		-	8840	1220	3060	19500
Tellurium		ug/L		-	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		-	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232		ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Titanium		ug/L		-	< 0.3	< 0.3	< 0.3	0.33
Uranium	20	ug/L		-	0.648	1.75	2.21	5
Vanadium	20	ug/L		-	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	3000	ug/L		-	2	7.9	1.7	2.6
Zirconium		ug/L		-	< 0.06	0.536	0.496	0.286
Cesium		ug/L		-	< 0.01	< 0.01	< 0.01	< 0.01
Rubidium		ug/L		-	0.32	0.54	0.5	0.47
Tungsten	3	ug/L		-	< 0.1	< 0.1	< 0.1	< 0.1
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	< 0.001	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	< 0.005	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	< 0.0004	-	-	-
Benzene	5	ug/L		-	< 0.0005	-	-	-
Ethylbenzene	140	ug/L		-	-	-	-	-
Styrene	800	ug/L		-	-	-	-	-
Toluene	60	ug/L		-	0.00291	-	-	-
Xylenes, Total	90	ug/L		-	-	-	-	-
o-Xylene		ug/L		-	-	-	-	-
m,p-Xylenes		ug/L		-	-	-	-	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	-	-
BTEX+Styrene, Total		ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_43	WG_E252314_43	WG_E252314_43	WG_E252314_44	WG_E252314_44
				690_N	789_N	920_N	004_N	035_N
			Sample Date	2019-08-13	2019-11-20	2020-03-30	2020-06-22	2020-07-23
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		452000	592000	570000	565000	-
Bromide (Br)		ug/L		-	1310	-	1410	-
Chloride (Cl)	250000	ug/L		226000	215000	210000	221000	-
Fluoride (F)	1.5	mg/L		< 0.1	< 0.1	< 0.2	< 0.2	-
Nitrate (as N)	10000	ug/L		< 25	< 25	< 50	< 50	-
Nitrite (as N)	1000	ug/L		< 5	< 5	< 10	< 10	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		28.5	78	80.8	52.7	-
Total Kjeldahl Nitrogen		ug/L		-	1610	675	588	-
Total Phosphorus		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		7800	2000	< 3000	14400	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		135	145	113	82	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		0.9	3	5.9	6.3	-
Conductivity, field measured		uS/cm		1031	1164	826	607	923
Oxidation Reduction Potential, field measured		mV		109.2	138.2	32.1	190.4	-
pH, field measured		pH units		6.64	6.67	6.79	6.68	-
pH, lab		pH		7.94	8.01	8	7.15	-
Temperature, field measured		deg c		8.7	7.9	4	6.1	6.6
Conductivity		uS/cm		-	1570	1620	1540	-
Specific Conductance		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	1070	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		10.1	9.35	18.1	13.6	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		614	719	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	750	711	-
Chemical Oxygen Demand		mg/L		47	31	66	58	-
Depth to Water		mbtoc		2.78	2.19	1.06	2.65	3.28
Metals, Dissolved								
Aluminum	9500	ug/L		9.8	7.2	3.7	120	-
Antimony	6	ug/L		0.21	0.11	0.55	0.39	-
Arsenic	10	ug/L		6.26	7.73	**17.3**	**14.9**	-
Barium	1000	ug/L		252	281	333	307	-
Beryllium	8	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Bismuth		ug/L		< 0.05	< 0.05	< 0.05	< 0.05	-
Boron	5000	ug/L		12	15	14	14	-
Cadmium	5	ug/L		0.0295	0.0611	< 0.005	0.0373	-
Calcium		ug/L		154000	188000	187000	181000	-
Chromium	50	ug/L		0.11	< 0.1	< 0.1	0.1	-
Cobalt	1	ug/L		**4.83**	**4.09**	**3.41**	**3.94**	-
Copper	1500	ug/L		0.41	1.16	< 0.2	0.77	-
Iron	6500	ug/L		**7060**	**12200**	**15300**	**9950**	-
Lead	10	ug/L		0.089	0.054	< 0.05	0.188	-
Lithium	8	ug/L		2.3	2.4	3.3	3	-
Magnesium		ug/L		55800	60600	68700	62800	-
Manganese	1500	ug/L		**2980**	**3620**	**4080**	**3150**	-
Mercury	1	ug/L		0.0062	< 0.005	< 0.005	< 0.005	-
Molybdenum	250	ug/L		0.282	0.25	4.63	2.33	-
Nickel	80	ug/L		4.3	3.32	6.44	7.68	-
Potassium		ug/L		3320	3590	3520	3450	-
Selenium	10	ug/L		2.33	0.158	< 0.05	0.107	-
Silicon		ug/L		7830	8510	8690	8260	-
Silver	20	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	-
Sodium	200000	ug/L		87900	84900	83100	79700	-
Strontium	2500	ug/L		1270	1550	1640	1490	-
Sulphur (S)		ug/L		6070	1090	880	5410	-
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	-
Thallium		ug/L		< 0.01	< 0.01	< 0.01	< 0.01	-
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Tin	2500	ug/L		0.1	0.11	< 0.1	< 0.1	-
Titanium		ug/L		0.31	< 0.3	< 0.3	< 3	-
Uranium	20	ug/L		2.45	1.37	2.07	4.41	-
Vanadium	20	ug/L		0.82	< 0.5	0.9	0.77	-
Zinc	3000	ug/L		1.6	6.5	< 1	2.7	-
Zirconium		ug/L		0.47	0.39	0.5	0.41	-
Cesium		ug/L		< 0.01	< 0.01	< 0.01	0.017	-
Rubidium		ug/L		0.66	0.6	0.54	0.62	-
Tungsten	3	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	< 250	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	< 250	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	< 250	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	< 100	-
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	< 100	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		-	-	-	< 0.5	-
Ethylbenzene	140	ug/L		-	-	-	< 0.5	-
Styrene	800	ug/L		-	-	-	< 0.5	-
Toluene	60	ug/L		-	-	-	< 0.5	-
Xylenes, Total	90	ug/L		-	-	-	< 0.75	-
o-Xylene		ug/L		-	-	-	< 0.5	-
m,p-Xylenes		ug/L		-	-	-	< 0.5	-
Methyl tert-Butyl Ether	95	ug/L		-	-	-	< 0.5	-
BTEX+Styrene, Total		ug/L		-	-	-	< 1.5	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_44	WG_E252314_44	WG_E252314_44	WG_E252314_44	WG_E252314_44
				068_N	083_N	125_N	147_N	181_N
			Sample Date	2020-08-25	2020-09-09	2020-10-21	2020-11-12	2020-12-16
			QA/QC					
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L		380000	-	535000	-	-
Bromide (Br)		ug/L		1310	-	1780	-	-
Chloride (Cl)	250000	ug/L		212000	-	226000	-	-
Fluoride (F)	1.5	mg/L		0.108	-	< 0.1	-	-
Nitrate (as N)	10000	ug/L		< 25	-	< 25	-	-
Nitrite (as N)	1000	ug/L		< 5	-	< 5	-	-
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-	-
Ammonia (as N)		ug/L		39.9	-	26.8	-	-
Total Kjeldahl Nitrogen		ug/L		510	-	282	-	-
Total Phosphorus		ug/L		-	-	-	-	-
Sulfate (SO4)	500000	ug/L		17900	-	3320	-	-
Cyanide	200	ug/L		-	-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-	-
Phosphorus, dissolved		ug/L		55	-	117	-	-
Phosphorus, total		ug/L		-	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured		mg/L		3.6	-	7.4	-	-
Conductivity, field measured		uS/cm		918	841	1096	1038	1231
Oxidation Reduction Potential, field measured		mV		304.2	-	273.4	-	-
pH, field measured		pH units		6.51	-	6.69	-	-
pH, lab		pH		7.25	-	7.11	-	-
Temperature, field measured		deg c		8.1	9.8	8.7	8.4	6.9
Conductivity		uS/cm		1350	-	1620	-	-
Specific Conductance		uS/cm		-	-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-	-
Total Organic Carbon		mg/L		7.37	-	5.69	-	-
Dissolved Organic Carbon		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		636	-	713	-	-
Chemical Oxygen Demand		mg/L		64	-	< 20	-	-
Depth to Water		mbtoc		2.26	2.57	2.31	0.51	2.17
Metals, Dissolved								
Aluminum	9500	ug/L		76.3	-	3.1	-	-
Antimony	6	ug/L		0.47	-	0.25	-	-
Arsenic	10	ug/L		4.6	-	5.31	-	-
Barium	1000	ug/L		228	-	248	-	-
Beryllium	8	ug/L		< 0.1	-	< 0.1	-	-
Bismuth		ug/L		< 0.05	-	< 0.05	-	-
Boron	5000	ug/L		10	-	13	-	-
Cadmium	5	ug/L		0.116	-	0.0169	-	-
Calcium		ug/L		172000	-	192000	-	-
Chromium	50	ug/L		< 0.1	-	< 0.1	-	-
Cobalt	1	ug/L		**5.82**	-	**5.33**	-	-
Copper	1500	ug/L		0.59	-	0.82	-	-
Iron	6500	ug/L		975	-	3910	-	-
Lead	10	ug/L		0.15	-	< 0.05	-	-
Lithium	8	ug/L		2.6	-	2.8	-	-
Magnesium		ug/L		50200	-	57000	-	-
Manganese	1500	ug/L		1350	-	**2760**	-	-
Mercury	1	ug/L		< 0.005	-	< 0.005	-	-
Molybdenum	250	ug/L		0.924	-	0.526	-	-
Nickel	80	ug/L		11.8	-	9.4	-	-
Potassium		ug/L		3760	-	3830	-	-
Selenium	10	ug/L		0.091	-	< 0.05	-	-
Silicon		ug/L		7630	-	7890	-	-
Silver	20	ug/L		< 0.01	-	< 0.01	-	-
Sodium	200000	ug/L		79400	-	74900	-	-
Strontium	2500	ug/L		1180	-	1380	-	-
Sulphur (S)		ug/L		6220	-	2040	-	-
Tellurium		ug/L		< 0.2	-	< 0.2	-	-
Thallium		ug/L		0.052	-	0.038	-	-
Thorium-232		ug/L		< 0.1	-	< 0.1	-	-
Tin	2500	ug/L		< 0.1	-	< 0.1	-	-
Titanium		ug/L		1.4	-	< 0.3	-	-
Uranium	20	ug/L		3.36	-	2.45	-	-
Vanadium	20	ug/L		1	-	< 0.5	-	-
Zinc	3000	ug/L		4	-	3.5	-	-
Zirconium		ug/L		0.32	-	< 0.2	-	-
Cesium		ug/L		< 0.01	-	< 0.01	-	-
Rubidium		ug/L		1.07	-	0.72	-	-
Tungsten	3	ug/L		< 0.1	-	< 0.1	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		< 250	-	< 250	-	-
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		< 250	-	< 250	-	-
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		< 100	-	< 100	-	-
Volatile Petroleum Hydrocarbons		ug/L		< 100	-	< 100	-	-
VOCs + BTEX								
1,4-Difluorobenzene		ug/L		-	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-	-
Benzene	5	ug/L		< 0.5	-	< 0.5	-	-
Ethylbenzene	140	ug/L		< 0.5	-	< 0.5	-	-
Styrene	800	ug/L		< 0.5	-	< 0.5	-	-
Toluene	60	ug/L		< 0.5	-	< 0.5	-	-
Xylenes, Total	90	ug/L		< 0.75	-	< 0.75	-	-
o-Xylene		ug/L		< 0.5	-	< 0.5	-	-
m,p-Xylenes		ug/L		< 0.5	-	< 0.5	-	-
Methyl tert-Butyl Ether	95	ug/L		< 0.5	-	< 0.5	-	-
BTEX+Styrene, Total		ug/L		-	-	-	-	-
Phenols, Non-Chlorinated								
Phenol	1000	ug/L		-	-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - BH-5B
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	Unit	Sample Name	BH-5B	BH-5B	BH-5B	BH-5B
			Laboratory ID	WG_E252314_44	WG_E252314_44	WG_E252314_44	WG_E252314_44
				216_N	308_N	393_N	491_N
			Sample Date	2021-01-20	2021-04-22	2021-07-16	2021-10-22
			QA/QC				
Anions + Nutrients							
Alkalinity, Total as CaCO3		ug/L		-	-	-	630000
Bromide (Br)		ug/L		-	-	-	-
Chloride (Cl)	250000	ug/L		-	-	-	209000
Fluoride (F)	1.5	mg/L		-	-	-	< 0.1
Nitrate (as N)	10000	ug/L		-	-	-	< 25
Nitrite (as N)	1000	ug/L		-	-	-	1.1
Nitrogen, Nitrate-Nitrite	10000	ug/L		-	-	-	-
Ammonia (as N)		ug/L		-	-	-	108
Total Kjeldahl Nitrogen		ug/L		-	-	-	527
Total Phosphorus		ug/L		-	-	-	-
Sulfate (SO4)	500000	ug/L		-	-	-	1760
Cyanide	200	ug/L		-	-	-	-
Cyanide (SAD)		ug/L		-	-	-	-
Phosphorus, dissolved		ug/L		-	-	-	267
Phosphorus, total		ug/L		-	-	-	-
Field + Physical							
Dissolved Oxygen, field measured		mg/L		-	-	-	4.3
Conductivity, field measured		uS/cm		905	1492	1365	1653
Oxidation Reduction Potential, field measured		mV		-	-	-	179.5
pH, field measured		pH units		-	-	-	6.74
pH, lab		pH		-	-	-	7.02
Temperature, field measured		deg c		5.1	5.2	8	8.3
Conductivity		uS/cm		-	-	-	1710
Specific Conductance		uS/cm		-	-	-	-
Total Dissolved Solids		mg/L		-	-	-	-
Total Suspended Solids		mg/L		-	-	-	-
Total Organic Carbon		mg/L		-	-	-	6.86
Dissolved Organic Carbon		mg/L		-	-	-	-
Hardness, Calcium Carbonate (Total)		mg/L		-	-	-	-
Hardness, Calcium Carbonate (Dissolved)		mg/L		-	-	-	766
Chemical Oxygen Demand		mg/L		-	-	-	32
Depth to Water		mbtoc		2.33	2.27	2.81	3.31
Metals, Dissolved							
Aluminum	9500	ug/L		-	-	-	6.1
Antimony	6	ug/L		-	-	-	0.2
Arsenic	10	ug/L		-	-	-	8.5
Barium	1000	ug/L		-	-	-	270
Beryllium	8	ug/L		-	-	-	< 0.1
Bismuth		ug/L		-	-	-	< 0.05
Boron	5000	ug/L		-	-	-	11
Cadmium	5	ug/L		-	-	-	0.0192
Calcium		ug/L		-	-	-	206000
Chromium	50	ug/L		-	-	-	< 0.5
Cobalt	1	ug/L		-	-	-	**2.69**
Copper	1500	ug/L		-	-	-	< 0.2
Iron	6500	ug/L		-	-	-	**12200**
Lead	10	ug/L		-	-	-	< 0.05
Lithium	8	ug/L		-	-	-	2.8
Magnesium		ug/L		-	-	-	61200
Manganese	1500	ug/L		-	-	-	**3850**
Mercury	1	ug/L		-	-	-	< 0.005
Molybdenum	250	ug/L		-	-	-	0.267
Nickel	80	ug/L		-	-	-	6.05
Potassium		ug/L		-	-	-	5290
Selenium	10	ug/L		-	-	-	0.111
Silicon		ug/L		-	-	-	8800
Silver	20	ug/L		-	-	-	< 0.01
Sodium	200000	ug/L		-	-	-	72500
Strontium	2500	ug/L		-	-	-	1490
Sulphur (S)		ug/L		-	-	-	< 500
Tellurium		ug/L		-	-	-	< 0.2
Thallium		ug/L		-	-	-	< 0.01
Thorium-232		ug/L		-	-	-	< 0.1
Tin	2500	ug/L		-	-	-	< 0.1
Titanium		ug/L		-	-	-	< 0.3
Uranium	20	ug/L		-	-	-	0.933
Vanadium	20	ug/L		-	-	-	< 0.5
Zinc	3000	ug/L		-	-	-	2.2
Zirconium		ug/L		-	-	-	< 0.2
Cesium		ug/L		-	-	-	< 0.01
Rubidium		ug/L		-	-	-	1.08
Tungsten	3	ug/L		-	-	-	< 0.1
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	ug/L		-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		-	-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	< 400
Total Extractable Petroleum Hydrocarbons (C10-C30)		ug/L		-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	ug/L		-	-	-	< 100
Volatile Petroleum Hydrocarbons		ug/L		-	-	-	< 100
VOCs + BTEX							
1,4-Difluorobenzene		ug/L		-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	50	ug/L		-	-	-	-
Vinyl Chloride (Chloroethene)	2	ug/L		-	-	-	-
Benzene	5	ug/L		-	-	-	< 0.5
Ethylbenzene	140	ug/L		-	-	-	< 0.5
Styrene	800	ug/L		-	-	-	< 0.5
Toluene	60	ug/L		-	-	-	< 0.5
Xylenes, Total	90	ug/L		-	-	-	< 0.5
o-Xylene		ug/L		-	-	-	< 0.3
m,p-Xylenes		ug/L		-	-	-	< 0.4
Methyl tert-Butyl Ether	95	ug/L		-	-	-	< 0.5
BTEX+Styrene, Total		ug/L		-	-	-	-
Phenols, Non-Chlorinated							
Phenol	1000	ug/L		-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-1	SGW-1	SGW-1	SGW-1
				Laboratory ID:	WG_E309746_42 900_N	WG_E309746_42 923_N	WG_E309746_42 929_N	WG_E309746_42 936_N
				Sample Date:	2017-06-14	2017-07-07	2017-07-13	2017-07-20
				QA/QC:				
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**91000**	**560000**	**690000**	**520000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	2400	122000	123000	132000
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L	-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	< 10	15	11	36
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	< 10	14.9	10.7	36.1
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L	140	330	1040	400
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L	< 1000	1200	< 1000	1800
Phosphorus, dissolved	-	-	-	ug/L	-	-	-	-
Phosphorus, total	-	-	-	ug/L	72	1210	649	3790
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-	-
Conductivity, field measured	-	-	-	uS/cm	-	-	-	-
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	6.8	6.6	**6.4**	6.8
Temperature, field measured	-	-	-	deg c	-	-	-	-
Conductivity	-	-	-	uS/cm	185	1350	1660	1220
Total Organic Carbon	-	-	-	mg/L	26.8	88.5	395	136
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	103	507	1050	712
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	6.9	230	590	200
Chemical Oxygen Demand	-	-	-	mg/L	83	770	944	902
Depth to Water	-	-	-	mbtoc	-	-	-	-
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L	-	-	-	-
Antimony	6	-	-	ug/L	-	-	-	-
Arsenic	10	-	-	ug/L	-	-	-	-
Barium	1000	-	-	ug/L	-	-	-	-
Beryllium	8	-	-	ug/L	-	-	-	-
Bismuth	-	-	-	ug/L	-	-	-	-
Boron	5000	-	-	ug/L	-	-	-	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L	-	-	-	-
Calcium	-	-	-	ug/L	-	-	-	-
Chromium	50	-	-	ug/L	-	-	-	-
Cobalt	1	-	-	ug/L	-	-	-	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L	-	-	-	-
Iron	6500	350	-	ug/L	-	-	-	-
Lead	10	-	-	ug/L	-	-	-	-
Lithium	8	-	-	ug/L	-	-	-	-
Magnesium	-	-	-	ug/L	-	-	-	-
Manganese	1500	-	-	ug/L	-	-	-	-
Mercury	1	-	-	ug/L	-	-	-	-
Molybdenum	250	-	-	ug/L	-	-	-	-
Nickel	80	-	-	ug/L	-	-	-	-
Potassium	-	-	-	ug/L	-	-	-	-
Selenium	10	-	-	ug/L	-	-	-	-
Silicon	-	-	-	ug/L	-	-	-	-
Silver	20	-	-	ug/L	-	-	-	-
Sodium	200000	-	-	ug/L	-	-	-	-
Strontium	2500	-	-	ug/L	-	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-	-
Tellurium	-	-	-	ug/L	-	-	-	-
Thallium	-	-	-	ug/L	-	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-	-
Tin	2500	-	-	ug/L	-	-	-	-
Titanium	-	-	-	ug/L	-	-	-	-
Uranium	20	-	-	ug/L	-	-	-	-
Vanadium	20	-	-	ug/L	-	-	-	-
Zinc	3000	-	-	ug/L	-	-	-	-
Zirconium	-	-	-	ug/L	-	-	-	-
Cesium	-	-	-	ug/L	-	-	-	-
Rubidium	-	-	-	ug/L	-	-	-	-
Tungsten	3	-	-	ug/L	-	-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L	403	18400	11500	88100
Antimony	-	-	9	ug/L	0.16	0.5	0.6	1.05
Arsenic	-	5	-	ug/L	3.81	20.1	20	42
Barium	-	-	1000	ug/L	32.5	440	479	1080
Beryllium	-	-	0.13	ug/L	< 0.1	0.66	0.29	2.29
Bismuth	-	-	-	ug/L	< 0.1	0.12	< 0.1	0.52
Boron	-	-	1200	ug/L	39	114	110	498
Cadmium	-	-	-	ug/L	0.042	0.787	0.359	1.49
Calcium	-	-	-	ug/L	30000	124000	273000	162000
Chromium	-	-	-	ug/L	0.74	20.3	11.5	97.1
Cobalt	-	110	4	ug/L	1.9	17.4	33.7	53.3
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L	2.08	**57.2**	**22.9**	**210**
Iron	-	1000	-	ug/L	1080	35400	43100	124000
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L	< 0.1	9.64	4.01	31.2
Lithium	-	-	-	ug/L	0.17	16.3	11	71.1
Magnesium	-	-	-	ug/L	6900	47800	88700	74700
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L	1140	5890	22700	8870
Mercury	-	-	0.01	ug/L	< 0.02	< 0.02	< 0.02	**0.021**
Molybdenum	-	46000	7600	ug/L	0.38	0.64	0.56	1.65
Nickel	-	-	98 - 150(H)	ug/L	2	36.9	26.7	143
Potassium	-	-	-	ug/L	2440	7940	11500	16500
Selenium	-	-	2	ug/L	< 0.5	< 0.5	< 0.5	1.43
Silicon	-	-	-	ug/L	6200	32400	24200	111000
Silver	-	3.0 (H)	1.5 (H)	ug/L	< 0.05	0.299	0.156	0.923
Sodium	-	-	-	ug/L	3960	48200	51400	75600
Strontium	-	-	-	ug/L	175	1040	2100	1250
Sulphur (S)	-	-	-	ug/L	< 3000	< 3000	< 3000	< 3000
Tellurium	-	-	-	ug/L	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	-	-	0.8	ug/L	< 0.02	0.086	0.046	0.319
Thorium-232	-	-	-	ug/L	< 0.1	0.51	0.44	2.42
Tin	-	-	-	ug/L	< 0.2	0.31	0.29	0.71
Titanium	-	-	-	ug/L	5.5	212	204	804
Uranium	-	-	8.5	ug/L	0.059	3.18	1.47	8.44
Vanadium	-	-	-	ug/L	1.4	42.6	23.9	180
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L	< 4	**88.6**	**47.2**	**347**
Zirconium	-	-	-	ug/L	0.58	2.2	2.7	7.23

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-1	SGW-1	SGW-1	SGW-1
				Laboratory ID:	WG_E309746_42 943_N	WG_E309746_42 948_N	WG_E309746_42 956_N	WG_E309746_42 963_N
				Sample Date:	2017-07-27	2017-08-01	2017-08-09	2017-08-16
				QA/QC:				
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**790000**	**720000**	**750000**	**770000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	**152000**	145000	**152000**	142000
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L	-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	83	64	< 10	73
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L	< 10	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	83.2	63.5	< 10	72.9
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L	540	530	430	390
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L	1100	1200	2200	< 1000
Phosphorus, dissolved	-	-	-	ug/L	-	-	-	-
Phosphorus, total	-	-	-	ug/L	1310	573	381	278
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-	-
Conductivity, field measured	-	-	-	uS/cm	-	-	-	-
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	**6.4**	6.5	6.5	6.5
Temperature, field measured	-	-	-	deg c	-	-	-	-
Conductivity	-	-	-	uS/cm	1860	1760	1780	1860
Total Organic Carbon	-	-	-	mg/L	279	224	210	152
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	1110	954	977	880
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	430	390	390	330
Chemical Oxygen Demand	-	-	-	mg/L	900	681	570	350
Depth to Water	-	-	-	mbtoc	-	-	-	-
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L	-	-	-	-
Antimony	6	-	-	ug/L	-	-	-	-
Arsenic	10	-	-	ug/L	-	-	-	-
Barium	1000	-	-	ug/L	-	-	-	-
Beryllium	8	-	-	ug/L	-	-	-	-
Bismuth	-	-	-	ug/L	-	-	-	-
Boron	5000	-	-	ug/L	-	-	-	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L	-	-	-	-
Calcium	-	-	-	ug/L	-	-	-	-
Chromium	50	-	-	ug/L	-	-	-	-
Cobalt	1	-	-	ug/L	-	-	-	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L	-	-	-	-
Iron	6500	350	-	ug/L	-	-	-	-
Lead	10	-	-	ug/L	-	-	-	-
Lithium	8	-	-	ug/L	-	-	-	-
Magnesium	-	-	-	ug/L	-	-	-	-
Manganese	1500	-	-	ug/L	-	-	-	-
Mercury	1	-	-	ug/L	-	-	-	-
Molybdenum	250	-	-	ug/L	-	-	-	-
Nickel	80	-	-	ug/L	-	-	-	-
Potassium	-	-	-	ug/L	-	-	-	-
Selenium	10	-	-	ug/L	-	-	-	-
Silicon	-	-	-	ug/L	-	-	-	-
Silver	20	-	-	ug/L	-	-	-	-
Sodium	200000	-	-	ug/L	-	-	-	-
Strontium	2500	-	-	ug/L	-	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-	-
Tellurium	-	-	-	ug/L	-	-	-	-
Thallium	-	-	-	ug/L	-	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-	-
Tin	2500	-	-	ug/L	-	-	-	-
Titanium	-	-	-	ug/L	-	-	-	-
Uranium	20	-	-	ug/L	-	-	-	-
Vanadium	20	-	-	ug/L	-	-	-	-
Zinc	3000	-	-	ug/L	-	-	-	-
Zirconium	-	-	-	ug/L	-	-	-	-
Cesium	-	-	-	ug/L	-	-	-	-
Rubidium	-	-	-	ug/L	-	-	-	-
Tungsten	3	-	-	ug/L	-	-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L	30300	11000	5170	4250
Antimony	-	-	9	ug/L	0.82	0.45	0.33	0.34
Arsenic	-	5	-	ug/L	24.5	15.4	16.8	14.6
Barium	-	-	1000	ug/L	637	385	310	289
Beryllium	-	-	0.13	ug/L	0.73	0.25	0.12	0.12
Bismuth	-	-	-	ug/L	0.18	< 0.1	< 0.1	< 0.1
Boron	-	-	1200	ug/L	258	99.5	100	89.1
Cadmium	-	-	-	ug/L	0.614	0.316	0.55	0.098
Calcium	-	-	-	ug/L	287000	246000	241000	220000
Chromium	-	-	-	ug/L	31.8	14.5	6.1	4.95
Cobalt	-	110	4	ug/L	38.8	24.2	22.3	17.3
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L	**66.8**	**24.3**	**14.2**	**10.3**
Iron	-	1000	-	ug/L	69700	44100	36600	30200
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L	11.5	3.98	2.21	0.9
Lithium	-	-	-	ug/L	33.2	10.8	6.88	6.72
Magnesium	-	-	-	ug/L	95400	82100	90900	80400
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L	19700	16900	16700	14600
Mercury	-	-	0.01	ug/L	**0.039**	**0.05**	**0.018**	**0.02**
Molybdenum	-	46000	7600	ug/L	0.68	0.61	0.65	0.68
Nickel	-	-	98 - 150(H)	ug/L	54.1	41.1	16.3	12.9
Potassium	-	-	-	ug/L	12300	8300	8380	6460
Selenium	-	-	2	ug/L	< 0.5	< 0.5	< 0.5	< 0.5
Silicon	-	-	-	ug/L	49500	26100	19200	18400
Silver	-	3.0 (H)	1.5 (H)	ug/L	0.384	0.126	< 0.05	0.196
Sodium	-	-	-	ug/L	59100	53900	57500	49400
Strontium	-	-	-	ug/L	2110	1860	1840	1800
Sulphur (S)	-	-	-	ug/L	< 3000	< 3000	< 3000	< 3000
Tellurium	-	-	-	ug/L	< 0.2	< 0.2	< 0.2	< 0.5
Thallium	-	-	0.8	ug/L	0.119	0.037	< 0.02	0.028
Thorium-232	-	-	-	ug/L	1.07	0.52	0.25	0.41
Tin	-	-	-	ug/L	0.4	0.3	0.21	< 0.2
Titanium	-	-	-	ug/L	351	189	121	104
Uranium	-	-	8.5	ug/L	2.31	1.67	1.09	1.1
Vanadium	-	-	-	ug/L	60.2	25.8	12.3	9.8
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L	**130**	**43.7**	**27**	**18.5**
Zirconium	-	-	-	ug/L	4.08	2.62	0.58	0.47

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-1	SGW-1	SGW-1	SGW-1
				Laboratory ID:	WG_E309746_43 013_N	WG_E309746_43 213_N	WG_E309746_43 221_N	WG_E309746_43 228_N
				Sample Date:	2017-10-05	2018-04-23	2018-05-01	2018-05-08
				QA/QC:				
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	230000	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	58100	-	-	-
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L	-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	30	-	-	-
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L	< 10	-	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	29.6	-	-	-
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L	80	-	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L	51700	-	-	-
Phosphorus, dissolved	-	-	-	ug/L	-	-	-	-
Phosphorus, total	-	-	-	ug/L	1080	-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-	-
Conductivity, field measured	-	-	-	uS/cm	-	1119	1278	1579
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	7	-	-	-
Temperature, field measured	-	-	-	deg c	-	3	5.4	5.2
Conductivity	-	-	-	uS/cm	704	-	-	-
Total Organic Carbon	-	-	-	mg/L	67.5	-	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	299	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	< 38	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	160	-	-	-
Depth to Water	-	-	-	mbtoc	-	0.7	1.1	0.8
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L	-	-	-	-
Antimony	6	-	-	ug/L	-	-	-	-
Arsenic	10	-	-	ug/L	-	-	-	-
Barium	1000	-	-	ug/L	-	-	-	-
Beryllium	8	-	-	ug/L	-	-	-	-
Bismuth	-	-	-	ug/L	-	-	-	-
Boron	5000	-	-	ug/L	-	-	-	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L	-	-	-	-
Calcium	-	-	-	ug/L	-	-	-	-
Chromium	50	-	-	ug/L	-	-	-	-
Cobalt	1	-	-	ug/L	-	-	-	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L	-	-	-	-
Iron	6500	350	-	ug/L	-	-	-	-
Lead	10	-	-	ug/L	-	-	-	-
Lithium	8	-	-	ug/L	-	-	-	-
Magnesium	-	-	-	ug/L	-	-	-	-
Manganese	1500	-	-	ug/L	-	-	-	-
Mercury	1	-	-	ug/L	-	-	-	-
Molybdenum	250	-	-	ug/L	-	-	-	-
Nickel	80	-	-	ug/L	-	-	-	-
Potassium	-	-	-	ug/L	-	-	-	-
Selenium	10	-	-	ug/L	-	-	-	-
Silicon	-	-	-	ug/L	-	-	-	-
Silver	20	-	-	ug/L	-	-	-	-
Sodium	200000	-	-	ug/L	-	-	-	-
Strontium	2500	-	-	ug/L	-	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-	-
Tellurium	-	-	-	ug/L	-	-	-	-
Thallium	-	-	-	ug/L	-	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-	-
Tin	2500	-	-	ug/L	-	-	-	-
Titanium	-	-	-	ug/L	-	-	-	-
Uranium	20	-	-	ug/L	-	-	-	-
Vanadium	20	-	-	ug/L	-	-	-	-
Zinc	3000	-	-	ug/L	-	-	-	-
Zirconium	-	-	-	ug/L	-	-	-	-
Cesium	-	-	-	ug/L	-	-	-	-
Rubidium	-	-	-	ug/L	-	-	-	-
Tungsten	3	-	-	ug/L	-	-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L	25200	-	-	-
Antimony	-	-	9	ug/L	0.73	-	-	-
Arsenic	-	5	-	ug/L	18.6	-	-	-
Barium	-	-	1000	ug/L	391	-	-	-
Beryllium	-	-	0.13	ug/L	0.5	-	-	-
Bismuth	-	-	-	ug/L	0.19	-	-	-
Boron	-	-	1200	ug/L	233	-	-	-
Cadmium	-	-	-	ug/L	0.836	-	-	-
Calcium	-	-	-	ug/L	81800	-	-	-
Chromium	-	-	-	ug/L	28.2	-	-	-
Cobalt	-	110	4	ug/L	18.5	-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L	**77.9**	-	-	-
Iron	-	1000	-	ug/L	37600	-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L	12.8	-	-	-
Lithium	-	-	-	ug/L	16.8	-	-	-
Magnesium	-	-	-	ug/L	22900	-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L	3110	-	-	-
Mercury	-	-	0.01	ug/L	**0.041**	-	-	-
Molybdenum	-	46000	7600	ug/L	2.01	-	-	-
Nickel	-	-	98 - 150(H)	ug/L	44.4	-	-	-
Potassium	-	-	-	ug/L	8120	-	-	-
Selenium	-	-	2	ug/L	0.5	-	-	-
Silicon	-	-	-	ug/L	36300	-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L	0.331	-	-	-
Sodium	-	-	-	ug/L	35600	-	-	-
Strontium	-	-	-	ug/L	495	-	-	-
Sulphur (S)	-	-	-	ug/L	13900	-	-	-
Tellurium	-	-	-	ug/L	< 0.5	-	-	-
Thallium	-	-	0.8	ug/L	0.137	-	-	-
Thorium-232	-	-	-	ug/L	0.83	-	-	-
Tin	-	-	-	ug/L	0.34	-	-	-
Titanium	-	-	-	ug/L	308	-	-	-
Uranium	-	-	8.5	ug/L	1.72	-	-	-
Vanadium	-	-	-	ug/L	56.6	-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L	**1680**	-	-	-
Zirconium	-	-	-	ug/L	2.42	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent.

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-1	SGW-1	SGW-1	SGW-1
					Laboratory ID	WG_E309746_43 231_N	WG_E309746_43 234_N	WG_E309746_43 242_N	WG_E309746_43 250_N
					Sample Date	2018-05-11	2018-05-14	2018-05-22	2018-05-30
					QA/QC				
Anions + Nutrients									
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	-	-	**707000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	-	-	105000
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L		-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	-	-	< 50
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		-	-	-	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-	< 60
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L		-	-	-	3090
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L		-	-	-	< 3000
Phosphorus, dissolved	-	-	-	ug/L		-	-	-	174
Phosphorus, total	-	-	-	ug/L		-	-	-	-
Field + Physical									
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-	-
Conductivity, field measured	-	-	-	uS/cm		1278	1693	1841	1487
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-
Temperature, field measured	-	-	-	deg c		5.4	6.9	6.2	9.1
Conductivity	-	-	-	uS/cm		-	-	-	-
Total Organic Carbon	-	-	-	mg/L		-	-	-	342
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-	1080
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	-	-	1050
Depth to Water	-	-	-	mbtoc		1.1	0.8	0.6	0.9
Metals, Dissolved									
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L		-	-	-	**42.1**
Antimony	6	-	-	ug/L		-	-	-	0.18
Arsenic	10	-	-	ug/L		-	-	-	9.04
Barium	1000	-	-	ug/L		-	-	-	499
Beryllium	8	-	-	ug/L		-	-	-	< 0.1
Bismuth	-	-	-	ug/L		-	-	-	< 0.05
Boron	5000	-	-	ug/L		-	-	-	107
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L		-	-	-	< 0.005
Calcium	-	-	-	ug/L		-	-	-	287000
Chromium	50	-	-	ug/L		-	-	-	0.42
Cobalt	1	-	-	ug/L		-	-	-	**19.3**
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L		-	-	-	***< 0.5***
Iron	6500	350	-	ug/L		-	-	-	**80300**
Lead	10	-	-	ug/L		-	-	-	< 0.05
Lithium	8	-	-	ug/L		-	-	-	1.9
Magnesium	-	-	-	ug/L		-	-	-	89000
Manganese	1500	-	-	ug/L		-	-	-	**19400**
Mercury	1	-	-	ug/L		-	-	-	< 0.005
Molybdenum	250	-	-	ug/L		-	-	-	0.63
Nickel	80	-	-	ug/L		-	-	-	6.27
Potassium	-	-	-	ug/L		-	-	-	12400
Selenium	10	-	-	ug/L		-	-	-	0.198
Silicon	-	-	-	ug/L		-	-	-	14100
Silver	20	-	-	ug/L		-	-	-	< 0.01
Sodium	200000	-	-	ug/L		-	-	-	49900
Strontium	2500	-	-	ug/L		-	-	-	2220
Sulphur (S)	-	-	-	ug/L		-	-	-	900
Tellurium	-	-	-	ug/L		-	-	-	< 0.2
Thallium	-	-	-	ug/L		-	-	-	< 0.01
Thorium-232	-	-	-	ug/L		-	-	-	< 0.1
Tin	2500	-	-	ug/L		-	-	-	0.31
Titanium	-	-	-	ug/L		-	-	-	2.19
Uranium	20	-	-	ug/L		-	-	-	0.6
Vanadium	20	-	-	ug/L		-	-	-	3.7
Zinc	3000	-	-	ug/L		-	-	-	3.1
Zirconium	-	-	-	ug/L		-	-	-	0.991
Cesium	-	-	-	ug/L		-	-	-	< 0.01
Rubidium	-	-	-	ug/L		-	-	-	1.15
Tungsten	3	-	-	ug/L		-	-	-	< 0.1
Metals, Total									
Aluminum	-	-	-	ug/L		-	-	-	-
Antimony	-	-	9	ug/L		-	-	-	-
Arsenic	-	5	-	ug/L		-	-	-	-
Barium	-	-	1000	ug/L		-	-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-	-
Bismuth	-	-	-	ug/L		-	-	-	-
Boron	-	-	1200	ug/L		-	-	-	-
Cadmium	-	-	-	ug/L		-	-	-	-
Calcium	-	-	-	ug/L		-	-	-	-
Chromium	-	-	-	ug/L		-	-	-	-
Cobalt	-	110	4	ug/L		-	-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L		-	-	-	-
Iron	-	1000	-	ug/L		-	-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L		-	-	-	-
Lithium	-	-	-	ug/L		-	-	-	-
Magnesium	-	-	-	ug/L		-	-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L		-	-	-	-
Mercury	-	-	0.01	ug/L		-	-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-	-
Nickel	-	-	98 - 150(H)	ug/L		-	-	-	-
Potassium	-	-	-	ug/L		-	-	-	-
Selenium	-	-	2	ug/L		-	-	-	-
Silicon	-	-	-	ug/L		-	-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L		-	-	-	-
Sodium	-	-	-	ug/L		-	-	-	-
Strontium	-	-	-	ug/L		-	-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-	-
Tellurium	-	-	-	ug/L		-	-	-	-
Thallium	-	-	0.8	ug/L		-	-	-	-
Thorium-232	-	-	-	ug/L		-	-	-	-
Tin	-	-	-	ug/L		-	-	-	-
Titanium	-	-	-	ug/L		-	-	-	-
Uranium	-	-	8.5	ug/L		-	-	-	-
Vanadium	-	-	-	ug/L		-	-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L		-	-	-	-
Zirconium	-	-	-	ug/L		-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)
Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent.
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< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard/ WQG **744**
Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-1	SGW-1	SGW-1	SGW-1
					Laboratory ID	WG_E309746_43 255_N	WG_E309746_43 263_N	WG_E309746_43 271_N	WG_E309746_43 277_N
					Sample Date	2018-06-04	2018-06-12	2018-06-20	2018-06-26
					QA/QC				
Anions + Nutrients									
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	-	-	-
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L		-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	-	-	-
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		-	-	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-	-
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L		-	-	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L		-	-	-	-
Phosphorus, dissolved	-	-	-	ug/L		-	-	-	-
Phosphorus, total	-	-	-	ug/L		-	-	-	-
Field + Physical									
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-	-
Conductivity, field measured	-	-	-	uS/cm		1846	1485	1418	1449
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-
Temperature, field measured	-	-	-	deg c		6.9	7.8	8.8	7.8
Conductivity	-	-	-	uS/cm		-	-	-	-
Total Organic Carbon	-	-	-	mg/L		-	-	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	-	-	-
Depth to Water	-	-	-	mbtoc		0.8	1.2	1.2	1.2
Metals, Dissolved									
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L		-	-	-	-
Antimony	6	-	-	ug/L		-	-	-	-
Arsenic	10	-	-	ug/L		-	-	-	-
Barium	1000	-	-	ug/L		-	-	-	-
Beryllium	8	-	-	ug/L		-	-	-	-
Bismuth	-	-	-	ug/L		-	-	-	-
Boron	5000	-	-	ug/L		-	-	-	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L		-	-	-	-
Calcium	-	-	-	ug/L		-	-	-	-
Chromium	50	-	-	ug/L		-	-	-	-
Cobalt	1	-	-	ug/L		-	-	-	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L		-	-	-	-
Iron	6500	350	-	ug/L		-	-	-	-
Lead	10	-	-	ug/L		-	-	-	-
Lithium	8	-	-	ug/L		-	-	-	-
Magnesium	-	-	-	ug/L		-	-	-	-
Manganese	1500	-	-	ug/L		-	-	-	-
Mercury	1	-	-	ug/L		-	-	-	-
Molybdenum	250	-	-	ug/L		-	-	-	-
Nickel	80	-	-	ug/L		-	-	-	-
Potassium	-	-	-	ug/L		-	-	-	-
Selenium	10	-	-	ug/L		-	-	-	-
Silicon	-	-	-	ug/L		-	-	-	-
Silver	20	-	-	ug/L		-	-	-	-
Sodium	200000	-	-	ug/L		-	-	-	-
Strontium	2500	-	-	ug/L		-	-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-	-
Tellurium	-	-	-	ug/L		-	-	-	-
Thallium	-	-	-	ug/L		-	-	-	-
Thorium-232	-	-	-	ug/L		-	-	-	-
Tin	2500	-	-	ug/L		-	-	-	-
Titanium	-	-	-	ug/L		-	-	-	-
Uranium	20	-	-	ug/L		-	-	-	-
Vanadium	20	-	-	ug/L		-	-	-	-
Zinc	3000	-	-	ug/L		-	-	-	-
Zirconium	-	-	-	ug/L		-	-	-	-
Cesium	-	-	-	ug/L		-	-	-	-
Rubidium	-	-	-	ug/L		-	-	-	-
Tungsten	3	-	-	ug/L		-	-	-	-
Metals, Total									
Aluminum	-	-	-	ug/L		-	-	-	-
Antimony	-	-	9	ug/L		-	-	-	-
Arsenic	-	5	-	ug/L		-	-	-	-
Barium	-	-	1000	ug/L		-	-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-	-
Bismuth	-	-	-	ug/L		-	-	-	-
Boron	-	-	1200	ug/L		-	-	-	-
Cadmium	-	-	-	ug/L		-	-	-	-
Calcium	-	-	-	ug/L		-	-	-	-
Chromium	-	-	-	ug/L		-	-	-	-
Cobalt	-	110	4	ug/L		-	-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L		-	-	-	-
Iron	-	1000	-	ug/L		-	-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L		-	-	-	-
Lithium	-	-	-	ug/L		-	-	-	-
Magnesium	-	-	-	ug/L		-	-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L		-	-	-	-
Mercury	-	-	0.01	ug/L		-	-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-	-
Nickel	-	-	98 - 150(H)	ug/L		-	-	-	-
Potassium	-	-	-	ug/L		-	-	-	-
Selenium	-	-	2	ug/L		-	-	-	-
Silicon	-	-	-	ug/L		-	-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L		-	-	-	-
Sodium	-	-	-	ug/L		-	-	-	-
Strontium	-	-	-	ug/L		-	-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-	-
Tellurium	-	-	-	ug/L		-	-	-	-
Thallium	-	-	0.8	ug/L		-	-	-	-
Thorium-232	-	-	-	ug/L		-	-	-	-
Tin	-	-	-	ug/L		-	-	-	-
Titanium	-	-	-	ug/L		-	-	-	-
Uranium	-	-	8.5	ug/L		-	-	-	-
Vanadium	-	-	-	ug/L		-	-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L		-	-	-	-
Zirconium	-	-	-	ug/L		-	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-1	SGW-1	SGW-1	SGW-1
				Laboratory ID:	WG_E309746_43	WG_E309746_43	WG_E309746_43	WG_E309746_43
					284_N	291_N	312_N	319_N
				Sample Date:	2018-07-03	2018-07-10	2018-07-31	2018-08-07
				QA/QC:				
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	**854000**	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	-	98100	-	-
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L	-	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	-	< 50	-	-
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L	-	< 10	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	< 60	-	-
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L	-	1280	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L	-	< 3000	-	-
Phosphorus, dissolved	-	-	-	ug/L	-	<250	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-	-
Conductivity, field measured	-	-	-	uS/cm	1501	1470	1226	1207
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-
Temperature, field measured	-	-	-	deg c	8.6	9	16	12
Conductivity	-	-	-	uS/cm	-	-	-	-
Total Organic Carbon	-	-	-	mg/L	-	245	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	611	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	-	672	-	-
Depth to Water	-	-	-	mbtoc	1.1	1.1	1.1	1.3
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L	-	21.7	-	-
Antimony	6	-	-	ug/L	-	< 0.5	-	-
Arsenic	10	-	-	ug/L	-	4.48	-	-
Barium	1000	-	-	ug/L	-	282	-	-
Beryllium	8	-	-	ug/L	-	< 0.5	-	-
Bismuth	-	-	-	ug/L	-	< 0.25	-	-
Boron	5000	-	-	ug/L	-	127	-	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L	-	0.033	-	-
Calcium	-	-	-	ug/L	-	162000	-	-
Chromium	50	-	-	ug/L	-	< 0.5	-	-
Cobalt	1	-	-	ug/L	-	**3.67**	-	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L	-	***< 1***	-	-
Iron	6500	350	-	ug/L	-	**37800**	-	-
Lead	10	-	-	ug/L	-	< 0.25	-	-
Lithium	8	-	-	ug/L	-	< 5	-	-
Magnesium	-	-	-	ug/L	-	50200	-	-
Manganese	1500	-	-	ug/L	-	**13300**	-	-
Mercury	1	-	-	ug/L	-	< 0.005	-	-
Molybdenum	250	-	-	ug/L	-	1.12	-	-
Nickel	80	-	-	ug/L	-	2.6	-	-
Potassium	-	-	-	ug/L	-	8830	-	-
Selenium	10	-	-	ug/L	-	< 0.25	-	-
Silicon	-	-	-	ug/L	-	8360	-	-
Silver	20	-	-	ug/L	-	< 0.05	-	-
Sodium	200000	-	-	ug/L	-	32200	-	-
Strontium	2500	-	-	ug/L	-	1270	-	-
Sulphur (S)	-	-	-	ug/L	-	< 2500	-	-
Tellurium	-	-	-	ug/L	-	< 1	-	-
Thallium	-	-	-	ug/L	-	< 0.05	-	-
Thorium-232	-	-	-	ug/L	-	< 0.5	-	-
Tin	2500	-	-	ug/L	-	< 0.5	-	-
Titanium	-	-	-	ug/L	-	< 1.5	-	-
Uranium	20	-	-	ug/L	-	0.614	-	-
Vanadium	20	-	-	ug/L	-	< 2.5	-	-
Zinc	3000	-	-	ug/L	-	< 5	-	-
Zirconium	-	-	-	ug/L	-	0.46	-	-
Cesium	-	-	-	ug/L	-	< 0.05	-	-
Rubidium	-	-	-	ug/L	-	1.1	-	-
Tungsten	3	-	-	ug/L	-	< 0.5	-	-
Metals, Total								
Aluminum	-	-	-	ug/L	-	-	-	-
Antimony	-	-	9	ug/L	-	-	-	-
Arsenic	-	5	-	ug/L	-	-	-	-
Barium	-	-	1000	ug/L	-	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-	-
Bismuth	-	-	-	ug/L	-	-	-	-
Boron	-	-	1200	ug/L	-	-	-	-
Cadmium	-	-	-	ug/L	-	-	-	-
Calcium	-	-	-	ug/L	-	-	-	-
Chromium	-	-	-	ug/L	-	-	-	-
Cobalt	-	110	4	ug/L	-	-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L	-	-	-	-
Iron	-	1000	-	ug/L	-	-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L	-	-	-	-
Lithium	-	-	-	ug/L	-	-	-	-
Magnesium	-	-	-	ug/L	-	-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L	-	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-	-
Nickel	-	-	98 - 150(H)	ug/L	-	-	-	-
Potassium	-	-	-	ug/L	-	-	-	-
Selenium	-	-	2	ug/L	-	-	-	-
Silicon	-	-	-	ug/L	-	-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L	-	-	-	-
Sodium	-	-	-	ug/L	-	-	-	-
Strontium	-	-	-	ug/L	-	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-	-
Tellurium	-	-	-	ug/L	-	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-	-
Tin	-	-	-	ug/L	-	-	-	-
Titanium	-	-	-	ug/L	-	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-	-
Vanadium	-	-	-	ug/L	-	-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L	-	-	-	-
Zirconium	-	-	-	ug/L	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)
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< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard/ WQG **744**
Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-1	SGW-1	SGW-1
					Laboratory ID	WG_E309746_43	WG_E309746_43	WG_E309746_43
						325_N	354_N	395_N
					Sample Date	2018-08-13	2018-09-11	2018-10-22
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	**934000**	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	98300	-
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	64	-
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		-	13	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	77	-
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L		-	1200	-
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L		-	< 3000	-
Phosphorus, dissolved	-	-	-	ug/L		-	<250	-
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		1215	1124	991
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
Temperature, field measured	-	-	-	deg c		11.3	13.2	8
Conductivity	-	-	-	uS/cm		-	-	-
Total Organic Carbon	-	-	-	mg/L		-	75	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	878	-
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	255	-
Depth to Water	-	-	-	mbtoc		1.2	1.1	0.5
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L		-	**160**	-
Antimony	6	-	-	ug/L		-	< 0.5	-
Arsenic	10	-	-	ug/L		-	**11.6**	-
Barium	1000	-	-	ug/L		-	470	-
Beryllium	8	-	-	ug/L		-	< 0.5	-
Bismuth	-	-	-	ug/L		-	< 0.25	-
Boron	5000	-	-	ug/L		-	212	-
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L		-	< 0.025	-
Calcium	-	-	-	ug/L		-	237000	-
Chromium	50	-	-	ug/L		-	0.71	-
Cobalt	1	-	-	ug/L		-	**6.26**	-
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L		-	***< 1***	-
Iron	6500	350	-	ug/L		-	**73000**	-
Lead	10	-	-	ug/L		-	< 0.25	-
Lithium	8	-	-	ug/L		-	< 5	-
Magnesium	-	-	-	ug/L		-	69700	-
Manganese	1500	-	-	ug/L		-	**14100**	-
Mercury	1	-	-	ug/L		-	< 0.05	-
Molybdenum	250	-	-	ug/L		-	0.52	-
Nickel	80	-	-	ug/L		-	4.3	-
Potassium	-	-	-	ug/L		-	12900	-
Selenium	10	-	-	ug/L		-	< 0.25	-
Silicon	-	-	-	ug/L		-	12000	-
Silver	20	-	-	ug/L		-	< 0.05	-
Sodium	200000	-	-	ug/L		-	51200	-
Strontium	2500	-	-	ug/L		-	1760	-
Sulphur (S)	-	-	-	ug/L		-	< 2500	-
Tellurium	-	-	-	ug/L		-	< 1	-
Thallium	-	-	-	ug/L		-	< 0.05	-
Thorium-232	-	-	-	ug/L		-	< 0.5	-
Tin	2500	-	-	ug/L		-	< 0.5	-
Titanium	-	-	-	ug/L		-	< 4.5	-
Uranium	20	-	-	ug/L		-	0.581	-
Vanadium	20	-	-	ug/L		-	3.2	-
Zinc	3000	-	-	ug/L		-	6	-
Zirconium	-	-	-	ug/L		-	1.36	-
Cesium	-	-	-	ug/L		-	< 0.05	-
Rubidium	-	-	-	ug/L		-	1.1	-
Tungsten	3	-	-	ug/L		-	< 0.5	-
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	98 - 150(H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-

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Appendix C
Results of Groundwater Analyses - SGW-1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-1	SGW-1	SGW-1
					Laboratory ID	WG_E309746_43 406_N	WG_E309746_43 571_N	WG_E309746_43 790_N
					Sample Date	2018-11-02	2019-04-16	2019-11-21
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	**237000**	**481000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	< 250
Chloride (Cl)	250000	600000	150000	ug/L		-	7080	59900
Fluoride (F)	1.5	1.3 - 2.3 (H)	-	mg/L		-	0.154	< 0.1
Nitrate (as N)	10000	32800	3000	ug/L		-	< 5	< 25
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		-	< 1	< 5
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-
Ammonia (as N)	-	21000-26000 (pH, T)	1600-2000 (pH, T)	ug/L		-	257	335
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	6190
Sulfate (SO4)	500000	-	309000-429000 (H)	ug/L		-	7280	11300
Phosphorus, dissolved	-	-	-	ug/L		-	234	<50
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	**1.2**	**1.8**
Conductivity, field measured	-	-	-	uS/cm		963	460	586
Oxidation Reduction Potential, field measured	-	-	-	mV		-	139.4	124.1
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	6.72	6.81
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	8.14
Temperature, field measured	-	-	-	deg c		8	3.9	4.5
Conductivity	-	-	-	uS/cm		-	-	915
Total Organic Carbon	-	-	-	mg/L		-	14.1	24.4
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	205	457
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	91	71
Depth to Water	-	-	-	mbtoc		0.8	0.95	1.09
Metals, Dissolved								
Aluminum	9500	66 - 100 (pH)	33 - 50 (pH)	ug/L		-	**3100**	**64.3**
Antimony	6	-	-	ug/L		-	0.11	< 0.1
Arsenic	10	-	-	ug/L		-	8.36	2.97
Barium	1000	-	-	ug/L		-	234	228
Beryllium	8	-	-	ug/L		-	< 0.1	< 0.1
Bismuth	-	-	-	ug/L		-	< 0.05	< 0.05
Boron	5000	-	-	ug/L		-	101	83
Cadmium	5	0.61 - 2.8 (H)	0.22 - 0.46 (H)	ug/L		-	**0.53**	0.0094
Calcium	-	-	-	ug/L		-	61500	117000
Chromium	50	-	-	ug/L		-	3.5	0.15
Cobalt	1	-	-	ug/L		-	**4.23**	**2.72**
Copper	1500	0.2 (pH, T, H)	0.2 (pH, T, H)	ug/L		-	**13.1**	**1.07**
Iron	6500	350	-	ug/L		-	**59300**	**34400**
Lead	10	-	-	ug/L		-	2.38	0.087
Lithium	8	-	-	ug/L		-	2.5	1.4
Magnesium	-	-	-	ug/L		-	12600	39900
Manganese	1500	-	-	ug/L		-	**3030**	**4150**
Mercury	1	-	-	ug/L		-	0.0186	< 0.005
Molybdenum	250	-	-	ug/L		-	0.381	0.248
Nickel	80	-	-	ug/L		-	6.69	2.38
Potassium	-	-	-	ug/L		-	3940	4310
Selenium	10	-	-	ug/L		-	0.423	< 0.05
Silicon	-	-	-	ug/L		-	7890	6310
Silver	20	-	-	ug/L		-	< 0.01	< 0.01
Sodium	200000	-	-	ug/L		-	13500	29300
Strontium	2500	-	-	ug/L		-	421	966
Sulphur (S)	-	-	-	ug/L		-	2640	3500
Tellurium	-	-	-	ug/L		-	< 0.2	< 0.2
Thallium	-	-	-	ug/L		-	0.014	< 0.01
Thorium-232	-	-	-	ug/L		-	0.14	< 0.1
Tin	2500	-	-	ug/L		-	0.1	0.13
Titanium	-	-	-	ug/L		-	46.8	1.07
Uranium	20	-	-	ug/L		-	0.289	0.541
Vanadium	20	-	-	ug/L		-	8.44	< 0.5
Zinc	3000	-	-	ug/L		-	204	9.4
Zirconium	-	-	-	ug/L		-	0.889	< 0.2
Cesium	-	-	-	ug/L		-	0.157	< 0.01
Rubidium	-	-	-	ug/L		-	1.33	0.32
Tungsten	3	-	-	ug/L		-	< 0.1	< 0.1
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	12 - 40 (H)	4.1 - 10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	85 - 417 (H)	6.6 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	1,675 - 3,394 (H)	1,058 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	98 - 150(H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0 (H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	43 - 341 (H)	17 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-

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- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard/ WQG **744**
Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_42	WG_E309747_42	WG_E309747_42
					Sample Date	2017-06-14	2017-07-07	2017-07-13
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**640000**	**320000**	**540000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		150000	45100	45700
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		82	60	14
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		82	59.6	14
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		90	390	400
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		2000	< 1000	< 1000
Phosphorus, dissolved	-	-	-	ug/L		-	-	-
Phosphorus, total	-	-	-	ug/L		81	1180	731
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		-	-	-
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		6.7	6.7	6.6
Temperature, field measured	-	-	-	deg c		-	-	-
Conductivity	-	-	-	uS/cm		1580	685	1090
Total Organic Carbon	-	-	-	mg/L		104	60	199
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		827	486	661
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		170	76	200
Chemical Oxygen Demand	-	-	-	mg/L		326	502	518
Depth to Water	-	-	-	mbtoc		-	-	-
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	-	-
Antimony	6	-	-	ug/L		-	-	-
Arsenic	10	-	-	ug/L		-	-	-
Barium	1000	-	-	ug/L		-	-	-
Beryllium	8	-	-	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	5000	-	-	ug/L		-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	50	-	-	ug/L		-	-	-
Cobalt	1	-	-	ug/L		-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	-	-
Iron	6500	350	-	ug/L		-	-	-
Lead	10	-	-	ug/L		-	-	-
Lithium	8	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	1500	-	-	ug/L		-	-	-
Mercury	1	-	-	ug/L		-	-	-
Molybdenum	250	-	-	ug/L		-	-	-
Nickel	80	-	-	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	10	-	-	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	20	-	-	ug/L		-	-	-
Sodium	200000	-	-	ug/L		-	-	-
Strontium	2500	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	-	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	2500	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	20	-	-	ug/L		-	-	-
Vanadium	20	-	-	ug/L		-	-	-
Zinc	3000	-	-	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Cesium	-	-	-	ug/L		-	-	-
Rubidium	-	-	-	ug/L		-	-	-
Tungsten	3	-	-	ug/L		-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L		475	50800	23100
Antimony	-	-	9	ug/L		0.15	0.57	0.67
Arsenic	-	5	-	ug/L		10	23.9	27.9
Barium	-	-	1000	ug/L		196	644	348
Beryllium	-	-	0.13	ug/L		< 0.1	**1.39**	**0.59**
Bismuth	-	-	-	ug/L		< 0.1	0.44	0.18
Boron	-	-	1200	ug/L		208	234	173
Cadmium	-	-	-	ug/L		0.186	0.585	0.258
Calcium	-	-	-	ug/L		201000	119000	175000
Chromium	-	-	-	ug/L		0.97	57.2	23
Cobalt	-	110	4	ug/L		10.5	32.1	23.6
Copper	-	30 - 40(H)	10 (H)	ug/L		3.66	**94.8**	**39.5**
Iron	-	1000	-	ug/L		16800	82200	56600
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		0.14	**20.2**	7.46
Lithium	-	-	-	ug/L		2.53	44.4	17.5
Magnesium	-	-	-	ug/L		79100	45700	54200
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		11400	5670	11700
Mercury	-	-	0.01	ug/L		< 0.02	**0.062**	< 0.02
Molybdenum	-	46000	7600	ug/L		0.16	0.63	0.53
Nickel	-	-	150 (H)	ug/L		4.59	77.1	35.1
Potassium	-	-	-	ug/L		6840	5500	4170
Selenium	-	-	2	ug/L		< 0.5	< 0.5	0.52
Silicon	-	-	-	ug/L		11700	72200	36200
Silver	-	3.0(H)	1.5 (H)	ug/L		< 0.05	0.445	0.221
Sodium	-	-	-	ug/L		55800	28500	35200
Strontium	-	-	-	ug/L		1640	778	1080
Sulphur (S)	-	-	-	ug/L		< 3000	< 3000	< 3000
Tellurium	-	-	-	ug/L		< 0.2	< 0.2	< 0.2
Thallium	-	-	0.8	ug/L		< 0.02	0.156	0.075
Thorium-232	-	-	-	ug/L		< 0.1	1.67	0.87
Tin	-	-	-	ug/L		< 0.2	0.41	0.28
Titanium	-	-	-	ug/L		11.3	362	306
Uranium	-	-	8.5	ug/L		1.19	2.46	1.39
Vanadium	-	-	-	ug/L		4.7	114	50.1
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		6.5	161	69.7
Zirconium	-	-	-	ug/L		0.59	3.75	3.14
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_42	WG_E309747_42	WG_E309747_42
					Sample Date	2017-07-20	2017-07-27	2017-08-01
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**680000**	**810000**	**440000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		48700	49200	25900
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		< 10	31	13
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		< 10	30.9	13.2
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		380	670	380
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		< 1000	< 1000	1400
Phosphorus, dissolved	-	-	-	ug/L		-	-	-
Phosphorus, total	-	-	-	ug/L		705	644	314
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		-	-	-
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		6.7	6.5	6.6
Temperature, field measured	-	-	-	deg c		-	-	-
Conductivity	-	-	-	uS/cm		1360	1620	914
Total Organic Carbon	-	-	-	mg/L		196	322	134
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		760	1020	461
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		340	530	210
Chemical Oxygen Demand	-	-	-	mg/L		609	938	385
Depth to Water	-	-	-	mbtoc		-	-	-
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	-	-
Antimony	6	-	-	ug/L		-	-	-
Arsenic	10	-	-	ug/L		-	-	-
Barium	1000	-	-	ug/L		-	-	-
Beryllium	8	-	-	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	5000	-	-	ug/L		-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	50	-	-	ug/L		-	-	-
Cobalt	1	-	-	ug/L		-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	-	-
Iron	6500	350	-	ug/L		-	-	-
Lead	10	-	-	ug/L		-	-	-
Lithium	8	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	1500	-	-	ug/L		-	-	-
Mercury	1	-	-	ug/L		-	-	-
Molybdenum	250	-	-	ug/L		-	-	-
Nickel	80	-	-	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	10	-	-	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	20	-	-	ug/L		-	-	-
Sodium	200000	-	-	ug/L		-	-	-
Strontium	2500	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	-	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	2500	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	20	-	-	ug/L		-	-	-
Vanadium	20	-	-	ug/L		-	-	-
Zinc	3000	-	-	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Cesium	-	-	-	ug/L		-	-	-
Rubidium	-	-	-	ug/L		-	-	-
Tungsten	3	-	-	ug/L		-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L		31100	19400	16300
Antimony	-	-	9	ug/L		0.82	0.71	0.64
Arsenic	-	5	-	ug/L		32.4	32.3	18.4
Barium	-	-	1000	ug/L		398	361	226
Beryllium	-	-	0.13	ug/L		**0.63**	**0.45**	**0.3**
Bismuth	-	-	-	ug/L		0.18	0.14	0.1
Boron	-	-	1200	ug/L		170	177	153
Cadmium	-	-	-	ug/L		0.257	0.296	0.109
Calcium	-	-	-	ug/L		199000	283000	124000
Chromium	-	-	-	ug/L		29.9	19	16.6
Cobalt	-	110	4	ug/L		25.9	29.1	12.8
Copper	-	30 - 40(H)	10 (H)	ug/L		**41.7**	**31.2**	**22.9**
Iron	-	1000	-	ug/L		61500	65000	33000
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		8.01	5.95	3.33
Lithium	-	-	-	ug/L		21.5	14.8	10.5
Magnesium	-	-	-	ug/L		64000	76500	36800
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		13000	18400	8070
Mercury	-	-	0.01	ug/L		**0.029**	**0.026**	**0.07**
Molybdenum	-	46000	7600	ug/L		0.85	0.63	0.79
Nickel	-	-	150 (H)	ug/L		39.2	30.9	19.2
Potassium	-	-	-	ug/L		5630	4550	3610
Selenium	-	-	2	ug/L		0.55	< 0.5	< 0.5
Silicon	-	-	-	ug/L		62000	38200	32800
Silver	-	3.0(H)	1.5 (H)	ug/L		0.23	0.224	0.132
Sodium	-	-	-	ug/L		46000	52000	31100
Strontium	-	-	-	ug/L		1160	1560	760
Sulphur (S)	-	-	-	ug/L		< 3000	< 3000	< 3000
Tellurium	-	-	-	ug/L		< 0.2	< 0.2	< 0.2
Thallium	-	-	0.8	ug/L		0.123	0.064	0.066
Thorium-232	-	-	-	ug/L		1.21	0.65	0.7
Tin	-	-	-	ug/L		0.53	0.29	0.28
Titanium	-	-	-	ug/L		689	308	370
Uranium	-	-	8.5	ug/L		2.33	1.37	1.14
Vanadium	-	-	-	ug/L		66.1	40.6	36.3
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		76	59.2	35
Zirconium	-	-	-	ug/L		9.57	3.35	8.54
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

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< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

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Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_42	WG_E309747_42	WG_E309747_43
					Sample Date: 2017-08-09	2017-08-16	2017-10-05
					QA/QC		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**800000**	**930000**	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	240000
Bromide (Br)	-	-	-	ug/L	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	43900	46300	87000
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	16	17	130
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	< 10	< 10	< 10
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	16.3	17.4	129
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	1030	490	90
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	1300	< 1000	7400
Phosphorus, dissolved	-	-	-	ug/L	-	-	-
Phosphorus, total	-	-	-	ug/L	597	563	1220
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-
Conductivity, field measured	-	-	-	uS/cm	-	-	-
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	**6.4**	6.5	6.9
Temperature, field measured	-	-	-	deg c	-	-	-
Conductivity	-	-	-	uS/cm	1630	1850	705
Total Organic Carbon	-	-	-	mg/L	390	372	67
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	1030	1050	360
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	640	630	< 38
Chemical Oxygen Demand	-	-	-	mg/L	1100	1000	291
Depth to Water	-	-	-	mbtoc	-	-	-
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	-	-	-
Antimony	6	-	-	ug/L	-	-	-
Arsenic	10	-	-	ug/L	-	-	-
Barium	1000	-	-	ug/L	-	-	-
Beryllium	8	-	-	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	5000	-	-	ug/L	-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	50	-	-	ug/L	-	-	-
Cobalt	1	-	-	ug/L	-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	-	-	-
Iron	6500	350	-	ug/L	-	-	-
Lead	10	-	-	ug/L	-	-	-
Lithium	8	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	1500	-	-	ug/L	-	-	-
Mercury	1	-	-	ug/L	-	-	-
Molybdenum	250	-	-	ug/L	-	-	-
Nickel	80	-	-	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	10	-	-	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	20	-	-	ug/L	-	-	-
Sodium	200000	-	-	ug/L	-	-	-
Strontium	2500	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	-	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	2500	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	20	-	-	ug/L	-	-	-
Vanadium	20	-	-	ug/L	-	-	-
Zinc	3000	-	-	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Cesium	-	-	-	ug/L	-	-	-
Rubidium	-	-	-	ug/L	-	-	-
Tungsten	3	-	-	ug/L	-	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	15800	20200	67000
Antimony	-	-	9	ug/L	0.67	0.74	0.54
Arsenic	-	5	-	ug/L	42.6	45.5	25
Barium	-	-	1000	ug/L	349	414	740
Beryllium	-	-	0.13	ug/L	**0.4**	**0.55**	**1.37**
Bismuth	-	-	-	ug/L	0.11	0.16	0.53
Boron	-	-	1200	ug/L	142	120	350
Cadmium	-	-	-	ug/L	0.291	0.445	0.441
Calcium	-	-	-	ug/L	273000	284000	75300
Chromium	-	-	-	ug/L	17	22.8	73.7
Cobalt	-	110	4	ug/L	35.4	35.5	39.6
Copper	-	30 - 40(H)	10 (H)	ug/L	**29.8**	**38.5**	**136**
Iron	-	1000	-	ug/L	73800	80100	95500
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	5.1	5.72	**22.7**
Lithium	-	-	-	ug/L	11.3	17.2	41.9
Magnesium	-	-	-	ug/L	83500	82300	41600
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	23700	24100	3780
Mercury	-	-	0.01	ug/L	**0.045**	**0.014**	**0.084**
Molybdenum	-	46000	7600	ug/L	0.66	0.92	0.71
Nickel	-	-	150 (H)	ug/L	30.4	36.2	**99.1**
Potassium	-	-	-	ug/L	4840	3680	8200
Selenium	-	-	2	ug/L	0.61	0.57	< 0.5
Silicon	-	-	-	ug/L	33800	41300	81300
Silver	-	3.0(H)	1.5 (H)	ug/L	0.147	0.333	0.464
Sodium	-	-	-	ug/L	58900	52400	46500
Strontium	-	-	-	ug/L	1590	1730	551
Sulphur (S)	-	-	-	ug/L	< 3000	< 3000	< 3000
Tellurium	-	-	-	ug/L	< 0.2	< 0.5	< 0.5
Thallium	-	-	0.8	ug/L	0.03	0.068	0.177
Thorium-232	-	-	-	ug/L	0.72	1.27	2.25
Tin	-	-	-	ug/L	0.24	0.34	0.3
Titanium	-	-	-	ug/L	223	294	321
Uranium	-	-	8.5	ug/L	1.16	1.64	2.02
Vanadium	-	-	-	ug/L	38.3	49.3	138
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	51.3	62.4	**206**
Zirconium	-	-	-	ug/L	1.85	2.21	2.61
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	-	-	-
Ethylbenzene	140	-	200	ug/L	-	-	-
Styrene	800	-	72	ug/L	-	-	-
Toluene	60	-	0.5	ug/L	-	-	-
Xylenes, Total	90	-	-	ug/L	-	-	-
o-Xylene	-	-	-	ug/L	-	-	-
m,p-Xylenes	-	-	-	ug/L	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date	2018-04-23	2018-05-01	2018-05-08
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		-	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		-	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		-	-	-
Phosphorus, dissolved	-	-	-	ug/L		-	-	-
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		2050	1953	1586
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
Temperature, field measured	-	-	-	deg c		2.5	3.7	4.8
Conductivity	-	-	-	uS/cm		-	-	-
Total Organic Carbon	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	-	-
Depth to Water	-	-	-	mbtoc		1.1	1.06	1.06
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	-	-
Antimony	6	-	-	ug/L		-	-	-
Arsenic	10	-	-	ug/L		-	-	-
Barium	1000	-	-	ug/L		-	-	-
Beryllium	8	-	-	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	5000	-	-	ug/L		-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	50	-	-	ug/L		-	-	-
Cobalt	1	-	-	ug/L		-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	-	-
Iron	6500	350	-	ug/L		-	-	-
Lead	10	-	-	ug/L		-	-	-
Lithium	8	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	1500	-	-	ug/L		-	-	-
Mercury	1	-	-	ug/L		-	-	-
Molybdenum	250	-	-	ug/L		-	-	-
Nickel	80	-	-	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	10	-	-	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	20	-	-	ug/L		-	-	-
Sodium	200000	-	-	ug/L		-	-	-
Strontium	2500	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	-	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	2500	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	20	-	-	ug/L		-	-	-
Vanadium	20	-	-	ug/L		-	-	-
Zinc	3000	-	-	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Cesium	-	-	-	ug/L		-	-	-
Rubidium	-	-	-	ug/L		-	-	-
Tungsten	3	-	-	ug/L		-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	150 (H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date	2018-05-11	2018-05-14	2018-05-22
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		-	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		-	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		-	-	-
Phosphorus, dissolved	-	-	-	ug/L		-	-	-
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		1953	1888	1586
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
Temperature, field measured	-	-	-	deg c		3.7	6.3	7.9
Conductivity	-	-	-	uS/cm		-	-	-
Total Organic Carbon	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	-	-
Depth to Water	-	-	-	mbtoc		1.06	1.05	1.12
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	-	-
Antimony	6	-	-	ug/L		-	-	-
Arsenic	10	-	-	ug/L		-	-	-
Barium	1000	-	-	ug/L		-	-	-
Beryllium	8	-	-	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	5000	-	-	ug/L		-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	50	-	-	ug/L		-	-	-
Cobalt	1	-	-	ug/L		-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	-	-
Iron	6500	350	-	ug/L		-	-	-
Lead	10	-	-	ug/L		-	-	-
Lithium	8	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	1500	-	-	ug/L		-	-	-
Mercury	1	-	-	ug/L		-	-	-
Molybdenum	250	-	-	ug/L		-	-	-
Nickel	80	-	-	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	10	-	-	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	20	-	-	ug/L		-	-	-
Sodium	200000	-	-	ug/L		-	-	-
Strontium	2500	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	-	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	2500	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	20	-	-	ug/L		-	-	-
Vanadium	20	-	-	ug/L		-	-	-
Zinc	3000	-	-	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Cesium	-	-	-	ug/L		-	-	-
Rubidium	-	-	-	ug/L		-	-	-
Tungsten	3	-	-	ug/L		-	-	-
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	150 (H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date: 2018-05-30	2018-06-04	2018-06-12
					QA/QC		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**749000**	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	43900	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	< 25	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	< 5	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	< 30	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	677	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	< 1500	-	-
Phosphorus, dissolved	-	-	-	ug/L	274	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-
Conductivity, field measured	-	-	-	uS/cm	1599	1590	1390
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
Temperature, field measured	-	-	-	deg c	8.1	7.9	7.3
Conductivity	-	-	-	uS/cm	-	-	-
Total Organic Carbon	-	-	-	mg/L	160	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	714	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	554	-	-
Depth to Water	-	-	-	mbtoc	1.14	1.11	1.11
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	**9330**	-	-
Antimony	6	-	-	ug/L	0.44	-	-
Arsenic	10	-	-	ug/L	**38.4**	-	-
Barium	1000	-	-	ug/L	277	-	-
Beryllium	8	-	-	ug/L	0.24	-	-
Bismuth	-	-	-	ug/L	< 0.05	-	-
Boron	5000	-	-	ug/L	164	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	0.0597	-	-
Calcium	-	-	-	ug/L	189000	-	-
Chromium	50	-	-	ug/L	10.9	-	-
Cobalt	1	-	-	ug/L	**19.5**	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	**18.1**	-	-
Iron	6500	350	-	ug/L	**61600**	-	-
Lead	10	-	-	ug/L	3.37	-	-
Lithium	8	-	-	ug/L	6.4	-	-
Magnesium	-	-	-	ug/L	59100	-	-
Manganese	1500	-	-	ug/L	**15500**	-	-
Mercury	1	-	-	ug/L	0.0122	-	-
Molybdenum	250	-	-	ug/L	0.311	-	-
Nickel	80	-	-	ug/L	19.9	-	-
Potassium	-	-	-	ug/L	4920	-	-
Selenium	10	-	-	ug/L	0.298	-	-
Silicon	-	-	-	ug/L	21300	-	-
Silver	20	-	-	ug/L	< 0.01	-	-
Sodium	200000	-	-	ug/L	41700	-	-
Strontium	2500	-	-	ug/L	1240	-	-
Sulphur (S)	-	-	-	ug/L	< 500	-	-
Tellurium	-	-	-	ug/L	< 0.2	-	-
Thallium	-	-	-	ug/L	0.014	-	-
Thorium-232	-	-	-	ug/L	0.24	-	-
Tin	2500	-	-	ug/L	< 0.1	-	-
Titanium	-	-	-	ug/L	30	-	-
Uranium	20	-	-	ug/L	0.76	-	-
Vanadium	20	-	-	ug/L	**23.6**	-	-
Zinc	3000	-	-	ug/L	35	-	-
Zirconium	-	-	-	ug/L	2.39	-	-
Cesium	-	-	-	ug/L	0.229	-	-
Rubidium	-	-	-	ug/L	2.1	-	-
Tungsten	3	-	-	ug/L	< 0.1	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	-	-	-
Ethylbenzene	140	-	200	ug/L	-	-	-
Styrene	800	-	72	ug/L	-	-	-
Toluene	60	-	0.5	ug/L	-	-	-
Xylenes, Total	90	-	-	ug/L	-	-	-
o-Xylene	-	-	-	ug/L	-	-	-
m,p-Xylenes	-	-	-	ug/L	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

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< or ND Indicates parameter was below laboratory equipment detection limit

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Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date: 2018-06-20	2018-06-26	2018-07-03
					QA/QC:		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	-	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	-	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	-	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	-	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	-	-	-
Phosphorus, dissolved	-	-	-	ug/L	-	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-
Conductivity, field measured	-	-	-	uS/cm	1330	1225	1167
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
Temperature, field measured	-	-	-	deg c	7.2	7.5	8.5
Conductivity	-	-	-	uS/cm	-	-	-
Total Organic Carbon	-	-	-	mg/L	-	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	-	-	-
Depth to Water	-	-	-	mbtoc	1.3	1.55	1.22
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	-	-	-
Antimony	6	-	-	ug/L	-	-	-
Arsenic	10	-	-	ug/L	-	-	-
Barium	1000	-	-	ug/L	-	-	-
Beryllium	8	-	-	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	5000	-	-	ug/L	-	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	50	-	-	ug/L	-	-	-
Cobalt	1	-	-	ug/L	-	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	-	-	-
Iron	6500	350	-	ug/L	-	-	-
Lead	10	-	-	ug/L	-	-	-
Lithium	8	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	1500	-	-	ug/L	-	-	-
Mercury	1	-	-	ug/L	-	-	-
Molybdenum	250	-	-	ug/L	-	-	-
Nickel	80	-	-	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	10	-	-	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	20	-	-	ug/L	-	-	-
Sodium	200000	-	-	ug/L	-	-	-
Strontium	2500	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	-	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	2500	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	20	-	-	ug/L	-	-	-
Vanadium	20	-	-	ug/L	-	-	-
Zinc	3000	-	-	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Cesium	-	-	-	ug/L	-	-	-
Rubidium	-	-	-	ug/L	-	-	-
Tungsten	3	-	-	ug/L	-	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	-	-	-
Ethylbenzene	140	-	200	ug/L	-	-	-
Styrene	800	-	72	ug/L	-	-	-
Toluene	60	-	0.5	ug/L	-	-	-
Xylenes, Total	90	-	-	ug/L	-	-	-
o-Xylene	-	-	-	ug/L	-	-	-
m,p-Xylenes	-	-	-	ug/L	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

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Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2 / Laboratory ID: WG_E309747_43 / Sample Date: 2018-07-10 / QA/QC	SGW-2 / WG_E309747_43 / 2018-07-31	SGW-2 / WG_E309747_43 / 2018-08-07
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**557000**	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	44300	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	-	-	-
Nitrate (as N)	10000	32800	3000	ug/L	< 25	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	< 5	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	< 30	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	694	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	13900	-	-
Phosphorus, dissolved	-	-	-	ug/L	<100	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-
Conductivity, field measured	-	-	-	uS/cm	1142	1005	1008
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-
Temperature, field measured	-	-	-	deg c	11.4	10.2	10.3
Conductivity	-	-	-	uS/cm	-	-	-
Total Organic Carbon	-	-	-	mg/L	114	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	421	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	365	-	-
Depth to Water	-	-	-	mbtoc	1.33	1.63	1.96
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	**52.2**	-	-
Antimony	6	-	-	ug/L	0.64	-	-
Arsenic	10	-	-	ug/L	**22.4**	-	-
Barium	1000	-	-	ug/L	149	-	-
Beryllium	8	-	-	ug/L	< 0.2	-	-
Bismuth	-	-	-	ug/L	< 0.1	-	-
Boron	5000	-	-	ug/L	288	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	0.013	-	-
Calcium	-	-	-	ug/L	116000	-	-
Chromium	50	-	-	ug/L	0.23	-	-
Cobalt	1	-	-	ug/L	**8.34**	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	***< 0.4***	-	-
Iron	6500	350	-	ug/L	**24400**	-	-
Lead	10	-	-	ug/L	< 0.1	-	-
Lithium	8	-	-	ug/L	< 2	-	-
Magnesium	-	-	-	ug/L	32000	-	-
Manganese	1500	-	-	ug/L	**8950**	-	-
Mercury	1	-	-	ug/L	< 0.005	-	-
Molybdenum	250	-	-	ug/L	0.68	-	-
Nickel	80	-	-	ug/L	5.2	-	-
Potassium	-	-	-	ug/L	3200	-	-
Selenium	10	-	-	ug/L	0.28	-	-
Silicon	-	-	-	ug/L	8260	-	-
Silver	20	-	-	ug/L	< 0.02	-	-
Sodium	200000	-	-	ug/L	34200	-	-
Strontium	2500	-	-	ug/L	768	-	-
Sulphur (S)	-	-	-	ug/L	8700	-	-
Tellurium	-	-	-	ug/L	< 0.4	-	-
Thallium	-	-	-	ug/L	< 0.02	-	-
Thorium-232	-	-	-	ug/L	< 0.2	-	-
Tin	2500	-	-	ug/L	< 0.2	-	-
Titanium	-	-	-	ug/L	2.76	-	-
Uranium	20	-	-	ug/L	0.684	-	-
Vanadium	20	-	-	ug/L	3.9	-	-
Zinc	3000	-	-	ug/L	3.6	-	-
Zirconium	-	-	-	ug/L	0.93	-	-
Cesium	-	-	-	ug/L	< 0.02	-	-
Rubidium	-	-	-	ug/L	0.5	-	-
Tungsten	3	-	-	ug/L	< 0.2	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	-	-	-
Ethylbenzene	140	-	200	ug/L	-	-	-
Styrene	800	-	72	ug/L	-	-	-
Toluene	60	-	0.5	ug/L	-	-	-
Xylenes, Total	90	-	-	ug/L	-	-	-
o-Xylene	-	-	-	ug/L	-	-	-
m,p-Xylenes	-	-	-	ug/L	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date	2018-08-13	2018-09-12	2018-10-22
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	**504000**	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		-	49200	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-
Nitrate (as N)	10000	32800	3000	ug/L		-	200	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		-	< 5	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	< 205	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		-	1050	-
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		-	6400	-
Phosphorus, dissolved	-	-	-	ug/L		-	<100	-
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-
Conductivity, field measured	-	-	-	uS/cm		944	825	908
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-
Temperature, field measured	-	-	-	deg c		10.5	9.8	7.6
Conductivity	-	-	-	uS/cm		-	-	-
Total Organic Carbon	-	-	-	mg/L		-	50.5	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	498	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	163	-
Depth to Water	-	-	-	mbtoc		2.1	2.16	2.14
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	**58.3**	-
Antimony	6	-	-	ug/L		-	0.4	-
Arsenic	10	-	-	ug/L		-	**27.8**	-
Barium	1000	-	-	ug/L		-	161	-
Beryllium	8	-	-	ug/L		-	< 0.2	-
Bismuth	-	-	-	ug/L		-	< 0.1	-
Boron	5000	-	-	ug/L		-	191	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	< 0.01	-
Calcium	-	-	-	ug/L		-	131000	-
Chromium	50	-	-	ug/L		-	0.64	-
Cobalt	1	-	-	ug/L		-	**10.5**	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	**0.52**	-
Iron	6500	350	-	ug/L		-	**42200**	-
Lead	10	-	-	ug/L		-	< 0.1	-
Lithium	8	-	-	ug/L		-	< 2	-
Magnesium	-	-	-	ug/L		-	41400	-
Manganese	1500	-	-	ug/L		-	**11500**	-
Mercury	1	-	-	ug/L		-	< 0.005	-
Molybdenum	250	-	-	ug/L		-	0.43	-
Nickel	80	-	-	ug/L		-	5.4	-
Potassium	-	-	-	ug/L		-	2640	-
Selenium	10	-	-	ug/L		-	0.18	-
Silicon	-	-	-	ug/L		-	9760	-
Silver	20	-	-	ug/L		-	< 0.02	-
Sodium	200000	-	-	ug/L		-	30100	-
Strontium	2500	-	-	ug/L		-	887	-
Sulphur (S)	-	-	-	ug/L		-	1200	-
Tellurium	-	-	-	ug/L		-	< 0.4	-
Thallium	-	-	-	ug/L		-	< 0.02	-
Thorium-232	-	-	-	ug/L		-	< 0.2	-
Tin	2500	-	-	ug/L		-	< 0.2	-
Titanium	-	-	-	ug/L		-	5.07	-
Uranium	20	-	-	ug/L		-	0.403	-
Vanadium	20	-	-	ug/L		-	6	-
Zinc	3000	-	-	ug/L		-	< 2	-
Zirconium	-	-	-	ug/L		-	1.31	-
Cesium	-	-	-	ug/L		-	< 0.02	-
Rubidium	-	-	-	ug/L		-	< 0.4	-
Tungsten	3	-	-	ug/L		-	< 0.2	-
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	150 (H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

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< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-2	SGW-2	SGW-2
					Laboratory ID	WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date	2018-11-02	2019-04-16	2019-08-12
					QA/QC			
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L		-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	122
Chloride (Cl)	250000	600000	150000	ug/L		-	123000	51100
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	0.12	0.186
Nitrate (as N)	10000	32800	3000	ug/L		-	< 25	71.7
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		-	< 5	14.7
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		-	366	908
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L		-	1600	20900
Phosphorus, dissolved	-	-	-	ug/L		-	690	<50
Phosphorus, total	-	-	-	ug/L		-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L		-	1.2	5.3
Conductivity, field measured	-	-	-	uS/cm		676	1053	625
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	6.67	6.55
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	7.24
Temperature, field measured	-	-	-	deg c		5.9	3.9	10.5
Conductivity	-	-	-	uS/cm		-	-	-
Total Organic Carbon	-	-	-	mg/L		-	81.8	130
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	582	303
Biochemical Oxygen Demand	-	-	-	mg/L		-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		-	264	397
Depth to Water	-	-	-	mbtoc		1.1	1.01	1.89
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	**20700**	**123**
Antimony	6	-	-	ug/L		-	0.52	0.6
Arsenic	10	-	-	ug/L		-	**28**	**22.6**
Barium	1000	-	-	ug/L		-	442	124
Beryllium	8	-	-	ug/L		-	0.52	< 0.1
Bismuth	-	-	-	ug/L		-	< 0.25	< 0.05
Boron	5000	-	-	ug/L		-	286	185
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	0.37	0.0236
Calcium	-	-	-	ug/L		-	153000	80900
Chromium	50	-	-	ug/L		-	17	0.43
Cobalt	1	-	-	ug/L		-	**19.7**	**6.06**
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	**39.6**	**1.65**
Iron	6500	350	-	ug/L		-	**49500**	**15600**
Lead	10	-	-	ug/L		-	7.31	0.149
Lithium	8	-	-	ug/L		-	**8.9**	< 1
Magnesium	-	-	-	ug/L		-	48800	24600
Manganese	1500	-	-	ug/L		-	**9550**	**6600**
Mercury	1	-	-	ug/L		-	0.0149	0.0076
Molybdenum	250	-	-	ug/L		-	0.62	0.581
Nickel	80	-	-	ug/L		-	26.7	4.88
Potassium	-	-	-	ug/L		-	5660	2030
Selenium	10	-	-	ug/L		-	< 0.25	0.175
Silicon	-	-	-	ug/L		-	33900	7410
Silver	20	-	-	ug/L		-	0.154	< 0.01
Sodium	200000	-	-	ug/L		-	64000	31400
Strontium	2500	-	-	ug/L		-	1090	594
Sulphur (S)	-	-	-	ug/L		-	< 2500	4560
Tellurium	-	-	-	ug/L		-	< 1	< 0.2
Thallium	-	-	-	ug/L		-	0.051	< 0.01
Thorium-232	-	-	-	ug/L		-	0.54	< 0.1
Tin	2500	-	-	ug/L		-	< 0.5	0.1
Titanium	-	-	-	ug/L		-	563	6.19
Uranium	20	-	-	ug/L		-	1.08	0.541
Vanadium	20	-	-	ug/L		-	**48.9**	3.65
Zinc	3000	-	-	ug/L		-	60.8	5
Zirconium	-	-	-	ug/L		-	5.74	0.8
Cesium	-	-	-	ug/L		-	0.927	< 0.01
Rubidium	-	-	-	ug/L		-	10.5	0.24
Tungsten	3	-	-	ug/L		-	< 0.5	< 0.1
Metals, Total								
Aluminum	-	-	-	ug/L		-	-	-
Antimony	-	-	9	ug/L		-	-	-
Arsenic	-	5	-	ug/L		-	-	-
Barium	-	-	1000	ug/L		-	-	-
Beryllium	-	-	0.13	ug/L		-	-	-
Bismuth	-	-	-	ug/L		-	-	-
Boron	-	-	1200	ug/L		-	-	-
Cadmium	-	-	-	ug/L		-	-	-
Calcium	-	-	-	ug/L		-	-	-
Chromium	-	-	-	ug/L		-	-	-
Cobalt	-	110	4	ug/L		-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L		-	-	-
Iron	-	1000	-	ug/L		-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L		-	-	-
Lithium	-	-	-	ug/L		-	-	-
Magnesium	-	-	-	ug/L		-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L		-	-	-
Mercury	-	-	0.01	ug/L		-	-	-
Molybdenum	-	46000	7600	ug/L		-	-	-
Nickel	-	-	150 (H)	ug/L		-	-	-
Potassium	-	-	-	ug/L		-	-	-
Selenium	-	-	2	ug/L		-	-	-
Silicon	-	-	-	ug/L		-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L		-	-	-
Sodium	-	-	-	ug/L		-	-	-
Strontium	-	-	-	ug/L		-	-	-
Sulphur (S)	-	-	-	ug/L		-	-	-
Tellurium	-	-	-	ug/L		-	-	-
Thallium	-	-	0.8	ug/L		-	-	-
Thorium-232	-	-	-	ug/L		-	-	-
Tin	-	-	-	ug/L		-	-	-
Titanium	-	-	-	ug/L		-	-	-
Uranium	-	-	8.5	ug/L		-	-	-
Vanadium	-	-	-	ug/L		-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L		-	-	-
Zirconium	-	-	-	ug/L		-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-
VOCs + BTEX								
Benzene	5	-	40	ug/L		-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-
Styrene	800	-	72	ug/L		-	-	-
Toluene	60	-	0.5	ug/L		-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-
o-Xylene	-	-	-	ug/L		-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_43	WG_E309747_43	WG_E309747_43
					Sample Date: 2019-11-21	2020-03-30	2020-05-11
					QA/QC		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	310	-	-
Chloride (Cl)	250000	600000	150000	ug/L	75000	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	0.11	-	-
Nitrate (as N)	10000	32800	3000	ug/L	< 25	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	< 5	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	481	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	9950	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	4400	-	-
Phosphorus, dissolved	-	-	-	ug/L	<50	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	1.8	-	-
Conductivity, field measured	-	-	-	uS/cm	528	Frozen	664
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	6.97	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	7.5	-	-
Temperature, field measured	-	-	-	deg c	3.8	-	12.3
Conductivity	-	-	-	uS/cm	799	-	-
Total Organic Carbon	-	-	-	mg/L	198	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	334	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	355	-	-
Depth to Water	-	-	-	mbtoc	1.08	-	0.89
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	**49.5**	-	-
Antimony	6	-	-	ug/L	0.2	-	-
Arsenic	10	-	-	ug/L	**13.4**	-	-
Barium	1000	-	-	ug/L	104	-	-
Beryllium	8	-	-	ug/L	< 0.1	-	-
Bismuth	-	-	-	ug/L	< 0.05	-	-
Boron	5000	-	-	ug/L	220	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	0.0066	-	-
Calcium	-	-	-	ug/L	90600	-	-
Chromium	50	-	-	ug/L	0.4	-	-
Cobalt	1	-	-	ug/L	**4.52**	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	**1.06**	-	-
Iron	6500	350	-	ug/L	**16000**	-	-
Lead	10	-	-	ug/L	0.053	-	-
Lithium	8	-	-	ug/L	< 1	-	-
Magnesium	-	-	-	ug/L	26100	-	-
Manganese	1500	-	-	ug/L	**4850**	-	-
Mercury	1	-	-	ug/L	< 0.005	-	-
Molybdenum	250	-	-	ug/L	0.17	-	-
Nickel	80	-	-	ug/L	3.4	-	-
Potassium	-	-	-	ug/L	3910	-	-
Selenium	10	-	-	ug/L	0.221	-	-
Silicon	-	-	-	ug/L	6580	-	-
Silver	20	-	-	ug/L	< 0.01	-	-
Sodium	200000	-	-	ug/L	48300	-	-
Strontium	2500	-	-	ug/L	600	-	-
Sulphur (S)	-	-	-	ug/L	1640	-	-
Tellurium	-	-	-	ug/L	< 0.2	-	-
Thallium	-	-	-	ug/L	< 0.01	-	-
Thorium-232	-	-	-	ug/L	< 0.1	-	-
Tin	2500	-	-	ug/L	0.13	-	-
Titanium	-	-	-	ug/L	2.18	-	-
Uranium	20	-	-	ug/L	0.235	-	-
Vanadium	20	-	-	ug/L	1.99	-	-
Zinc	3000	-	-	ug/L	4.1	-	-
Zirconium	-	-	-	ug/L	0.64	-	-
Cesium	-	-	-	ug/L	< 0.01	-	-
Rubidium	-	-	-	ug/L	0.42	-	-
Tungsten	3	-	-	ug/L	< 0.1	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	-	-	-
Ethylbenzene	140	-	200	ug/L	-	-	-
Styrene	800	-	72	ug/L	-	-	-
Toluene	60	-	0.5	ug/L	-	-	-
Xylenes, Total	90	-	-	ug/L	-	-	-
o-Xylene	-	-	-	ug/L	-	-	-
m,p-Xylenes	-	-	-	ug/L	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

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Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_44	WG_E309747_44	WG_E309747_44
					Sample Date: 2020-06-25	2020-08-26	2020-09-09
					QA/QC		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**347000**	**278000**	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	326	174	-
Chloride (Cl)	250000	600000	150000	ug/L	49900	33700	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	0.116	0.121	-
Nitrate (as N)	10000	32800	3000	ug/L	< 5	25.9	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	< 25	4.1	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	587	504	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	9200	3270	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	< 1500	300	-
Phosphorus, dissolved	-	-	-	ug/L	82	75	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	4.5	3.2	-
Conductivity, field measured	-	-	-	uS/cm	747	745	609
Oxidation Reduction Potential, field measured	-	-	-	mV	119	126.8	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	**6.37**	6.55	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	6.96	7.27	-
Temperature, field measured	-	-	-	deg c	8	11	11.7
Conductivity	-	-	-	uS/cm	760	603	-
Total Organic Carbon	-	-	-	mg/L	141	95.3	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	303	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	267	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	518	132	-
Depth to Water	-	-	-	mbtoc	1.1	1.12	1.01
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	**42**	**62.8**	-
Antimony	6	-	-	ug/L	0.18	0.18	-
Arsenic	10	-	-	ug/L	**14.2**	**12.2**	-
Barium	1000	-	-	ug/L	84.4	81.4	-
Beryllium	8	-	-	ug/L	< 0.1	< 0.1	-
Bismuth	-	-	-	ug/L	< 0.05	< 0.05	-
Boron	5000	-	-	ug/L	286	291	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	< 0.005	< 0.005	-
Calcium	-	-	-	ug/L	84800	76500	-
Chromium	50	-	-	ug/L	0.4	0.41	-
Cobalt	1	-	-	ug/L	**3.43**	**2.75**	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	**1.62**	**0.57**	-
Iron	6500	350	-	ug/L	**13100**	**8000**	-
Lead	10	-	-	ug/L	0.056	0.067	-
Lithium	8	-	-	ug/L	< 1	< 1	-
Magnesium	-	-	-	ug/L	22100	18500	-
Manganese	1500	-	-	ug/L	**3940**	**2800**	-
Mercury	1	-	-	ug/L	< 0.005	< 0.005	-
Molybdenum	250	-	-	ug/L	0.253	0.349	-
Nickel	80	-	-	ug/L	2.95	2.95	-
Potassium	-	-	-	ug/L	3690	3440	-
Selenium	10	-	-	ug/L	0.241	0.167	-
Silicon	-	-	-	ug/L	6560	6310	-
Silver	20	-	-	ug/L	< 0.01	< 0.01	-
Sodium	200000	-	-	ug/L	38000	31300	-
Strontium	2500	-	-	ug/L	566	490	-
Sulphur (S)	-	-	-	ug/L	< 500	< 500	-
Tellurium	-	-	-	ug/L	< 0.2	< 0.2	-
Thallium	-	-	-	ug/L	< 0.01	< 0.01	-
Thorium-232	-	-	-	ug/L	< 0.1	< 0.1	-
Tin	2500	-	-	ug/L	< 0.1	< 0.1	-
Titanium	-	-	-	ug/L	1.93	< 2.4	-
Uranium	20	-	-	ug/L	0.261	0.235	-
Vanadium	20	-	-	ug/L	1.76	1.52	-
Zinc	3000	-	-	ug/L	2.1	2.1	-
Zirconium	-	-	-	ug/L	0.61	0.53	-
Cesium	-	-	-	ug/L	< 0.01	< 0.01	-
Rubidium	-	-	-	ug/L	0.56	0.74	-
Tungsten	3	-	-	ug/L	< 0.1	< 0.1	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	< 250	< 250	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	< 250	< 250	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	< 250	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	< 100	< 100	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	< 0.5	< 0.5	-
Ethylbenzene	140	-	200	ug/L	< 0.5	< 0.5	-
Styrene	800	-	72	ug/L	< 0.5	< 0.5	-
Toluene	60	-	0.5	ug/L	**53.1**	**34.6**	-
Xylenes, Total	90	-	-	ug/L	< 0.75	< 0.75	-
o-Xylene	-	-	-	ug/L	< 0.5	< 0.5	-
m,p-Xylenes	-	-	-	ug/L	< 0.5	< 0.5	-
Methyl tert-Butyl Ether	95	-	-	ug/L	< 0.5	< 0.5	-

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Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

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Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-2	SGW-2	SGW-2
					Laboratory ID: WG_E309747_44	WG_E309747_44	WG_E309747_44
					Sample Date: 2020-10-22	2020-11-12	2020-12-16
					QA/QC:		
Anions + Nutrients							
Alkalinity, Total as CaCO3	-	-	20000	ug/L	**226000**	-	-
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-
Bromide (Br)	-	-	-	ug/L	155	-	-
Chloride (Cl)	250000	600000	150000	ug/L	23700	-	-
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	0.082	-	-
Nitrate (as N)	10000	32800	3000	ug/L	22.1	-	-
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	1.7	-	-
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	616	-	-
Total Kjeldahl Nitrogen	-	-	-	ug/L	8960	-	-
Sulfate (SO4)	500000	-	429000 (H)	ug/L	< 300	-	-
Phosphorus, dissolved	-	-	-	ug/L	128	-	-
Phosphorus, total	-	-	-	ug/L	-	-	-
Field + Physical							
Dissolved Oxygen, field measured	-	5	8	mg/L	4	-	-
Conductivity, field measured	-	-	-	uS/cm	336.6	913	Frozen
Oxidation Reduction Potential, field measured	-	-	-	mV	172.8	-	-
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	6.77	-	-
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	7.46	-	-
Temperature, field measured	-	-	-	deg c	5.3	6.5	-
Conductivity	-	-	-	uS/cm	489	-	-
Total Organic Carbon	-	-	-	mg/L	119	-	-
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	259	-	-
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	196	-	-
Depth to Water	-	-	-	mbtoc	1.05	1.04	-
Metals, Dissolved							
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	**50.1**	-	-
Antimony	6	-	-	ug/L	0.12	-	-
Arsenic	10	-	-	ug/L	7.55	-	-
Barium	1000	-	-	ug/L	72.9	-	-
Beryllium	8	-	-	ug/L	< 0.1	-	-
Bismuth	-	-	-	ug/L	< 0.05	-	-
Boron	5000	-	-	ug/L	193	-	-
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	< 0.005	-	-
Calcium	-	-	-	ug/L	72100	-	-
Chromium	50	-	-	ug/L	0.32	-	-
Cobalt	1	-	-	ug/L	**2.42**	-	-
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	**3.35**	-	-
Iron	6500	350	-	ug/L	**8700**	-	-
Lead	10	-	-	ug/L	0.101	-	-
Lithium	8	-	-	ug/L	< 1	-	-
Magnesium	-	-	-	ug/L	19100	-	-
Manganese	1500	-	-	ug/L	**2380**	-	-
Mercury	1	-	-	ug/L	< 0.005	-	-
Molybdenum	250	-	-	ug/L	0.156	-	-
Nickel	80	-	-	ug/L	2.4	-	-
Potassium	-	-	-	ug/L	4350	-	-
Selenium	10	-	-	ug/L	0.168	-	-
Silicon	-	-	-	ug/L	5680	-	-
Silver	20	-	-	ug/L	< 0.01	-	-
Sodium	200000	-	-	ug/L	29000	-	-
Strontium	2500	-	-	ug/L	494	-	-
Sulphur (S)	-	-	-	ug/L	< 500	-	-
Tellurium	-	-	-	ug/L	< 0.2	-	-
Thallium	-	-	-	ug/L	< 0.01	-	-
Thorium-232	-	-	-	ug/L	< 0.1	-	-
Tin	2500	-	-	ug/L	< 0.1	-	-
Titanium	-	-	-	ug/L	1.85	-	-
Uranium	20	-	-	ug/L	0.152	-	-
Vanadium	20	-	-	ug/L	1.09	-	-
Zinc	3000	-	-	ug/L	5.2	-	-
Zirconium	-	-	-	ug/L	0.43	-	-
Cesium	-	-	-	ug/L	< 0.01	-	-
Rubidium	-	-	-	ug/L	0.95	-	-
Tungsten	3	-	-	ug/L	< 0.1	-	-
Metals, Total							
Aluminum	-	-	-	ug/L	-	-	-
Antimony	-	-	9	ug/L	-	-	-
Arsenic	-	5	-	ug/L	-	-	-
Barium	-	-	1000	ug/L	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-
Bismuth	-	-	-	ug/L	-	-	-
Boron	-	-	1200	ug/L	-	-	-
Cadmium	-	-	-	ug/L	-	-	-
Calcium	-	-	-	ug/L	-	-	-
Chromium	-	-	-	ug/L	-	-	-
Cobalt	-	110	4	ug/L	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-
Iron	-	1000	-	ug/L	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-
Lithium	-	-	-	ug/L	-	-	-
Magnesium	-	-	-	ug/L	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-
Potassium	-	-	-	ug/L	-	-	-
Selenium	-	-	2	ug/L	-	-	-
Silicon	-	-	-	ug/L	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-
Sodium	-	-	-	ug/L	-	-	-
Strontium	-	-	-	ug/L	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-
Tellurium	-	-	-	ug/L	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-
Tin	-	-	-	ug/L	-	-	-
Titanium	-	-	-	ug/L	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-
Vanadium	-	-	-	ug/L	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-
Zirconium	-	-	-	ug/L	-	-	-
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	< 250	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	< 250	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	< 100	-	-
VOCs + BTEX							
Benzene	5	-	40	ug/L	< 0.5	-	-
Ethylbenzene	140	-	200	ug/L	< 0.5	-	-
Styrene	800	-	72	ug/L	< 0.5	-	-
Toluene	60	-	0.5	ug/L	**26.2**	-	-
Xylenes, Total	90	-	-	ug/L	< 0.75	-	-
o-Xylene	-	-	-	ug/L	< 0.5	-	-
m,p-Xylenes	-	-	-	ug/L	< 0.5	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L	< 0.5	-	-

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

				Sample Name	SGW-2	SGW-2	SGW-2	SGW-2
				Laboratory ID	WG_E309747_44	WG_E309747_44	WG_E309747_44	VA21C4148-002
				Sample Date	2021-01-20	2021-04-21	2021-07-16	2021-10-26
				QA/QC				
Parameter	**CSR DW**	**WQG AW-F STA**	**WQG AW-F LTC**	**Unit**				
Anions + Nutrients								
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	-	-	**209000**
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L	-	-	-	-
Bromide (Br)	-	-	-	ug/L	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	-	-	-	67300
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L	-	-	-	0.063
Nitrate (as N)	10000	32800	3000	ug/L	-	-	-	< 5
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L	-	-	-	< 1
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L	-	-	-	9.3
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	1350
Sulfate (SO4)	500000	-	429000 (H)	ug/L	-	-	-	1920
Phosphorus, dissolved	-	-	-	ug/L	-	-	-	<50
Phosphorus, total	-	-	-	ug/L	-	-	-	-
Field + Physical								
Dissolved Oxygen, field measured	-	5	8	mg/L	-	1.1	-	1.1
Conductivity, field measured	-	-	-	uS/cm	501	602	1452	460.4
Oxidation Reduction Potential, field measured	-	-	-	mV	-	44.7	-	228.4
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	6.72	-	6.71
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	7.69
Temperature, field measured	-	-	-	deg c	2.7	6.2	9.6	6.2
Conductivity	-	-	-	uS/cm	-	-	-	603
Total Organic Carbon	-	-	-	mg/L	-	-	-	29.1
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-	208
Biochemical Oxygen Demand	-	-	-	mg/L	-	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L	-	-	-	48
Depth to Water	-	-	-	mbtoc	1.93	1.91	1.08	1.07
Metals, Dissolved								
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L	-	-	-	**50.5**
Antimony	6	-	-	ug/L	-	-	-	0.1
Arsenic	10	-	-	ug/L	-	-	-	3.44
Barium	1000	-	-	ug/L	-	-	-	52.8
Beryllium	8	-	-	ug/L	-	-	-	< 0.1
Bismuth	-	-	-	ug/L	-	-	-	< 0.05
Boron	5000	-	-	ug/L	-	-	-	258
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L	-	-	-	0.0136
Calcium	-	-	-	ug/L	-	-	-	58200
Chromium	50	-	-	ug/L	-	-	-	< 0.5
Cobalt	1	-	-	ug/L	-	-	-	**1.49**
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L	-	-	-	**0.57**
Iron	6500	350	-	ug/L	-	-	-	1820
Lead	10	-	-	ug/L	-	-	-	< 0.05
Lithium	8	-	-	ug/L	-	-	-	< 1
Magnesium	-	-	-	ug/L	-	-	-	15100
Manganese	1500	-	-	ug/L	-	-	-	1020
Mercury	1	-	-	ug/L	-	-	-	< 0.005
Molybdenum	250	-	-	ug/L	-	-	-	0.146
Nickel	80	-	-	ug/L	-	-	-	3.16
Potassium	-	-	-	ug/L	-	-	-	3500
Selenium	10	-	-	ug/L	-	-	-	0.111
Silicon	-	-	-	ug/L	-	-	-	4920
Silver	20	-	-	ug/L	-	-	-	< 0.01
Sodium	200000	-	-	ug/L	-	-	-	41100
Strontium	2500	-	-	ug/L	-	-	-	362
Sulphur (S)	-	-	-	ug/L	-	-	-	750
Tellurium	-	-	-	ug/L	-	-	-	< 0.2
Thallium	-	-	-	ug/L	-	-	-	< 0.01
Thorium-232	-	-	-	ug/L	-	-	-	< 0.1
Tin	2500	-	-	ug/L	-	-	-	< 0.1
Titanium	-	-	-	ug/L	-	-	-	1.47
Uranium	20	-	-	ug/L	-	-	-	0.084
Vanadium	20	-	-	ug/L	-	-	-	< 0.5
Zinc	3000	-	-	ug/L	-	-	-	2.3
Zirconium	-	-	-	ug/L	-	-	-	0.26
Cesium	-	-	-	ug/L	-	-	-	< 0.01
Rubidium	-	-	-	ug/L	-	-	-	0.78
Tungsten	3	-	-	ug/L	-	-	-	< 0.1
Metals, Total								
Aluminum	-	-	-	ug/L	-	-	-	-
Antimony	-	-	9	ug/L	-	-	-	-
Arsenic	-	5	-	ug/L	-	-	-	-
Barium	-	-	1000	ug/L	-	-	-	-
Beryllium	-	-	0.13	ug/L	-	-	-	-
Bismuth	-	-	-	ug/L	-	-	-	-
Boron	-	-	1200	ug/L	-	-	-	-
Cadmium	-	-	-	ug/L	-	-	-	-
Calcium	-	-	-	ug/L	-	-	-	-
Chromium	-	-	-	ug/L	-	-	-	-
Cobalt	-	110	4	ug/L	-	-	-	-
Copper	-	30 - 40(H)	10 (H)	ug/L	-	-	-	-
Iron	-	1000	-	ug/L	-	-	-	-
Lead	-	335 - 417(H)	16 - 20(H)	ug/L	-	-	-	-
Lithium	-	-	-	ug/L	-	-	-	-
Magnesium	-	-	-	ug/L	-	-	-	-
Manganese	-	3,394(H)	1,938 - 2,585(H)	ug/L	-	-	-	-
Mercury	-	-	0.01	ug/L	-	-	-	-
Molybdenum	-	46000	7600	ug/L	-	-	-	-
Nickel	-	-	150 (H)	ug/L	-	-	-	-
Potassium	-	-	-	ug/L	-	-	-	-
Selenium	-	-	2	ug/L	-	-	-	-
Silicon	-	-	-	ug/L	-	-	-	-
Silver	-	3.0(H)	1.5 (H)	ug/L	-	-	-	-
Sodium	-	-	-	ug/L	-	-	-	-
Strontium	-	-	-	ug/L	-	-	-	-
Sulphur (S)	-	-	-	ug/L	-	-	-	-
Tellurium	-	-	-	ug/L	-	-	-	-
Thallium	-	-	0.8	ug/L	-	-	-	-
Thorium-232	-	-	-	ug/L	-	-	-	-
Tin	-	-	-	ug/L	-	-	-	-
Titanium	-	-	-	ug/L	-	-	-	-
Uranium	-	-	8.5	ug/L	-	-	-	-
Vanadium	-	-	-	ug/L	-	-	-	-
Zinc	-	193 - 341 (H)	167 - 188 (H)	ug/L	-	-	-	-
Zirconium	-	-	-	ug/L	-	-	-	-
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-	< 250
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-	< 100
VOCs + BTEX								
Benzene	5	-	40	ug/L	-	-	-	< 0.5
Ethylbenzene	140	-	200	ug/L	-	-	-	< 0.5
Styrene	800	-	72	ug/L	-	-	-	< 0.5
Toluene	60	-	0.5	ug/L	-	-	-	**1.71**
Xylenes, Total	90	-	-	ug/L	-	-	-	< 0.5
o-Xylene	-	-	-	ug/L	-	-	-	< 0.3
m,p-Xylenes	-	-	-	ug/L	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-	< 0.5

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.

BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)

Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent

QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3	SGW-3
					Laboratory ID	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_42	WG_E309748_43	WG_E309748_43	WG_E309748_43	WG_E309748_43	WG_E309748_43	WG_E309748_43
					Sample Date	900 N	923 N	929 N	936 N	943 N	948 N	956 N	963 N	013 N	250 N	291 N	571 N	689 N	790 N
					QA/QC	2017-06-14	2017-07-07	2017-07-13	2017-07-20	2017-07-27	2017-08-01	2017-08-09	2017-08-16	2017-10-05	2018-05-30	2018-07-10	2019-04-16	2019-08-12	2019-11-21
Anions + Nutrients																			
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**160000**	**340000**	**340000**	**290000**	**460000**	**260000**	**600000**	**690000**	-	**215000**	**428000**	**606000**	**752000**	733000
Alkalinity, Phenolphthalein as CaCO3	-	-	-	ug/L		-	-	-	-	-	-	-	-	150000	-	-	-	-	-
Bromide (Br)	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	-	320	270
Chloride (Cl)	250000	600000	150000	ug/L		19200	12000	10500	12000	14200	10100	17600	17800	7500	4660	7600	9400	12400	9800
Fluoride (F)	1.5	1.8 - 2.3(H)	-	mg/L		-	-	-	-	-	-	-	-	-	-	-	0.12	0.19	0.14
Nitrate (as N)	10000	32800	3000	ug/L		< 10	< 10	47	46	49	14	10	13	210	< 5	< 25	< 25	46	< 25
Nitrite (as N)	1000	60(Cl)	20(Cl)	ug/L		< 10	30	< 10	< 10	< 10	< 10	< 10	10	< 10	< 1	< 5	< 5	< 5	< 5
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		< 10	20.7	46.8	46	48.8	13.6	10.5	23	209	< 6	< 300	-	-	-
Ammonia (as N)	-	22000-26000 (pH, T)	1800-2000 (pH, T)	ug/L		110	2180	1740	870	2040	1090	2390	2500	470	1200	3070	606	1450	1280
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	-	-	3050
Sulfate (SO4)	500000	-	429000 (H)	ug/L		< 1000	3000	< 1000	3300	< 1000	< 1000	< 1000	< 1000	1100	< 300	< 1500	< 1500	< 1500	< 1500
Phosphorus, dissolved	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	<250	<250	58
Field + Physical																			
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	-	-	-	-	-	-	-	-	-	2.1	3	1.9
Conductivity, field measured	-	-	-	uS/cm		-	-	-	-	-	-	-	-	-	540	663	1126	919	804
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-	-	-	-	-	-	-	-	-	329.1	146.2	125
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-	-	-	-	-	-	-	-	6.63	6.53	6.58
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH		7	6.6	7	7.1	6.6	6.9	6.7	6.6	6.6	-	-	-	7.38	7.67
Temperature, field measured	-	-	-	deg c		-	-	-	-	-	-	-	-	-	7.2	8.5	2.9	11.2	4.2
Conductivity	-	-	-	uS/cm		352	643	613	586	830	505	1060	1240	294	-	-	-	736	1120
Total Organic Carbon	-	-	-	mg/L		46.3	49.6	100	75	75.5	51	136	94	56	249	88.1	24.7	26.7	36.9
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		159	410	443	477	531	309	710	630	329	175	339	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-	-	-	-	-	-	-	-	-	623	-	673
Biochemical Oxygen Demand	-	-	-	mg/L		15	96	84	79	92	35	110	94	< 20	-	-	-	-	-
Chemical Oxygen Demand	-	-	-	mg/L		128	465	266	509	427	288	528	249	350	854	300	120	129	135
Depth to Water	-	-	-	mbtoc		-	-	-	-	-	-	-	-	-	1.2	1.4	1.11	1.58	1.07
Metals, Dissolved																			
Aluminum	9500	74 - 100(H)	40 - 50(H)	ug/L		-	-	-	-	-	-	-	-	-	-	-	**58.8**	20.8	26.9
Antimony	6	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	< 0.1
Arsenic	10	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	2.11	9.13	8.55
Barium	1000	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	129	190	148
Beryllium	8	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	< 0.1
Bismuth	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.25	< 0.25	< 0.05
Boron	5000	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 50	< 50	14
Cadmium	5	1.8 - 2.8(H)	0.46(H)	ug/L		-	-	-	-	-	-	-	-	-	-	-	0.041	0.034	0.205
Calcium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	154000	184000	172000
Chromium	50	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	0.16
Cobalt	1	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	**10.1**	**9.04**	**9.83**
Copper	1500	0.2 (H, pH, T)	0.2 (H, pH, T)	ug/L		-	-	-	-	-	-	-	-	-	-	-	***< 1***	***< 1***	**0.64**
Iron	6500	350	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	**124000**	**24900**	**74200**
Lead	10	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.25	< 0.25	< 0.05
Lithium	8	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 5	< 5	< 1
Magnesium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	57900	66900	59300
Manganese	1500	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	**14500**	**15600**	**13500**
Mercury	1	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.005	< 0.005	< 0.005
Molybdenum	250	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	1.53	1.12	1.15
Nickel	80	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	11.2	6.2	9.77
Potassium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	2080	1950	2380
Selenium	10	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.25	< 0.25	0.163
Silicon	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	6750	10100	8650
Silver	20	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05	< 0.01
Sodium	200000	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	14500	18800	14400
Strontium	2500	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	953	1090	1010
Sulphur (S)	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 2500	< 2500	< 500
Tellurium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 1	< 1	< 0.2
Thallium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05	< 0.01
Thorium-232	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	< 0.1
Tin	2500	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	0.3
Titanium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 1.5	< 1.5	1.14
Uranium	20	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	0.374	1.43	0.765
Vanadium	20	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 2.5	< 2.5	0.83
Zinc	3000	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 5	< 5	4.3
Zirconium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.3	< 1	0.33
Cesium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.05	< 0.05	< 0.01
Rubidium	-	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 1	< 1	0.68
Tungsten	3	-	-	ug/L		-	-	-	-	-	-	-	-	-	-	-	< 0.5	< 0.5	< 0.1

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)
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< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard/ WQG **744**
Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-4
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-4	SGW-4	SGW-4	SGW-4	SGW-4	SGW-4
					Laboratory ID	WG_E309749_43	WG_E309749_43	WG_E309749_43	WG_E309749_43	WG_E309749_43	WG_E309749_43
					Sample Date	2018-07-10	2018-09-11	2019-04-16	2019-08-12	2019-11-21	2020-03-30
					QA/QC						
Anions + Nutrients											
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**454000**	**547000**	-	-	-	**351000**
Bromide (Br)	-	-	-	ug/L		-	-	-	< 250	< 250	-
Chloride (Cl)	250000	600000	150000	ug/L		-	-	14300	8700	6300	3520
Fluoride (F)	1.5	1.7 - 2.1 (H)	-	mg/L		-	-	< 0.1	< 0.1	< 0.1	0.045
Nitrate (as N)	10000	32800	3000	ug/L		< 25	< 25	< 25	< 25	49	1.1
Nitrite (as N)	1000	60-600 (Cl)	20-200 (Cl)	ug/L		< 5	< 5	< 5	< 5	< 5	< 5
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		< 30	< 30	-	-	-	-
Ammonia (as N)	-	16000-22000 (pH, T)	1800-2000 (pH, T)	ug/L		29.8	68.9	78	69.8	70.7	46.5
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-	-	2770	2220
Sulfate (SO4)	500000	-	429000 (H)	ug/L		-	-	8200	4400	8000	3300
Phosphorus, dissolved	-	-	-	ug/L		<50	<50	<50	<50	<50	<50
Field + Physical											
Dissolved Oxygen, field measured	-	5	8	mg/L		-	-	**0.9**	**1.6**	**4.1**	**2.7**
Conductivity, field measured	-	-	-	uS/cm		-	-	421	644	291	338.1
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	144.8	239.4	145	-49.4
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	7.15	6.91	7.25	7.41
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-	-	8.23
Temperature, field measured	-	-	-	deg c		-	-	2.5	10.9	2.9	2.3
Conductivity	-	-	-	uS/cm		-	-	-	-	-	543
Total Organic Carbon	-	-	-	mg/L		10.6	9.04	12.6	10.5	19.2	23.9
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		494	656	454	506	426	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-	-	-	276
Chemical Oxygen Demand	-	-	-	mg/L		-	-	85	72	35	92
Depth to Water	-	-	-	mbtoc		-	-	0.93	2.01	0.91	0.77
Metals, Dissolved											
Aluminum	9500	100(pH)	50(pH)	ug/L		**57.1**	**278**	5.1	4	8.1	5.3
Antimony	6	-	-	ug/L		0.11	0.12	< 0.1	< 0.1	< 0.1	< 0.1
Arsenic	10	-	-	ug/L		3.51	9.94	1	2	0.53	0.66
Barium	1000	-	-	ug/L		99.7	169	103	132	104	65.2
Beryllium	8	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	-	-	-	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	5000	-	-	ug/L		17	24	17	20	15	< 10
Cadmium	5	1.7 - 2.8(H)	0.45 - 0.46(H)	ug/L		0.0304	0.0538	0.0313	0.0172	0.0781	0.0491
Calcium	-	-	-	ug/L		110000	148000	100000	109000	102000	59800
Chromium	50	-	-	ug/L		< 0.1	0.23	< 0.1	< 0.1	< 0.1	< 0.1
Cobalt	1	-	-	ug/L		**8.42**	**9.34**	**7.72**	**5.96**	**1.07**	**6.44**
Copper	1500	0.2 (pH, H, T)	0.2 (pH, H, T)	ug/L		**7.2**	**2.12**	**1.15**	**0.53**	**2.1**	**1**
Iron	6500	350	-	ug/L		159	**2810**	**1760**	239	30	**4590**
Lead	10	-	-	ug/L		0.399	0.705	< 0.05	< 0.05	< 0.05	< 0.05
Lithium	8	-	-	ug/L		2.2	2.9	2	2.4	2.1	1.7
Magnesium	-	-	-	ug/L		53500	69700	49400	57100	41700	30600
Manganese	1500	-	-	ug/L		**1700**	**3020**	1300	**1760**	798	1220
Mercury	1	-	-	ug/L		0.0162	0.0133	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum	250	-	-	ug/L		4.47	4.11	1.44	2.4	1.45	1.36
Nickel	80	-	-	ug/L		3.77	4.52	3.34	3.17	2.59	3.14
Potassium	-	-	-	ug/L		2690	3220	2300	2950	2410	1730
Selenium	10	-	-	ug/L		0.053	0.069	0.055	< 0.05	0.071	0.073
Silicon	-	-	-	ug/L		5360	6930	4630	6390	5770	3510
Silver	20	-	-	ug/L		< 0.01	0.019	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	200000	-	-	ug/L		13700	16500	10900	12300	8240	5380
Strontium	2500	-	-	ug/L		1120	1550	1070	1190	1010	620
Sulphur (S)	-	-	-	ug/L		6960	3340	3410	1760	2950	1220
Tellurium	-	-	-	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	-	-	-	ug/L		< 0.01	< 0.01	< 0.01	0.01	0.011	< 0.01
Thorium-232	-	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	2500	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	-	-	-	ug/L		1.42	< 6	< 0.3	< 0.3	0.6	< 0.3
Uranium	20	-	-	ug/L		0.984	1.2	0.539	0.867	0.761	0.362
Vanadium	20	-	-	ug/L		< 0.5	0.92	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	3000	-	-	ug/L		6.3	2.7	2.2	< 1	1.1	< 1
Zirconium	-	-	-	ug/L		< 0.06	0.221	< 0.06	< 0.2	< 0.2	< 0.2
Cesium	-	-	-	ug/L		0.011	0.039	< 0.01	< 0.01	< 0.01	< 0.01
Rubidium	-	-	-	ug/L		0.4	0.48	0.34	0.44	0.28	0.21
Tungsten	3	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hydrocarbons											
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-	-	-	-
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-	-	-	-
Volatile Petroleum Hydrocarbons	-	-	-	ug/L		-	-	-	-	-	-
VOCs + BTEX											
Benzene	5	-	40	ug/L		-	-	-	-	-	-
Ethylbenzene	140	-	200	ug/L		-	-	-	-	-	-
Styrene	800	-	72	ug/L		-	-	-	-	-	-
Toluene	60	-	0.5	ug/L		-	-	-	-	-	-
Xylenes, Total	90	-	-	ug/L		-	-	-	-	-	-
o-Xylene	-	-	-	ug/L		-	-	-	-	-	-
m,p-Xylenes	-	-	-	ug/L		-	-	-	-	-	-
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-	-	-	-
BTEX+Styrene, Total	-	-	-	ug/L		-	-	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022
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Result exceeds applicable CSR standard/ WQG **744**
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Appendix C
Results of Groundwater Analyses - SGW-4
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-4	SGW-4	SGW-4	SGW-4	SGW-4	SGW-4
					Laboratory ID	WG_E309749_43	WG_E309749_44	WG_E309749_44	WG_E309749_44	WG_E309749_44	WG_E309749_44
					Sample Date	2020-05-11	2020-06-22	2020-08-26	2020-09-09	2020-10-22	2020-11-13
					QA/QC						
Anions + Nutrients											
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	**305000**	**403000**	-	**251000**	-	
Bromide (Br)	-	-	-	ug/L	-	< 50	< 250	-	< 50	-	
Chloride (Cl)	250000	600000	150000	ug/L	-	2360	3490	-	1070	-	
Fluoride (F)	1.5	1.7 - 2.1 (H)	-	mg/L	-	0.067	< 0.1	-	0.062	-	
Nitrate (as N)	10000	32800	3000	ug/L	-	< 1	< 25	-	6.2	-	
Nitrite (as N)	1000	60-600 (Cl)	20-200 (Cl)	ug/L	-	< 5	< 5	-	< 1	-	
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-	-	-	-	
Ammonia (as N)	-	16000-22000 (pH, T)	1800-2000 (pH, T)	ug/L	-	53.9	59.4	-	35.2	-	
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	404	412	-	758	-	
Sulfate (SO4)	500000	-	429000 (H)	ug/L	-	2480	2670	-	1030	-	
Phosphorus, dissolved	-	-	-	ug/L	-	<50	<50	-	<50	-	
Field + Physical											
Dissolved Oxygen, field measured	-	5	8	mg/L	-	**4.4**	**3**	-	**1.5**	-	
Conductivity, field measured	-	-	-	uS/cm	293	376.1	716	445	311	702	
Oxidation Reduction Potential, field measured	-	-	-	mV	-	156.5	239.9	-	227.4	-	
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	6.98	6.99	-	7.26	-	
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	7.55	7.74	-	8.02	-	
Temperature, field measured	-	-	-	deg c	9.1	11.8	7.2	10.4	7.8	7.3	
Conductivity	-	-	-	uS/cm	-	515	701	-	475	-	
Total Organic Carbon	-	-	-	mg/L	-	11.7	11.6	-	20.6	-	
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-	-	-	-	
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	319	371	-	318	-	
Chemical Oxygen Demand	-	-	-	mg/L	-	76	30	-	76	-	
Depth to Water	-	-	-	mbtoc	0.9	1.04	0.82	0.74	0.92	0.87	
Metals, Dissolved											
Aluminum	9500	100(pH)	50(pH)	ug/L	-	4.1	6.5	-	16.9	-	
Antimony	6	-	-	ug/L	-	< 0.1	< 0.1	-	0.1	-	
Arsenic	10	-	-	ug/L	-	0.86	0.98	-	1.63	-	
Barium	1000	-	-	ug/L	-	74	91.7	-	77.7	-	
Beryllium	8	-	-	ug/L	-	< 0.1	< 0.1	-	< 0.1	-	
Bismuth	-	-	-	ug/L	-	< 0.05	< 0.05	-	< 0.05	-	
Boron	5000	-	-	ug/L	-	12	17	-	16	-	
Cadmium	5	1.7 - 2.8(H)	0.45 - 0.46(H)	ug/L	-	0.0233	0.0353	-	0.0287	-	
Calcium	-	-	-	ug/L	-	72700	87400	-	73500	-	
Chromium	50	-	-	ug/L	-	< 0.1	< 0.1	-	< 0.1	-	
Cobalt	1	-	-	ug/L	-	**6.1**	**5.03**	-	**5.7**	-	
Copper	1500	0.2 (pH, H, T)	0.2 (pH, H, T)	ug/L	-	**3.04**	**0.92**	-	**2.9**	-	
Iron	6500	350	-	ug/L	-	**3880**	**2740**	-	136	-	
Lead	10	-	-	ug/L	-	0.079	< 0.05	-	0.054	-	
Lithium	8	-	-	ug/L	-	1.5	2	-	1.7	-	
Magnesium	-	-	-	ug/L	-	33300	37100	-	32500	-	
Manganese	1500	-	-	ug/L	-	1350	1480	-	1400	-	
Mercury	1	-	-	ug/L	-	< 0.005	< 0.005	-	< 0.005	-	
Molybdenum	250	-	-	ug/L	-	2.02	2.4	-	3.1	-	
Nickel	80	-	-	ug/L	-	2.73	2.98	-	3.88	-	
Potassium	-	-	-	ug/L	-	1970	2160	-	2240	-	
Selenium	10	-	-	ug/L	-	0.112	0.057	-	0.081	-	
Silicon	-	-	-	ug/L	-	3880	4980	-	4720	-	
Silver	20	-	-	ug/L	-	< 0.01	< 0.01	-	< 0.01	-	
Sodium	200000	-	-	ug/L	-	6740	7400	-	6970	-	
Strontium	2500	-	-	ug/L	-	736	844	-	792	-	
Sulphur (S)	-	-	-	ug/L	-	620	790	-	560	-	
Tellurium	-	-	-	ug/L	-	< 0.2	< 0.2	-	< 0.2	-	
Thallium	-	-	-	ug/L	-	< 0.01	< 0.01	-	< 0.01	-	
Thorium-232	-	-	-	ug/L	-	< 0.1	< 0.1	-	< 0.1	-	
Tin	2500	-	-	ug/L	-	< 0.1	0.21	-	< 0.1	-	
Titanium	-	-	-	ug/L	-	< 0.3	< 0.3	-	0.44	-	
Uranium	20	-	-	ug/L	-	0.498	0.65	-	0.542	-	
Vanadium	20	-	-	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
Zinc	3000	-	-	ug/L	-	2.4	1.3	-	3.9	-	
Zirconium	-	-	-	ug/L	-	< 0.2	< 0.2	-	< 0.2	-	
Cesium	-	-	-	ug/L	-	< 0.01	< 0.01	-	< 0.01	-	
Rubidium	-	-	-	ug/L	-	0.28	0.32	-	0.3	-	
Tungsten	3	-	-	ug/L	-	< 0.1	< 0.1	-	< 0.1	-	
Hydrocarbons											
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	< 250	< 250	-	< 250	-	
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	< 250	< 250	-	< 250	-	
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	< 250	-	-	-	-	
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	< 100	< 100	-	< 100	-	
Volatile Petroleum Hydrocarbons	-	-	-	ug/L	-	< 100	< 100	-	< 100	-	
VOCs + BTEX											
Benzene	5	-	40	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
Ethylbenzene	140	-	200	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
Styrene	800	-	72	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
Toluene	60	-	0.5	ug/L	-	< 0.5	< 0.5	-	**4.65**	-	
Xylenes, Total	90	-	-	ug/L	-	< 0.75	< 0.75	-	< 0.75	-	
o-Xylene	-	-	-	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
m,p-Xylenes	-	-	-	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
Methyl tert-Butyl Ether	95	-	-	ug/L	-	< 0.5	< 0.5	-	< 0.5	-	
BTEX+Styrene, Total	-	-	-	ug/L	-	< 1.5	-	-	-	-	

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG **744**

Detection limit exceeds applicable CSR standard/ WQG ***< 2***

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Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name: SGW-4	SGW-4	SGW-4	SGW-4	SGW-4
					Laboratory ID: WG_E309749_44	WG_E309749_44	WG_E309749_44	WG_E309749_44	VA21C4148-003
					Sample Date: 2020-12-16	2021-01-20	2021-04-22	2021-07-16	2021-10-26
					QA/QC:				
Anions + Nutrients									
Alkalinity, Total as CaCO3	-	-	20000	ug/L	-	-	-	-	**546000**
Bromide (Br)	-	-	-	ug/L	-	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L	-	-	-	-	7440
Fluoride (F)	1.5	1.7 - 2.1 (H)	-	mg/L	-	-	-	-	< 0.1
Nitrate (as N)	10000	32800	3000	ug/L	-	-	-	-	< 25
Nitrite (as N)	1000	60-600 (Cl)	20-200 (Cl)	ug/L	-	-	-	-	< 5
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L	-	-	-	-	-
Ammonia (as N)	-	16000-22000 (pH, T)	1800-2000 (pH, T)	ug/L	-	-	-	-	42.6
Total Kjeldahl Nitrogen	-	-	-	ug/L	-	-	-	-	760
Sulfate (SO4)	500000	-	429000 (H)	ug/L	-	-	-	-	5260
Phosphorus, dissolved	-	-	-	ug/L	-	-	-	-	<50
Field + Physical									
Dissolved Oxygen, field measured	-	5	8	mg/L	-	-	-	-	**1.7**
Conductivity, field measured	-	-	-	uS/cm	636	501	559	805	444
Oxidation Reduction Potential, field measured	-	-	-	mV	-	-	-	-	242.2
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-	7.25
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units	-	-	-	-	7.34
Temperature, field measured	-	-	-	deg c	3.8	2.7	4.7	8.6	8.1
Conductivity	-	-	-	uS/cm	-	-	-	-	951
Total Organic Carbon	-	-	-	mg/L	-	-	-	-	14.9
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L	-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L	-	-	-	-	464
Chemical Oxygen Demand	-	-	-	mg/L	-	-	-	-	27
Depth to Water	-	-	-	mbtoc	0.99	0.84	0.98	1.79	1.05
Metals, Dissolved									
Aluminum	9500	100(pH)	50(pH)	ug/L	-	-	-	-	32.2
Antimony	6	-	-	ug/L	-	-	-	-	0.15
Arsenic	10	-	-	ug/L	-	-	-	-	1.8
Barium	1000	-	-	ug/L	-	-	-	-	134
Beryllium	8	-	-	ug/L	-	-	-	-	< 0.1
Bismuth	-	-	-	ug/L	-	-	-	-	< 0.05
Boron	5000	-	-	ug/L	-	-	-	-	17
Cadmium	5	1.7 - 2.8(H)	0.45 - 0.46(H)	ug/L	-	-	-	-	0.092
Calcium	-	-	-	ug/L	-	-	-	-	113000
Chromium	50	-	-	ug/L	-	-	-	-	< 0.5
Cobalt	1	-	-	ug/L	-	-	-	-	**3.44**
Copper	1500	0.2 (pH, H, T)	0.2 (pH, H, T)	ug/L	-	-	-	-	**4.75**
Iron	6500	350	-	ug/L	-	-	-	-	302
Lead	10	-	-	ug/L	-	-	-	-	0.061
Lithium	8	-	-	ug/L	-	-	-	-	2
Magnesium	-	-	-	ug/L	-	-	-	-	44300
Manganese	1500	-	-	ug/L	-	-	-	-	**2310**
Mercury	1	-	-	ug/L	-	-	-	-	< 0.005
Molybdenum	250	-	-	ug/L	-	-	-	-	2.04
Nickel	80	-	-	ug/L	-	-	-	-	4.01
Potassium	-	-	-	ug/L	-	-	-	-	2300
Selenium	10	-	-	ug/L	-	-	-	-	0.076
Silicon	-	-	-	ug/L	-	-	-	-	6020
Silver	20	-	-	ug/L	-	-	-	-	< 0.01
Sodium	200000	-	-	ug/L	-	-	-	-	9300
Strontium	2500	-	-	ug/L	-	-	-	-	1090
Sulphur (S)	-	-	-	ug/L	-	-	-	-	2500
Tellurium	-	-	-	ug/L	-	-	-	-	< 0.2
Thallium	-	-	-	ug/L	-	-	-	-	< 0.01
Thorium-232	-	-	-	ug/L	-	-	-	-	< 0.1
Tin	2500	-	-	ug/L	-	-	-	-	< 0.1
Titanium	-	-	-	ug/L	-	-	-	-	1.05
Uranium	20	-	-	ug/L	-	-	-	-	1.09
Vanadium	20	-	-	ug/L	-	-	-	-	< 0.5
Zinc	3000	-	-	ug/L	-	-	-	-	2.4
Zirconium	-	-	-	ug/L	-	-	-	-	< 0.2
Cesium	-	-	-	ug/L	-	-	-	-	< 0.01
Rubidium	-	-	-	ug/L	-	-	-	-	0.31
Tungsten	3	-	-	ug/L	-	-	-	-	< 0.1
Hydrocarbons									
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L	-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L	-	-	-	-	< 250
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L	-	-	-	-	< 100
Volatile Petroleum Hydrocarbons	-	-	-	ug/L	-	-	-	-	< 100
VOCs + BTEX									
Benzene	5	-	40	ug/L	-	-	-	-	< 0.5
Ethylbenzene	140	-	200	ug/L	-	-	-	-	< 0.5
Styrene	800	-	72	ug/L	-	-	-	-	< 0.5
Toluene	60	-	0.5	ug/L	-	-	-	-	< 0.5
Xylenes, Total	90	-	-	ug/L	-	-	-	-	< 0.5
o-Xylene	-	-	-	ug/L	-	-	-	-	< 0.3
m,p-Xylenes	-	-	-	ug/L	-	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	-	-	ug/L	-	-	-	-	< 0.5
BTEX+Styrene, Total	-	-	-	ug/L	-	-	-	-	-

Table Notes:
Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)
Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.
Result exceeds applicable CSR standard/ WQG **744**
Detection limit exceeds applicable CSR standard/ WQG ***< 2***

Appendix C
Results of Groundwater Analyses - SGW-5
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5
					Laboratory ID	WG_E309750_43	WG_E309750_43	WG_E309750_43	WG_E309750_43	WG_E309750_43	WG_E309750_43	WG_E309750_44
						291_N	354_N	571_N	689_N	790_N	962_N	007_N
					Sample Date	2018-07-10	2018-09-11	2019-04-16	2019-08-12	2019-11-21	2020-05-11	2020-06-25
					QA/QC							
Anions + Nutrients												
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**454000**	**547000**	-	-	-	-	**305000**
Bromide (Br)	-	-	-	ug/L		-	-	-	-	-	-	< 50
Chloride (Cl)	250000	600000	150000	ug/L		12700	12700	-	-	-	-	2360
Fluoride (F)	1.5	1.7 - 2.1 (H)	-	mg/L		-	-	-	-	-	-	0.067
Nitrate (as N)	10000	32800	3000	ug/L		< 25	< 25	< 5	< 5	< 5	-	< 1
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		< 5	< 5	< 25	< 25	**49**	-	< 5
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		< 30	< 30	-	-	-	-	-
Ammonia (as N)	-	15000-21000 (pH, T)	1900-2000 (pH, T)	ug/L		29.8	68.9	-	-	-	-	53.9
Total Kjeldahl Nitrogen	-	-	-	ug/L		-	-	-	-	-	-	404
Sulfate (SO4)	500000	-	429000 (H)	ug/L		23400	13900	-	-	-	-	2480
Phosphorus, dissolved	-	-	-	ug/L		<50	<50	<50	<50	<50	-	<50
Field + Physical												
Dissolved Oxygen, field measured	-	8	5	mg/L		-	-	-	-	-	-	**2.1**
Conductivity, field measured	-	-	-	uS/cm		-	-	-	-	-	117	273.7
Oxidation Reduction Potential, field measured	-	-	-	mV		-	-	-	-	-	-	67.2
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-	-	-	7.09
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		-	-	-	-	-	-	7.55
Temperature, field measured	-	-	-	deg c		-	-	-	-	-	9.4	5.5
Conductivity	-	-	-	uS/cm		-	-	-	-	-	-	515
Total Organic Carbon	-	-	-	mg/L		10.6	9.04	-	-	-	-	11.7
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		494	656	454	506	426	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		-	-	-	-	-	-	319
Chemical Oxygen Demand	-	-	-	mg/L		55	24	85	72	35	-	76
Depth to Water	-	-	-	mbtoc		-	-	-	-	-	0.57	1.1
Metals, Dissolved												
Aluminum	9500	100(pH)	50(pH)	ug/L		**57.1**	**278**	5.1	4	8.1	-	4.1
Antimony	6	-	-	ug/L		0.11	0.12	< 0.1	< 0.1	< 0.1	-	< 0.1
Arsenic	10	-	-	ug/L		3.51	9.94	1	2	0.53	-	0.86
Barium	1000	-	-	ug/L		99.7	169	103	132	104	-	74
Beryllium	8	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
Bismuth	-	-	-	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05
Boron	5000	-	-	ug/L		17	24	17	20	15	-	12
Cadmium	5	1.7 - 2.8(H)	0.45 - 0.46(H)	ug/L		0.0304	0.0538	0.0313	0.0172	0.0781	-	0.0233
Calcium	-	-	-	ug/L		110000	148000	100000	109000	102000	-	72700
Chromium	50	-	-	ug/L		< 0.1	0.23	< 0.1	< 0.1	< 0.1	-	< 0.1
Cobalt	1	-	-	ug/L		**8.42**	**9.34**	**7.72**	**5.96**	**1.07**	-	**6.1**
Copper	1500	0.2 (pH, H, T)	0.2 (pH, H, T)	ug/L		**7.2**	**2.12**	**1.15**	**0.53**	**2.1**	-	**3.04**
Iron	6500	350	-	ug/L		159	**2810**	**1760**	239	30	-	**3880**
Lead	10	-	-	ug/L		0.399	0.705	< 0.05	< 0.05	< 0.05	-	0.079
Lithium	8	-	-	ug/L		2.2	2.9	2	2.4	2.1	-	1.5
Magnesium	-	-	-	ug/L		53500	69700	49400	57100	41700	-	33300
Manganese	1500	-	-	ug/L		**1700**	**3020**	1300	**1760**	798	-	1350
Mercury	1	-	-	ug/L		0.0162	0.0133	< 0.005	< 0.005	< 0.005	-	< 0.005
Molybdenum	250	-	-	ug/L		4.47	4.11	1.44	2.4	1.45	-	2.02
Nickel	80	-	-	ug/L		3.77	4.52	3.34	3.17	2.59	-	2.73
Potassium	-	-	-	ug/L		2690	3220	2300	2950	2410	-	1970
Selenium	10	-	-	ug/L		0.053	0.069	0.055	< 0.05	0.071	-	0.112
Silicon	-	-	-	ug/L		5360	6930	4630	6390	5770	-	3880
Silver	20	-	-	ug/L		< 0.01	0.019	< 0.01	< 0.01	< 0.01	-	< 0.01
Sodium	200000	-	-	ug/L		13700	16500	10900	12300	8240	-	6740
Strontium	2500	-	-	ug/L		1120	1550	1070	1190	1010	-	736
Sulphur (S)	-	-	-	ug/L		6960	3340	3410	1760	2950	-	620
Tellurium	-	-	-	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	-	< 0.2
Thallium	-	-	-	ug/L		< 0.01	< 0.01	< 0.01	0.01	0.011	-	< 0.01
Thorium-232	-	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
Tin	2500	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
Titanium	-	-	-	ug/L		1.42	< 6	< 0.3	< 0.3	0.6	-	< 0.3
Uranium	20	-	-	ug/L		0.984	1.2	0.539	0.867	0.761	-	0.498
Vanadium	20	-	-	ug/L		< 0.5	0.92	< 0.5	< 0.5	< 0.5	-	< 0.5
Zinc	3000	-	-	ug/L		6.3	2.7	2.2	< 1	1.1	-	2.4
Zirconium	-	-	-	ug/L		< 0.06	0.221	< 0.06	< 0.2	< 0.2	-	< 0.2
Cesium	-	-	-	ug/L		0.011	0.039	< 0.01	< 0.01	< 0.01	-	< 0.01
Rubidium	-	-	-	ug/L		0.4	0.48	0.34	0.44	0.28	-	0.28
Tungsten	3	-	-	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	-	< 0.1
Hydrocarbons												
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		-	-	-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		-	-	-	-	-	-	< 250
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-	-	-	-	< 250
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		-	-	-	-	-	-	< 100
Volatile Petroleum Hydrocarbons	-	-	-	ug/L		-	-	-	-	-	-	< 100
VOCs + BTEX												
Benzene	5	-	40	ug/L		-	-	-	-	-	-	< 0.5
Ethylbenzene	140	-	200	ug/L		-	-	-	-	-	-	< 0.5
Styrene	800	-	72	ug/L		-	-	-	-	-	-	< 0.5
Toluene	60	-	0.5	ug/L		-	-	-	-	-	-	< 0.5
Xylenes, Total	90	-	-	ug/L		-	-	-	-	-	-	< 0.75
o-Xylene	-	-	-	ug/L		-	-	-	-	-	-	< 0.5
m,p-Xylenes	-	-	-	ug/L		-	-	-	-	-	-	< 0.5
Methyl tert-Butyl Ether	95	-	-	ug/L		-	-	-	-	-	-	< 0.5

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Result exceeds applicable CSR standard/ WQG **744**
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Appendix C
Results of Groundwater Analyses - SGW-5
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR DW	WQG AW-F STA	WQG AW-F LTC	Unit	Sample Name	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5	SGW-5
					Laboratory ID	WG_E309750_44 069_N	WG_E309750_44 083_N	WG_E309750_44 126_N	WG_E309750_44 147_N	WG_E309750_44 307_N	WG_E309750_44 393_N	VA21C4148-004
					Sample Date	2020-08-26	2020-09-09	2020-10-22	2020-11-12	2021-04-21	2021-07-16	2021-10-26
					QA/QC							
Anions + Nutrients												
Alkalinity, Total as CaCO3	-	-	20000	ug/L		**403000**	-	**278000**	-	-	-	**314000**
Bromide (Br)	-	-	-	ug/L		< 250	-	< 50	-	-	-	-
Chloride (Cl)	250000	600000	150000	ug/L		3490	-	3490	-	-	-	2590
Fluoride (F)	1.5	1.7 - 2.1 (H)	-	mg/L		< 0.1	-	0.067	-	-	-	0.058
Nitrate (as N)	10000	32800	3000	ug/L		< 25	-	< 5	-	-	-	9.6
Nitrite (as N)	1000	120-600 (Cl)	40-200 (Cl)	ug/L		< 5	-	1.2	-	-	-	2
Nitrogen, Nitrate-Nitrite	10000	-	-	ug/L		-	-	-	-	-	-	-
Ammonia (as N)	-	15000-21000 (pH, T)	1900-2000 (pH, T)	ug/L		59.4	-	94.6	-	-	-	119
Total Kjeldahl Nitrogen	-	-	-	ug/L		412	-	431	-	-	-	609
Sulfate (SO4)	500000	-	429000 (H)	ug/L		2670	-	3330	-	-	-	4800
Phosphorus, dissolved	-	-	-	ug/L		<50	-	<50	-	-	-	<50
Field + Physical												
Dissolved Oxygen, field measured	-	8	5	mg/L		**2.2**	-	**2.1**	-	**0.8**	-	**1.7**
Conductivity, field measured	-	-	-	uS/cm		410	354	327.3	327	238	527	352
Oxidation Reduction Potential, field measured	-	-	-	mV		235.5	-	225	-	76.2	-	7.1
pH, field measured	-	6.5 - 9.0	6.5 - 9.0	pH units		6.99	-	7.19	-	7.4	-	7.39
pH, lab	-	6.5 - 9.0	6.5 - 9.0	pH units		7.74	-	7.94	-	-	-	7.94
Temperature, field measured	-	-	-	deg c		7.7	10.4	6.9	2.3	3.3	6.3	7.9
Conductivity	-	-	-	uS/cm		701	-	511	-	-	-	560
Total Organic Carbon	-	-	-	mg/L		11.6	-	9.69	-	-	-	10.2
Hardness, Calcium Carbonate (Total)	-	-	-	mg/L		-	-	-	-	-	-	-
Hardness, Calcium Carbonate (Dissolved)	-	-	-	mg/L		371	-	290	-	-	-	276
Chemical Oxygen Demand	-	-	-	mg/L		30	-	40	-	-	-	27
Depth to Water	-	-	-	mbtoc		0.97	1.04	1.1	0.52	0.93	1.54	1.1
Metals, Dissolved												
Aluminum	9500	100(pH)	50(pH)	ug/L		6.5	-	29.9	-	-	-	12.8
Antimony	6	-	-	ug/L		< 0.1	-	< 0.1	-	-	-	< 0.1
Arsenic	10	-	-	ug/L		0.98	-	1.2	-	-	-	1.57
Barium	1000	-	-	ug/L		91.7	-	72.6	-	-	-	77.6
Beryllium	8	-	-	ug/L		< 0.1	-	< 0.1	-	-	-	< 0.1
Bismuth	-	-	-	ug/L		< 0.05	-	< 0.05	-	-	-	< 0.05
Boron	5000	-	-	ug/L		17	-	< 10	-	-	-	< 10
Cadmium	5	1.7 - 2.8(H)	0.45 - 0.46(H)	ug/L		0.0353	-	0.0074	-	-	-	0.0152
Calcium	-	-	-	ug/L		87400	-	79500	-	-	-	80400
Chromium	50	-	-	ug/L		< 0.1	-	< 0.1	-	-	-	< 0.5
Cobalt	1	-	-	ug/L		**5.03**	-	**2.83**	-	-	-	**2.02**
Copper	1500	0.2 (pH, H, T)	0.2 (pH, H, T)	ug/L		**0.92**	-	**2.55**	-	-	-	**0.53**
Iron	6500	350	-	ug/L		**2740**	-	220	-	-	-	**2650**
Lead	10	-	-	ug/L		< 0.05	-	0.067	-	-	-	< 0.05
Lithium	8	-	-	ug/L		2	-	1.5	-	-	-	1.4
Magnesium	-	-	-	ug/L		37100	-	22200	-	-	-	18200
Manganese	1500	-	-	ug/L		1480	-	952	-	-	-	**1630**
Mercury	1	-	-	ug/L		< 0.005	-	< 0.005	-	-	-	< 0.005
Molybdenum	250	-	-	ug/L		2.4	-	1.71	-	-	-	1.76
Nickel	80	-	-	ug/L		2.98	-	2	-	-	-	2.54
Potassium	-	-	-	ug/L		2160	-	1580	-	-	-	1690
Selenium	10	-	-	ug/L		0.057	-	< 0.05	-	-	-	< 0.05
Silicon	-	-	-	ug/L		4980	-	5450	-	-	-	5490
Silver	20	-	-	ug/L		< 0.01	-	< 0.01	-	-	-	< 0.01
Sodium	200000	-	-	ug/L		7400	-	9920	-	-	-	6510
Strontium	2500	-	-	ug/L		844	-	650	-	-	-	596
Sulphur (S)	-	-	-	ug/L		790	-	1140	-	-	-	1520
Tellurium	-	-	-	ug/L		< 0.2	-	< 0.2	-	-	-	< 0.2
Thallium	-	-	-	ug/L		< 0.01	-	< 0.01	-	-	-	< 0.01
Thorium-232	-	-	-	ug/L		< 0.1	-	< 0.1	-	-	-	< 0.1
Tin	2500	-	-	ug/L		0.21	-	< 0.1	-	-	-	< 0.1
Titanium	-	-	-	ug/L		< 0.3	-	0.38	-	-	-	< 0.3
Uranium	20	-	-	ug/L		0.65	-	0.415	-	-	-	0.405
Vanadium	20	-	-	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.5
Zinc	3000	-	-	ug/L		1.3	-	2.1	-	-	-	< 1
Zirconium	-	-	-	ug/L		< 0.2	-	< 0.2	-	-	-	< 0.2
Cesium	-	-	-	ug/L		< 0.01	-	< 0.01	-	-	-	< 0.01
Rubidium	-	-	-	ug/L		0.32	-	0.31	-	-	-	0.38
Tungsten	3	-	-	ug/L		< 0.1	-	< 0.1	-	-	-	< 0.1
Hydrocarbons												
Extractable Petroleum Hydrocarbons (C10-C19)	5000	-	-	ug/L		< 250	-	< 250	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	-	-	-	ug/L		< 250	-	< 250	-	-	-	< 250
Total Extractable Petroleum Hydrocarbons (C10-C30)	-	-	-	ug/L		-	-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	15000	-	-	ug/L		< 100	-	< 100	-	-	-	< 100
Volatile Petroleum Hydrocarbons	-	-	-	ug/L		< 100	-	< 100	-	-	-	< 100
VOCs + BTEX												
Benzene	5	-	40	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.5
Ethylbenzene	140	-	200	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.5
Styrene	800	-	72	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.5
Toluene	60	-	0.5	ug/L		< 0.5	-	**2.08**	-	-	-	< 0.5
Xylenes, Total	90	-	-	ug/L		< 0.75	-	< 0.75	-	-	-	< 0.5
o-Xylene	-	-	-	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.3
m,p-Xylenes	-	-	-	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.4
Methyl tert-Butyl Ether	95	-	-	ug/L		< 0.5	-	< 0.5	-	-	-	< 0.5

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for the protection of drinking water (DW), updated April 2022.
BC WQG = British Columbia Approved (updated December 2021) and Working (updated February 2021) Water Quality Guidelines for the protection of freshwater aquatic life (AW-F); LTC (Long Term Chronic), STC (Short Term Acute)
Cl = chloride-dependent, H = hardness-dependent, pH = pH-dependent, T = temperature dependent
QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate
< or ND Indicates parameter was below laboratory equipment detection limit
- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard/ WQG	**744**
Detection limit exceeds applicable CSR standard/ WQG	***< 2***

3 - Leachate Data

Appendix C
Results of Leachate Analyses - Phytoremediation Stand
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name: PHYTO STAND	PHYTO STAND
Laboratory ID:			L2315550-2	L2321734-2
Sample Date:			2019-07-22	2019-07-31
QA/QC:				
Anions + Nutrients				
Alkalinity, Total as CaCO3		ug/L	425000	423000
Chloride (Cl)	3750000	ug/L	660	-
Fluoride (F)		mg/L	157	180
Nitrate (as N)		ug/L	100	< 100
Nitrite (as N)		ug/L	514	33
Ammonia (as N)	30000	ug/L	544	377
Sulfate (SO4)		ug/L	30300	18200
Total Nitrogen	60000	ug/L	36	15.5
Phosphorus, Total Orthophosphate		ug/L	2.9	< 1
Phosphorus, Total		ug/L	183	87
Field + Physical				
Dissolved Oxygen, field measured		mg/L	3.9	5.8
Conductivity, field measured		uS/cm	1112	1230
Oxidation Reduction Potential, field measured		mV	225.4	192.5
pH, field measured		pH units	7.28	7.17
pH, lab	6.5 - 8.5	pH	8.24	8.32
Temperature, field measured		deg c	16.6	16.5
Total Organic Carbon		mg/L	35.7	37.5
Hardness, Calcium Carbonate		mg/L	516	588
Biochemical Oxygen Demand		mg/L	4.1	2.9
Chemical Oxygen Demand		mg/L	111	100
Metals, Total				
Aluminum		ug/L	2910	473
Antimony		ug/L	0.51	0.3
Arsenic		ug/L	4.04	3.83
Barium		ug/L	176	167
Beryllium		ug/L	< 0.1	< 0.1
Bismuth		ug/L	< 0.05	< 0.05
Boron		ug/L	636	466
Cadmium	100	ug/L	0.172	0.0582
Calcium		ug/L	150000	164000
Chromium		ug/L	2.8	0.68
Cobalt		ug/L	3.61	2.64
Copper		ug/L	9.81	3.91
Iron	4500	ug/L	4210	1540
Lead		ug/L	1.12	0.315
Lithium		ug/L	2.1	< 1
Magnesium		ug/L	34300	43200
Manganese		ug/L	3450	4170
Mercury		ug/L	0.0145	0.0115
Molybdenum		ug/L	3.46	3.63
Nickel		ug/L	13	11.2
Potassium		ug/L	11400	13100
Selenium		ug/L	0.304	0.29
Silicon		ug/L	7940	4150
Silver		ug/L	0.049	0.022
Sodium		ug/L	76700	91600
Strontium		ug/L	861	980
Sulphur (S)		ug/L	12100	8600
Tellurium		ug/L	< 0.2	< 0.2
Thallium		ug/L	0.02	< 0.01
Thorium-232		ug/L	< 0.1	< 0.1
Tin		ug/L	0.1	0.15
Titanium		ug/L	70.8	8.59
Uranium		ug/L	2.05	2.26
Vanadium		ug/L	7.15	2.09
Zinc	75000	ug/L	11.8	3.1
Zirconium		ug/L	0.6	0.49
Tungsten		ug/L	< 0.1	< 0.1
Rubidium		ug/L	2.57	1.79
Cesium		ug/L	0.328	0.033
VOCs + BTEX				
Bromodichloromethane (BDCM)		ug/L	< 0.001	-
Bromoform (Tribromomethane)		ug/L	< 0.001	-
Carbon Tetrachloride		ug/L	< 0.0005	-
Chlorobenzene		ug/L	< 0.001	-
Chloroethane		ug/L	< 0.001	-
Chloroform		ug/L	< 0.001	-
Chloromethane		ug/L	< 0.005	-
Dichloromethane (DCM) (Methylene Chloride)		ug/L	< 0.005	-
Dibromochloromethane (DBCM)		ug/L	< 0.001	-
1,2-dichlorobenzene		ug/L	< 0.0005	-
1,3-dichlorobenzene		ug/L	< 0.001	-
1,4-dichlorobenzene		ug/L	< 0.001	-
1,1-dichloroethane		ug/L	< 0.001	-
1,2-dichloroethane		ug/L	< 0.001	-
1,1-dichloroethene		ug/L	< 0.001	-
1,2-dichloroethylene (cis) (1,2-dichloroethene) (cis)		ug/L	< 0.001	-
1,2-dichloroethylene (trans) (1,2-dichloroethene) (trans)		ug/L	< 0.001	-
1,2-dichloropropane (Propylene Dichloride)		ug/L	< 0.001	-
1,3-dichloropropene (cis)		ug/L	< 0.0005	-
1,3-dichloropropene (trans)		ug/L	< 0.0005	-
Dichloropropylene, Total		ug/L	< 0.001	-
1,1,1,2-tetrachloroethane		ug/L	< 0.001	-
1,1,2,2-tetrachloroethane		ug/L	< 0.0002	-
Tetrachloroethylene (PCE/PERC)		ug/L	< 0.001	-
1,1,1-trichloroethane		ug/L	< 0.001	-
1,1,2-trichloroethane		ug/L	< 0.0005	-
Trichloroethylene (TCE)		ug/L	< 0.001	-
Trichlorofluoromethane (Freon 11)		ug/L	< 0.001	-
Vinyl Chloride (Chloroethene)		ug/L	< 0.0004	-
Benzene		ug/L	< 0.0005	-
Ethylbenzene		ug/L	< 0.0005	-
Styrene		ug/L	< 0.0005	-
Toluene		ug/L	< 0.00045	-
Xylenes, Total		ug/L	< 0.00075	-
o-Xylene		ug/L	< 0.0005	-
m,p-Xylenes		ug/L	< 0.0005	-
Methyl tert-Butyl Ether		ug/L	< 0.0005	-

Table Notes:
Criteria from the Hazelton Landfill Operational Certificate (OC) No. 17226, administered by the BC Ministry of Environment and Climate Change (ENV), last updated 19 October 2021
QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined.
Result exceeds applicable OC criteria **744**
Detection limit exceeds applicable OC criteria ***< 2***

Appendix C
Results of Leachate Analyses - Wetland 4 Outlet
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name: WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET
		Laboratory ID:	L2321734-9	L2325524-8	L2335286-8	VA20A6390-	VA20B1764-	VA20B5077-001	VA20B9054-002
		Sample Date:	2019-07-31	2019-08-07	2019-08-22	2020-05-11	2020-07-30	2020-09-09	2020-10-22
		QA/QC:							
Anions + Nutrients									
Alkalinity, Total as CaCO3		ug/L	256000	263000	252000	205000	245000	259000	323000
Bromide (Br)		ug/L	-	-	390	239	214	227	256
Chloride (Cl)	3750000	ug/L	57800	58200	53300	42700	52200	41300	48200
Fluoride (F)		mg/L	0.154	0.148	0.12	0.093	0.098	0.097	< 0.1
Nitrate (as N)		ug/L	5.5	< 5	72	376	343	724	803
Nitrite (as N)		ug/L	< 1	< 1	< 5	5.1	129	33.6	22.2
Ammonia (as N)	30000	ug/L	218	141	126	9.9	96.7	396	2260
Total Kjeldahl Nitrogen		ug/L	-	-	-	661	1070	1070	3060
Sulfate (SO4)		ug/L	7040	8120	7900	12800	9760	8770	6430
Total Nitrogen	60000	ug/L	-	1480	1320	1040	1540	1830	3880
Phosphorus, Total Orthophosphate		ug/L	< 1	< 1	< 1	1.1	1.4	2.2	< 1
Phosphorus, Total		ug/L	51	<50	<50	<50	<50	<50	<50
Field + Physical									
Dissolved Oxygen, field measured		mg/L	2.6	3.3	6.4	12.1	8.9	1.9	3.6
Conductivity, field measured		uS/cm	553	634	505	407.8	593	470	453.5
Oxidation Reduction Potential, field measured		mV	250.3	327.5	272.7	293.6	301.5	334.4	240.6
pH, field measured		pH units	7.28	7.29	7.56	7.7	7.59	6.74	7.2
pH, lab	6.5 - 8.5	pH	**8.56**	**8.52**	8.44	7.97	8.24	7.59	8.1
Specific conductivity, field measured		uS/cm	-	-	-	524.5	635	575.7	748
Temperature, field measured		deg c	17.4	22.8	15.4	13.3	21.5	15.4	5.8
Turbidity, field measured		NTU	-	12	12.1	7.8	-	4.03	2.68
Conductivity		uS/cm	-	665	-	520	673	585	739
Total Organic Carbon		mg/L	19.7	18.9	15.4	8.38	12.8	9.39	9.78
Hardness, Calcium Carbonate		mg/L	265	243	241	213	241	238	300
Biochemical Oxygen Demand		mg/L	< 2	< 2	< 2	< 2	2.3	< 2	< 2
Chemical Oxygen Demand		mg/L	56	49	55	22	47	40	22
Discharge		m3/s	-	-	-	-	0	1.5	0.5
Metals, Total									
Aluminum		ug/L	147	71.3	167	156	58	57.4	27.4
Antimony		ug/L	0.21	0.23	0.17	0.19	0.26	0.22	0.22
Arsenic		ug/L	6.15	5.11	2.88	1.07	1.16	0.94	0.84
Barium		ug/L	122	109	97.5	53.8	55.4	60.7	89.3
Beryllium		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron		ug/L	624	571	474	228	404	307	336
Cadmium	100	ug/L	0.0057	< 0.005	0.0082	0.0186	0.0104	0.038	0.0226
Calcium		ug/L	70200	65400	65000	63100	66400	71000	88800
Chromium		ug/L	0.31	0.2	0.25	0.28	0.26	0.29	0.46
Cobalt		ug/L	0.54	0.38	0.3	0.44	0.31	0.3	0.44
Copper		ug/L	0.88	0.71	1.15	1.99	1.51	1.81	1.22
Iron	4500	ug/L	1160	683	500	206	53	374	330
Lead		ug/L	0.166	0.098	0.116	0.053	< 0.05	< 0.05	< 0.05
Lithium		ug/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Magnesium		ug/L	21800	19300	19200	13400	18400	14800	18900
Manganese		ug/L	1020	590	131	127	13	269	416
Mercury		ug/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum		ug/L	1.18	1.07	0.914	0.927	1.63	0.64	0.533
Nickel		ug/L	3.94	3.49	3.32	2.37	3.67	2.6	3.62
Potassium		ug/L	9110	8190	7040	5070	7000	5910	9300
Selenium		ug/L	0.172	0.089	0.138	0.091	0.129	0.07	0.093
Silicon		ug/L	3320	2770	2880	970	340	2000	2820
Silver		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium		ug/L	47800	43000	42100	28400	50100	35000	43400
Strontium		ug/L	515	501	471	384	473	464	599
Sulphur (S)		ug/L	3680	3100	4360	5620	4500	4020	3130
Tellurium		ug/L	< 0.2	0.22	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium		ug/L	2.97	1.37	2.2	3.51	1.27	0.71	0.52
Uranium		ug/L	0.285	0.293	0.309	0.369	0.447	0.286	0.31
Vanadium		ug/L	0.97	0.66	0.63	0.71	< 0.5	< 0.5	< 0.5
Zinc	75000	ug/L	< 3	< 3	< 3	< 3	< 3	4.1	3.6
Zirconium		ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tungsten		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium		ug/L	0.87	0.86	0.74	0.66	1.33	1.17	1.87
Cesium		ug/L	0.014	< 0.01	0.015	0.014	0.012	0.012	0.016
Hydrocarbons									
Extractable Petroleum Hydrocarbons (C10-C19)		ug/L	-	-	-	-	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L	-	-	-	-	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L	-	-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)		ug/L	-	-	-	-	< 100	< 100	< 100
VHCs									
Volatile Hydrocarbons (C6-C10)		ug/L	-	-	-	-	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons		ug/L	-	-	-	-	< 100	< 100	< 100
VOCs + BTEX									
Benzene		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
Ethylbenzene		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
Styrene		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
Toluene		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
Xylenes, Total		ug/L	-	-	-	-	< 0.75	< 0.75	< 0.75
o-Xylene		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
m,p-Xylenes		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5
Methyl tert-Butyl Ether		ug/L	-	-	-	-	< 0.5	< 0.5	< 0.5

Table Notes:

Criteria from the Hazelton Landfill Operational Certificate (OC) No. 17226, administered by the BC Ministry of Environment and Climate Change (ENV), last updated 19 October 2021

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate

< Indicates parameter was below laboratory equipment detection limit.

- Chemical not analyzed or criteria not defined.

Result exceeds applicable OC criteria **744**

Detection limit exceeds applicable OC criteria ***< 2***

Appendix C
Results of Leachate Analyses - Wetland 4 Outlet
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA20C0839-001 Sample Date: 2020-11-12	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA20C4119-001 Sample Date: 2020-12-22	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A1323-001 Sample Date: 2021-01-21 QA/QC: FDA	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A1323-002 Sample Date: 2021-01-21 QA/QC: FD	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A5251-001 Sample Date: 2021-03-17 QA/QC: FDA	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A5251-002 Sample Date: 2021-03-17 QA/QC: FD
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L	323000	213000	326000	322000	295000	295000
Bromide (Br)		ug/L	< 250	187	247	< 250	-	-
Chloride (Cl)	3750000	ug/L	47000	37300	40900	40300	39200	39100
Fluoride (F)		mg/L	< 0.1	0.078	0.095	< 0.1	0.076	0.077
Nitrate (as N)		ug/L	106	249	906	945	978	988
Nitrite (as N)		ug/L	< 5	8.1	6.8	7.8	10.2	13.6
Ammonia (as N)	30000	ug/L	1890	2300	1610	1490	1630	1630
Total Kjeldahl Nitrogen		ug/L	2460	2970	2310	2140	2480	2490
Sulfate (SO4)		ug/L	6550	5690	4250	3900	8940	8950
Total Nitrogen	60000	ug/L	2690	3230	2930	2930	2960	2920
Phosphorus, Total Orthophosphate		ug/L	1.3	< 1	< 1	< 1	< 1	< 1
Phosphorus, Total		ug/L	<50	<50	<50	<50	<50	<50
Field + Physical								
Dissolved Oxygen, field measured		mg/L	2.2	5.5	5.8	5.8	8.4	8.4
Conductivity, field measured		uS/cm	432.4	465.9	394.5	394.5	359.8	359.8
Oxidation Reduction Potential, field measured		mV	191.3	255.3	296.7	296.7	279.7	279.7
pH, field measured		pH units	7.77	7.42	7.45	7.45	7.23	7.23
pH, lab	6.5 - 8.5	pH	7.9	8.27	8.39	8.38	8.05	8.04
Specific conductivity, field measured		uS/cm	778.7	806.9	742.4	742.4	-	-
Temperature, field measured		deg c	3.3	2.9	0.5	0.5	0.5	0.5
Turbidity, field measured		NTU	0.79	0.55	1.54	1.54	-	-
Conductivity		uS/cm	730	525	710	703	655	656
Total Organic Carbon		mg/L	10.3	8.08	8.92	8.89	8.24	8.22
Hardness, Calcium Carbonate		mg/L	281	269	319	302	294	303
Biochemical Oxygen Demand		mg/L	< 2	2.3	2.1	< 2	< 2	2.1
Chemical Oxygen Demand		mg/L	28	< 20	24	29	26	28
Discharge		m3/s	0.25	< 0.25	0.25	0.25	-	-
Metals, Total								
Aluminum		ug/L	9.7	11.5	67.4	72	309	268
Antimony		ug/L	0.22	0.19	0.16	0.16	0.15	0.14
Arsenic		ug/L	1.04	0.83	0.74	0.72	1.07	1.03
Barium		ug/L	77.2	72.1	76.4	74.2	77.4	75.2
Beryllium		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron		ug/L	314	193	242	238	204	218
Cadmium	100	ug/L	0.0752	0.121	0.0686	0.0862	0.0802	0.0775
Calcium		ug/L	83300	80500	92900	86500	87500	91600
Chromium		ug/L	0.44	0.33	0.41	0.53	0.61	0.56
Cobalt		ug/L	1.26	1.94	1.09	0.94	1.4	1.36
Copper		ug/L	2.04	1.62	1.44	1.48	2	1.86
Iron	4500	ug/L	137	49	103	104	536	420
Lead		ug/L	< 0.05	< 0.05	< 0.05	< 0.05	0.189	0.131
Lithium		ug/L	< 1	< 1	< 1	< 1	< 1	< 1
Magnesium		ug/L	17700	16500	21200	20900	18400	18100
Manganese		ug/L	1950	3870	2570	2240	2850	2890
Mercury		ug/L	0.0134	0.0057	< 0.005	< 0.005	0.0053	< 0.005
Molybdenum		ug/L	0.694	0.739	0.683	0.636	0.548	0.528
Nickel		ug/L	3.51	2.56	2.97	2.88	2.93	2.87
Potassium		ug/L	7280	7200	7550	7280	6730	6880
Selenium		ug/L	0.098	0.081	0.097	0.107	< 0.05	0.07
Silicon		ug/L	3220	3790	4240	4160	4780	4870
Silver		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium		ug/L	40300	26200	33800	33200	30500	31200
Strontium		ug/L	534	532	605	550	540	525
Sulphur (S)		ug/L	2660	2320	1880	1900	3270	3180
Tellurium		ug/L	< 0.2	0.26	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium		ug/L	< 0.3	< 0.3	1.47	1.41	7.7	5.78
Uranium		ug/L	0.312	0.242	0.377	0.354	0.312	0.312
Vanadium		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	0.79	0.72
Zinc	75000	ug/L	3.7	4.9	< 3	< 3	6.3	6.5
Zirconium		ug/L	< 0.2	< 0.2	0.26	< 0.2	< 0.2	0.27
Tungsten		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium		ug/L	0.82	0.58	0.91	0.92	1.08	1.17
Cesium		ug/L	0.011	< 0.01	0.016	0.016	0.035	0.029
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)		ug/L	< 250	< 250	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L	< 250	< 250	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L	-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)		ug/L	< 100	< 100	< 100	< 100	< 100	< 100
VHCs								
Volatile Hydrocarbons (C6-C10)		ug/L	< 100	< 100	< 100	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons		ug/L	< 100	< 100	< 100	< 100	< 100	< 100
VOCs + BTEX								
Benzene		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total		ug/L	< 0.75	< 0.75	< 0.5	< 0.5	< 0.5	< 0.5
o-Xylene		ug/L	< 0.5	< 0.5	< 0.3	< 0.3	< 0.3	< 0.3
m,p-Xylenes		ug/L	< 0.5	< 0.5	< 0.4	< 0.4	< 0.4	< 0.4
Methyl tert-Butyl Ether		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table Notes:

Criteria from the Hazelton Landfill Operational Certificate (OC) No. 17226, administered by the BC Ministry of Environment and Climate Change (ENV), last updated 19 October 2021

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate

< Indicates parameter was below laboratory equipment detection limit.

- Chemical not analyzed or criteria not defined.

Result exceeds applicable OC criteria **744**

Detection limit exceeds applicable OC criteria ***< 2***

Appendix C
Results of Leachate Analyses - Wetland 4 Outlet
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A7734-001 Sample Date: 2021-04-21 QA/QC: FDA	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A7734-002 Sample Date: 2021-04-21 QA/QC: FD	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A9247-001 Sample Date: 2021-05-12 QA/QC: FDA	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21A9247-002 Sample Date: 2021-05-12 QA/QC: FD	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21B1843-001 Sample Date: 2021-06-10 QA/QC: FDA	Sample Name: WETLAND 4 OUTLET Laboratory ID: VA21B1843-002 Sample Date: 2021-06-10 QA/QC: FD
Anions + Nutrients								
Alkalinity, Total as CaCO3		ug/L	376000	381000	275000	269000	292000	294000
Bromide (Br)		ug/L	-	-	-	-	-	-
Chloride (Cl)	3750000	ug/L	48200	48200	48500	48500	50600	50500
Fluoride (F)		mg/L	< 0.1	< 0.1	< 0.1	< 0.1	0.098	0.098
Nitrate (as N)		ug/L	237	247	1930	1870	740	706
Nitrite (as N)		ug/L	16.9	10.5	108	102	19.8	21
Ammonia (as N)	30000	ug/L	3210	3250	264	269	50.6	51.5
Total Kjeldahl Nitrogen		ug/L	4020	4120	1030	1040	935	968
Sulfate (SO4)		ug/L	11200	11000	12800	12800	6760	6760
Total Nitrogen	60000	ug/L	4330	4330	2940	3020	1740	1640
Phosphorus, Total Orthophosphate		ug/L	< 1	< 1	< 1	< 1	< 1	< 1
Phosphorus, Total		ug/L	<50	<50	<50	<50	<50	<50
Field + Physical								
Dissolved Oxygen, field measured		mg/L	3.9	3.9	1.7	1.7	3.7	3.7
Conductivity, field measured		uS/cm	623	623	558	558	561	561
Oxidation Reduction Potential, field measured		mV	236.7	236.7	241.4	241.4	234.8	234.8
pH, field measured		pH units	7.41	7.41	7.57	7.57	7.75	7.75
pH, lab	6.5 - 8.5	pH	8.27	8.2	8.3	8.3	8.25	8.25
Specific conductivity, field measured		uS/cm	811	811	698	698	678	678
Temperature, field measured		deg c	12.9	12.9	14.5	14.5	16	16
Turbidity, field measured		NTU	2.16	2.16	1.35	1.35	1.05	1.05
Conductivity		uS/cm	784	792	728	739	661	659
Total Organic Carbon		mg/L	11.2	11.2	9.25	9.02	10	9.72
Hardness, Calcium Carbonate		mg/L	312	317	265	265	255	261
Biochemical Oxygen Demand		mg/L	< 2	< 2	< 2	< 2	< 2	< 2
Chemical Oxygen Demand		mg/L	31	33	24	25	30	32
Discharge		m3/s	0.5	0.5	0.5	0.5	0.25	0.25
Metals, Total								
Aluminum		ug/L	81.6	70.5	54.8	59.1	33	30.2
Antimony		ug/L	0.21	0.21	0.17	0.18	0.19	0.19
Arsenic		ug/L	1.19	1.1	0.67	0.65	0.9	0.92
Barium		ug/L	73.1	74.9	57.1	57.4	46.3	47.6
Beryllium		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron		ug/L	422	439	362	361	340	362
Cadmium	100	ug/L	0.0287	0.0258	0.0132	0.0108	0.0096	0.0082
Calcium		ug/L	93700	96000	76900	77100	74100	76200
Chromium		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Cobalt		ug/L	0.94	0.94	0.38	0.39	0.29	0.3
Copper		ug/L	1.44	1.32	1.1	1.1	1.3	1.04
Iron	4500	ug/L	155	137	79	80	68	64
Lead		ug/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lithium		ug/L	< 1	< 1	< 1	< 1	< 1	< 1
Magnesium		ug/L	18900	18800	17700	17700	17000	17200
Manganese		ug/L	2360	2390	245	245	134	135
Mercury		ug/L	< 0.005	< 0.005	< 0.005	< 0.005	0.0051	< 0.005
Molybdenum		ug/L	1.06	1.08	0.849	0.886	0.916	0.95
Nickel		ug/L	4.68	4.76	3.51	3.44	3.46	3.51
Potassium		ug/L	9600	9750	9630	9690	8300	8400
Selenium		ug/L	0.11	0.09	0.064	0.057	0.056	0.054
Silicon		ug/L	3100	3160	1210	1230	1210	1240
Silver		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium		ug/L	42400	43000	43000	43000	45600	46600
Strontium		ug/L	583	598	503	502	490	520
Sulphur (S)		ug/L	4670	4450	4950	5230	2990	3090
Tellurium		ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium		ug/L	< 2.4	2.71	1.07	1.08	0.57	0.54
Uranium		ug/L	0.4	0.406	0.4	0.401	0.386	0.402
Vanadium		ug/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	75000	ug/L	3.4	3.1	< 3	< 3	< 3	< 3
Zirconium		ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tungsten		ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium		ug/L	1.72	1.64	1.31	1.3	1.03	1.06
Cesium		ug/L	0.029	0.032	0.014	0.015	0.01	0.011
Hydrocarbons								
Extractable Petroleum Hydrocarbons (C10-C19)		ug/L	< 250	-	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L	< 250	-	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L	-	-	-	-	-	-
Volatile Hydrocarbons (C6-C10)		ug/L	< 100	-	< 100	< 100	< 100	< 100
VHCs								
Volatile Hydrocarbons (C6-C10)		ug/L	< 100	-	< 100	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons		ug/L	< 100	-	< 100	< 100	< 100	< 100
VOCs + BTEX								
Benzene		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5
Styrene		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5
Toluene		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5
o-Xylene		ug/L	< 0.3	-	< 0.3	< 0.3	< 0.3	< 0.3
m,p-Xylenes		ug/L	< 0.4	-	< 0.4	< 0.4	< 0.4	< 0.4
Methyl tert-Butyl Ether		ug/L	< 0.5	-	< 0.5	< 0.5	< 0.5	< 0.5

Table Notes:

Criteria from the Hazelton Landfill Operational Certificate (OC) No. 17226, administered by the BC Ministry of Environment and Climate Change (ENV), last updated 19 October 2021

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable OC criteria **744**

Detection limit exceeds applicable OC criteria ***< 2***

Appendix C
Results of Leachate Analyses - Wetland 4 Outlet
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET
			Laboratory ID	VA21B5000-001	VA21B5000-002	VA21C1750-001	VA21C1750-002	VA21C3191-001	VA21C3191-002
			Sample Date	2021-07-20	2021-07-20	2021-09-28	2021-09-28	2021-10-18	2021-10-18
			QA/QC	FDA	FD	FDA	FD	FDA	FD
Anions + Nutrients									
Alkalinity, Total as CaCO3		ug/L		272000	273000	233000	230000	254000	242000
Bromide (Br)		ug/L		-	-	-	-	167	167
Chloride (Cl)	3750000	ug/L		61600	61900	37400	37800	41600	40800
Fluoride (F)		mg/L		0.103	0.101	0.117	0.113	0.1	0.098
Nitrate (as N)		ug/L		37.2	35.2	666	664	734	740
Nitrite (as N)		ug/L		< 5	< 5	5.1	6.1	1.2	1.3
Ammonia (as N)	30000	ug/L		25.2	27.7	28.8	31.4	8.6	9.2
Total Kjeldahl Nitrogen		ug/L		953	973	740	824	670	640
Sulfate (SO4)		ug/L		1620	1620	7860	7810	10800	10600
Total Nitrogen	60000	ug/L		886	881	1310	1310	1220	1250
Phosphorus, Total Orthophosphate		ug/L		< 1	< 1	< 1	< 1	1.2	< 1
Phosphorus, Total		ug/L		<50	<50	<50	<50	<50	<50
Field + Physical									
Dissolved Oxygen, field measured		mg/L		7.3	7.3	6.7	6.7	7.2	7.2
Conductivity, field measured		uS/cm		611	611	389.2	389.2	374.2	374.2
Oxidation Reduction Potential, field measured		mV		225.4	225.4	250.8	250.8	270.1	270.1
pH, field measured		pH units		9.23	9.23	7.66	7.66	7.84	7.84
pH, lab	6.5 - 8.5	pH		8.37	8.36	8.44	8.42	8.37	8.35
Specific conductivity, field measured		uS/cm		675	675	525.8	525.8	612	612
Temperature, field measured		deg c		20.1	20.1	11.4	11.4	4.7	4.7
Turbidity, field measured		NTU		5.25	5.25	6.1	6.1	1.45	1.45
Conductivity		uS/cm		670	667	527	535	614	603
Total Organic Carbon		mg/L		11.7	12.4	10.2	9.41	9.03	9.21
Hardness, Calcium Carbonate		mg/L		230	229	205	198	232	228
Biochemical Oxygen Demand		mg/L		2.4	2.5	< 2	< 2	< 2	< 2
Chemical Oxygen Demand		mg/L		41	39	34	30	25	24
Discharge		m3/s		< 0.25	< 0.25	1	1	< 0.25	< 0.25
Metals, Total									
Aluminum		ug/L		125	110	334	318	27.7	25.4
Antimony		ug/L		0.24	0.24	0.13	0.13	0.1	0.1
Arsenic		ug/L		1.95	2.2	1.2	1.1	0.69	0.69
Barium		ug/L		26.6	29.6	43.1	42.1	46.6	46
Beryllium		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth		ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron		ug/L		427	441	320	298	322	327
Cadmium	100	ug/L		0.0144	0.01	< 0.005	< 0.005	0.0054	< 0.005
Calcium		ug/L		63200	63200	57500	54700	66500	65600
Chromium		ug/L		< 0.5	< 0.5	0.53	< 0.5	< 0.5	< 0.5
Cobalt		ug/L		0.34	0.36	0.23	0.23	0.14	0.13
Copper		ug/L		1.42	1.53	1.57	1.54	1.29	1.26
Iron	4500	ug/L		167	216	386	377	46	42
Lead		ug/L		< 0.05	0.065	0.071	0.071	< 0.05	< 0.05
Lithium		ug/L		< 1	< 1	< 1	< 1	< 1	< 1
Magnesium		ug/L		17500	17400	14900	14800	16000	15600
Manganese		ug/L		261	272	37.6	37.4	14.9	11.4
Mercury		ug/L		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum		ug/L		1.83	1.85	0.552	0.548	0.482	0.462
Nickel		ug/L		4.4	4.46	2.67	2.56	2.48	2.35
Potassium		ug/L		8000	8050	6310	6110	6020	5890
Selenium		ug/L		0.101	0.089	0.066	0.054	0.074	0.06
Silicon		ug/L		3860	4110	3760	3720	2390	2340
Silver		ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium		ug/L		55700	56000	38700	37800	36700	36400
Strontium		ug/L		462	464	358	358	431	422
Sulphur (S)		ug/L		1010	980	3260	3220	4040	3910
Tellurium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium		ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium		ug/L		3.32	4.47	7.03	7.36	< 0.6	< 0.6
Uranium		ug/L		0.442	0.457	0.259	0.252	0.346	0.334
Vanadium		ug/L		0.52	0.63	0.86	0.81	< 0.5	< 0.5
Zinc	75000	ug/L		< 3	< 3	< 3	< 3	< 3	< 3
Zirconium		ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tungsten		ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium		ug/L		0.93	0.96	0.81	0.74	0.48	0.51
Cesium		ug/L		0.016	0.02	0.027	0.026	< 0.01	< 0.01
Hydrocarbons									
Extractable Petroleum Hydrocarbons (C10-C19)		ug/L		< 250	< 250	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)		ug/L		< 250	< 250	< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C10-C32)		ug/L		-	-	-	-	< 400	< 400
Volatile Hydrocarbons (C6-C10)		ug/L		< 100	< 100	< 100	< 100	< 100	< 100
VHCs									
Volatile Hydrocarbons (C6-C10)		ug/L		< 100	< 100	< 100	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons		ug/L		< 100	< 100	< 100	< 100	< 100	< 100
VOCs + BTEX									
Benzene		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Styrene		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
o-Xylene		ug/L		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
m,p-Xylenes		ug/L		< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Methyl tert-Butyl Ether		ug/L		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

Table Notes:

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- Chemical not analyzed or criteria not defined.

Result exceeds applicable OC criteria **744**

Detection limit exceeds applicable OC criteria ***< 2***

Appendix C
Results of Leachate Analyses - EQ Pond
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	EQ POND	EQ POND	EQ POND	EQ POND	EQ POND	EQ POND	EQ POND
		Laboratory ID	L2283535-1	L2321734-4	L2325524-3	L2335286-3	L2335286-9	L239600-1	VA20A6390-002
		Sample Date	2019-05-30	2019-07-31	2019-08-07	2019-08-22	2019-08-22	2019-08-29	2020-05-11
		QA/QC				FDA	FD		
Anions + Nutrients									
Alkalinity, Total as CaCO3	ug/L		466000	319000	344000	338000	340000	391000	312000
Bromide (Br)	ug/L		660	-	-	760	620	730	< 250
Chloride (Cl)	ug/L		108000	112000	116000	115000	114000	118000	54400
Fluoride (F)	mg/L		< 0.1	< 0.1	< 0.1	< 0.2	< 0.1	< 0.1	0.102
Nitrate (as N)	ug/L		33	148	146	154	142	104	< 25
Nitrite (as N)	ug/L		5.8	10.1	12.1	14	6.6	40.8	< 5
Ammonia (as N)	ug/L		8210	7780	7690	7700	7080	11100	4050
Total Kjeldahl Nitrogen	ug/L		-	-	-	-	-	-	6600
Sulfate (SO4)	ug/L		35400	28600	33700	35300	30900	34100	22900
Total Nitrogen	ug/L		-	-	8610	8260	7730	12800	6600
Phosphorus, Total Orthophosphate	ug/L		< 1	< 1	< 1	< 1	-	136	87.6
Phosphorus, Total	ug/L		<50	<50	<50	<50	<50	233	292
Field + Physical									
Dissolved Oxygen, field measured	mg/L		-	4.9	5.7	5	5	5	1.1
Conductivity, field measured	uS/cm		-	977	1068	893	893	893	625
Oxidation Reduction Potential, field measured	mV		-	329.5	330.4	345.6	345.6	345.6	216.7
pH, field measured	pH units		-	7.68	7.61	7.68	7.68	7.68	7.54
pH, lab	pH		8.08	8.18	8.15	8.13	8.15	8.25	7.74
Specific conductivity, field measured	uS/cm		-	-	-	-	-	-	755
Temperature, field measured	deg c		-	17.9	21.7	16.5	16.5	16.5	16.1
Turbidity, field measured	NTU		-	-	5.1	6.8	6.8	6.8	-
Conductivity	uS/cm		-	-	1010	-	-	1110	756
Total Organic Carbon	mg/L		20.6	20.4	21.6	21.9	19.3	20.8	17.8
Hardness, Calcium Carbonate	mg/L		431	366	342	332	335	338	268
Biochemical Oxygen Demand	mg/L		3.6	4.3	3.1	3.3	2.6	2.9	11.3
Chemical Oxygen Demand	mg/L		88	55	52	58	83	70	74
Metals, Total									
Aluminum	ug/L		9.6	68.3	21.7	74.6	70.4	40.3	338
Antimony	ug/L		0.33	0.41	0.33	0.37	0.36	0.41	0.37
Arsenic	ug/L		2	3.29	2.93	3.05	3.01	4.31	3.02
Barium	ug/L		234	220	202	212	212	198	144
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.077	< 0.05
Boron	ug/L		869	963	950	911	878	999	391
Cadmium	ug/L		< 0.005	0.0077	< 0.005	0.01	0.0109	0.0075	0.0371
Calcium	ug/L		128000	99700	89500	86100	85600	87700	78400
Chromium	ug/L		0.66	0.49	0.42	0.48	0.41	0.42	1.49
Cobalt	ug/L		3.22	1.96	1.74	1.62	1.62	2.03	2.2
Copper	ug/L		< 0.5	0.75	0.71	0.97	1.03	1.68	1.63
Iron	ug/L		391	201	97	224	225	257	1400
Lead	ug/L		< 0.05	0.092	< 0.05	0.101	0.101	0.076	0.405
Lithium	ug/L		1.2	1.4	1.2	1.2	1.2	1.2	< 1
Magnesium	ug/L		27400	28400	28700	28300	29400	28800	17500
Manganese	ug/L		3090	616	266	239	243	738	2310
Mercury	ug/L		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum	ug/L		0.8	1.11	0.954	1.18	1.19	1.55	0.719
Nickel	ug/L		8.78	7.88	7.76	7.68	7.9	7.66	5.29
Potassium	ug/L		17200	19000	18500	19200	19700	18800	9840
Selenium	ug/L		0.115	0.191	0.175	0.212	0.192	0.272	0.23
Silicon	ug/L		4300	4440	4130	4300	4410	4180	3520
Silver	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		88700	92800	90100	91400	92800	96000	45200
Strontium	ug/L		823	834	762	757	787	753	494
Sulphur (S)	ug/L		15300	13200	12200	13700	14200	14300	9920
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	0.13	< 0.1	0.11	0.11	0.15	< 0.1
Titanium	ug/L		< 0.3	0.86	< 0.3	0.85	0.84	0.55	5.7
Uranium	ug/L		0.504	0.484	0.461	0.506	0.546	0.509	0.365
Vanadium	ug/L		< 0.5	0.52	< 0.5	< 0.5	< 0.5	< 0.5	1.13
Zinc	ug/L		< 3	< 3	< 3	< 3	< 3	3.6	9.6
Zirconium	ug/L		0.127	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.24
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		3.93	3.88	3.98	3.94	4.08	4.41	2.69
Cesium	ug/L		0.024	0.028	0.021	0.027	0.026	0.046	0.044

Table Notes:
QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Phase 2 to EQ Pond
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name: PHASE 2 TO EQ POND	PHASE 2 TO EQ POND	PHASE 2 TO EQ POND	PHASE 2 TO EQ POND
		Laboratory ID: L2315550-1	L2321734-1	L2325524-1	L2335286-1
		Sample Date: 2019-07-22	2019-07-31	2019-08-07	2019-08-22
		QA/QC			
Anions + Nutrients					
Alkalinity, Total as CaCO3	ug/L	99600	226000	578000	137000
Bromide (Br)	ug/L	98	-	-	-
Chloride (Cl)	ug/L	26000	34500	105000	22800
Fluoride (F)	mg/L	0.106	0.062	< 0.2	0.102
Nitrate (as N)	ug/L	2240	383	< 50	1450
Nitrite (as N)	ug/L	116	335	49	155
Ammonia (as N)	ug/L	1420	2760	15700	2040
Sulfate (SO4)	ug/L	81400	76200	91800	57600
Total Nitrogen	ug/L	-	-	20000	4390
Phosphorus, Total Orthophosphate	ug/L	1.1	< 1	1.1	1.6
Phosphorus, Total	ug/L	<50	<50	<25	62
Field + Physical					
Dissolved Oxygen, field measured	mg/L	5.1	6.5	6.6	4.8
Conductivity, field measured	uS/cm	374.1	549	1355	412
Oxidation Reduction Potential, field measured	mV	466.8	352.1	356.7	322.5
pH, field measured	pH units	7.19	7.06	6.63	7.22
pH, lab	pH	7.84	8.32	8.01	8.09
Temperature, field measured	deg c	14.4	12.7	13.2	14.3
Turbidity, field measured	NTU	19.8	-	50.1	42.8
Conductivity	uS/cm	-	-	1680	-
Total Organic Carbon	mg/L	51.9	103	552	54
Hardness, Calcium Carbonate	mg/L	187	291	728	193
Biochemical Oxygen Demand	mg/L	104	130	870	100
Chemical Oxygen Demand	mg/L	163	306	1550	165
Metals, Total					
Aluminum	ug/L	1230	35.8	54	1420
Antimony	ug/L	0.41	0.51	1.36	0.43
Arsenic	ug/L	2.28	3.78	6.46	3.94
Barium	ug/L	71.9	99.6	370	87.9
Beryllium	ug/L	< 0.1	< 0.1	< 0.5	< 0.1
Bismuth	ug/L	< 0.05	< 0.05	< 0.25	< 0.05
Boron	ug/L	67	96	352	67
Cadmium	ug/L	0.053	< 0.03	0.039	0.0353
Calcium	ug/L	59100	91100	232000	59400
Chromium	ug/L	1.68	2.57	14.6	2.11
Cobalt	ug/L	2.22	2.43	17.2	2.93
Copper	ug/L	3.56	1.45	< 2.5	6.02
Iron	ug/L	1010	923	7880	1890
Lead	ug/L	0.357	0.062	< 0.25	0.725
Lithium	ug/L	< 1	< 1	< 5	< 1
Magnesium	ug/L	9610	15400	35900	10900
Manganese	ug/L	1580	3880	17200	1950
Mercury	ug/L	0.0083	0.0058	0.0125	0.013
Molybdenum	ug/L	1.92	2.63	1.7	1.9
Nickel	ug/L	3.71	4.33	15.5	3.94
Potassium	ug/L	3770	5890	21500	4550
Selenium	ug/L	3.47	2.33	1.11	1.48
Silicon	ug/L	7130	5510	6490	7460
Silver	ug/L	0.014	< 0.01	< 0.05	0.017
Sodium	ug/L	21200	31200	89400	20900
Strontium	ug/L	339	552	1210	302
Sulphur (S)	ug/L	29200	28900	32100	21400
Tellurium	ug/L	< 0.2	< 0.2	< 1	< 0.2
Thallium	ug/L	< 0.01	< 0.01	< 0.05	< 0.01
Thorium-232	ug/L	< 0.1	< 0.1	< 0.5	< 0.1
Tin	ug/L	< 0.1	< 0.1	< 0.5	< 0.1
Titanium	ug/L	17	0.84	2.1	9.91
Uranium	ug/L	0.188	0.375	0.479	0.374
Vanadium	ug/L	2.19	< 0.5	< 2.5	2.35
Zinc	ug/L	7.6	9.7	30	9.7
Zirconium	ug/L	0.36	< 0.2	< 1	< 0.2
Tungsten	ug/L	< 0.1	< 0.1	< 0.5	< 0.1
Rubidium	ug/L	1.09	1.15	3.8	1.23
Cesium	ug/L	0.099	0.012	< 0.05	0.106
VOCs + BTEX					
Bromodichloromethane (BDCM)	ug/L	< 0.001	-	-	-
Bromoform (Tribromomethane)	ug/L	< 0.001	-	-	-
Carbon Tetrachloride	ug/L	< 0.0005	-	-	-
Chlorobenzene	ug/L	< 0.001	-	-	-
Chloroethane	ug/L	< 0.001	-	-	-
Chloroform	ug/L	< 0.001	-	-	-
Chloromethane	ug/L	< 0.005	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	ug/L	< 0.005	-	-	-
Dibromochloromethane (DBCM)	ug/L	< 0.001	-	-	-
1,2-dichlorobenzene	ug/L	< 0.0005	-	-	-
1,3-dichlorobenzene	ug/L	< 0.001	-	-	-
1,4-dichlorobenzene	ug/L	< 0.001	-	-	-
1,1-dichloroethane	ug/L	< 0.001	-	-	-
1,2-dichloroethane	ug/L	< 0.001	-	-	-
1,1-dichloroethene	ug/L	< 0.001	-	-	-
1,2-dichloroethylene (cis) (1,2-dichloroethene) (cis)	ug/L	< 0.001	-	-	-
1,2-dichloroethylene (trans) (1,2-dichloroethene) (trans)	ug/L	< 0.001	-	-	-
1,2-dichloropropane (Propylene Dichloride)	ug/L	< 0.001	-	-	-
1,3-dichloropropene (cis)	ug/L	< 0.0005	-	-	-
1,3-dichloropropene (trans)	ug/L	< 0.0005	-	-	-
Dichloropropylene, Total	ug/L	< 0.001	-	-	-
1,1,1,2-tetrachloroethane	ug/L	< 0.001	-	-	-
1,1,2,2-tetrachloroethane	ug/L	< 0.0002	-	-	-
Tetrachloroethylene (PCE/PERC)	ug/L	< 0.001	-	-	-
1,1,1-trichloroethane	ug/L	< 0.001	-	-	-
1,1,2-trichloroethane	ug/L	< 0.0005	-	-	-
Trichloroethylene (TCE)	ug/L	< 0.001	-	-	-
Trichlorofluoromethane (Freon 11)	ug/L	< 0.001	-	-	-
Vinyl Chloride (Chloroethene)	ug/L	< 0.0004	-	-	-
Benzene	ug/L	< 0.0005	-	-	-
Ethylbenzene	ug/L	< 0.0005	-	-	-
Styrene	ug/L	< 0.0005	-	-	-
Toluene	ug/L	< 0.00045	-	-	-
Xylenes, Total	ug/L	< 0.00075	-	-	-
o-Xylene	ug/L	< 0.0005	-	-	-
m,p-Xylenes	ug/L	< 0.0005	-	-	-
Methyl tert-Butyl Ether	ug/L	< 0.0005	-	-	-

Table Notes:
QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Pump Station
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	PUMP STATION	PUMP STATION	PUMP STATION	PUMP STATION	PUMP STATION
		Laboratory ID	L2315550-3	L2321734-3	L2325524-2	L2335286-2	VA20A6390-001
		Sample Date	2019-07-22	2019-07-31	2019-08-07	2019-08-22	2020-05-11
		QA/QC					
Anions + Nutrients							
Alkalinity, Total as CaCO3	ug/L		859000	870000	1150000	755000	1060000
Bromide (Br)	ug/L		1070	-	-	1200	< 1000
Chloride (Cl)	ug/L		205000	215000	251000	175000	175000
Fluoride (F)	mg/L		< 0.2	< 0.4	< 0.4	< 0.4	< 0.4
Nitrate (as N)	ug/L		5970	2040	1020	2260	550
Nitrite (as N)	ug/L		107	35	51	73	41
Ammonia (as N)	ug/L		17700	26400	21600	12400	25300
Total Kjeldahl Nitrogen	ug/L		-	-	-	-	28900
Sulfate (SO4)	ug/L		46500	29200	19300	55400	23600
Total Nitrogen	ug/L		-	-	23400	16100	29500
Phosphorus, Total Orthophosphate	ug/L		< 1	< 1	< 1	< 1	< 1
Phosphorus, Total	ug/L		<100	<100	<100	61	192
Field + Physical							
Dissolved Oxygen, field measured	mg/L		1.8	3.4	2.6	2.7	0.6
Conductivity, field measured	uS/cm		1746	1912	1930	1474	1704
Oxidation Reduction Potential, field measured	mV		234.2	177	349.9	398.7	94
pH, field measured	pH units		6.73	6.71	6.61	6.36	6.56
pH, lab	pH		7.53	7.68	7.38	7.39	6.96
Specific conductivity, field measured	uS/cm		-	-	-	-	2622
Temperature, field measured	deg c		14.5	13.2	15.7	14	5.7
Turbidity, field measured	NTU		22.1	-	28.7	14.3	-
Conductivity	uS/cm		-	-	2590	-	2280
Total Organic Carbon	mg/L		28.1	33.9	30.2	23.1	33.6
Hardness, Calcium Carbonate	mg/L		734	816	778	705	832
Biochemical Oxygen Demand	mg/L		8.2	5.7	7	6.7	7
Chemical Oxygen Demand	mg/L		124	103	81	119	120
Metals, Total							
Aluminum	ug/L		321	43.8	21.4	115	21.2
Antimony	ug/L		0.52	0.42	0.27	0.47	0.4
Arsenic	ug/L		4.97	10.5	2.38	3.04	9.1
Barium	ug/L		606	927	713	579	537
Beryllium	ug/L		< 0.2	< 0.2	< 0.1	< 0.2	< 0.2
Bismuth	ug/L		< 0.1	< 0.1	< 0.1	< 0.05	< 0.1
Boron	ug/L		2160	2450	2250	1830	1830
Cadmium	ug/L		0.233	0.104	0.239	0.358	0.0483
Calcium	ug/L		218000	237000	230000	211000	254000
Chromium	ug/L		1.65	1.57	1.1	1.08	1.91
Cobalt	ug/L		4.22	4.03	3.04	4.32	3.99
Copper	ug/L		6.4	3	8.3	6.57	< 1
Iron	ug/L		7560	15600	3270	5400	25500
Lead	ug/L		0.26	< 0.1	< 0.1	0.13	< 0.1
Lithium	ug/L		2.4	2.9	2.5	2.2	2.6
Magnesium	ug/L		46000	54200	49200	43300	47900
Manganese	ug/L		4310	5730	4290	5110	5940
Mercury	ug/L		0.0105	< 0.005	0.0067	0.0089	< 0.005
Molybdenum	ug/L		1.16	1.15	0.86	1.27	1
Nickel	ug/L		13.5	14	11.6	12.5	11.3
Potassium	ug/L		34500	43600	36700	31900	37400
Selenium	ug/L		0.26	0.22	0.2	0.259	0.167
Silicon	ug/L		10100	11000	9810	9870	10100
Silver	ug/L		< 0.02	< 0.02	< 0.02	0.017	< 0.02
Sodium	ug/L		180000	217000	186000	152000	158000
Strontium	ug/L		1350	1620	1460	1330	1440
Sulphur (S)	ug/L		19400	15600	12900	22600	11800
Tellurium	ug/L		< 0.4	< 0.4	< 0.4	< 0.2	< 0.4
Thallium	ug/L		0.021	< 0.02	0.021	0.047	< 0.02
Thorium-232	ug/L		< 0.2	< 0.2	< 0.2	< 0.1	< 0.2
Tin	ug/L		< 0.2	< 0.2	< 0.2	0.18	< 0.2
Titanium	ug/L		7	0.85	< 0.6	3.08	< 0.6
Uranium	ug/L		0.81	0.896	0.681	0.863	0.65
Vanadium	ug/L		1.5	1.2	< 1	0.76	< 1
Zinc	ug/L		13.9	< 6	< 6	5.8	10.3
Zirconium	ug/L		0.49	0.79	< 0.4	0.34	0.64
Tungsten	ug/L		< 0.2	< 0.2	< 0.2	< 0.1	< 0.2
Rubidium	ug/L		7.12	8.33	6.85	6.53	8.07
Cesium	ug/L		0.107	0.085	0.093	0.093	0.077
VOCs + BTEX							
Bromodichloromethane (BDCM)	ug/L		< 0.001	-	-	-	-
Bromoform (Tribromomethane)	ug/L		< 0.001	-	-	-	-
Carbon Tetrachloride	ug/L		< 0.0005	-	-	-	-
Chlorobenzene	ug/L		< 0.001	-	-	-	-
Chloroethane	ug/L		< 0.001	-	-	-	-
Chloroform	ug/L		< 0.001	-	-	-	-
Chloromethane	ug/L		< 0.005	-	-	-	-
Dichloromethane (DCM) (Methylene Chloride)	ug/L		< 0.005	-	-	-	-
Dibromochloromethane (DBCM)	ug/L		< 0.001	-	-	-	-
1,2-dichlorobenzene	ug/L		< 0.0005	-	-	-	-
1,3-dichlorobenzene	ug/L		< 0.001	-	-	-	-
1,4-dichlorobenzene	ug/L		< 0.001	-	-	-	-
1,1-dichloroethane	ug/L		< 0.001	-	-	-	-
1,2-dichloroethane	ug/L		< 0.001	-	-	-	-
1,1-dichloroethene	ug/L		< 0.001	-	-	-	-
1,2-dichloroethylene (cis) (1,2-dichloroethene) (cis)	ug/L		< 0.001	-	-	-	-
1,2-dichloroethylene (trans) (1,2-dichloroethene) (trans)	ug/L		< 0.001	-	-	-	-
1,2-dichloropropane (Propylene Dichloride)	ug/L		< 0.001	-	-	-	-
1,3-dichloropropene (cis)	ug/L		< 0.0005	-	-	-	-
1,3-dichloropropene (trans)	ug/L		< 0.0005	-	-	-	-
Dichloropropylene, Total	ug/L		< 0.001	-	-	-	-
1,1,1,2-tetrachloroethane	ug/L		< 0.001	-	-	-	-
1,1,2,2-tetrachloroethane	ug/L		< 0.0002	-	-	-	-
Tetrachloroethylene (PCE/PERC)	ug/L		< 0.001	-	-	-	-
1,1,1-trichloroethane	ug/L		< 0.001	-	-	-	-
1,1,2-trichloroethane	ug/L		< 0.0005	-	-	-	-
Trichloroethylene (TCE)	ug/L		< 0.001	-	-	-	-
Trichlorofluoromethane (Freon 11)	ug/L		< 0.001	-	-	-	-
Vinyl Chloride (Chloroethene)	ug/L		< 0.0004	-	-	-	-
Benzene	ug/L		< 0.0005	-	-	-	-
Ethylbenzene	ug/L		< 0.0005	-	-	-	-
Styrene	ug/L		< 0.0005	-	-	-	-
Toluene	ug/L		< 0.00045	-	-	-	-
Xylenes, Total	ug/L		< 0.00075	-	-	-	-
o-Xylene	ug/L		< 0.0005	-	-	-	-
m,p-Xylenes	ug/L		< 0.0005	-	-	-	-
Methyl tert-Butyl Ether	ug/L		< 0.0005	-	-	-	-

Table Notes:
QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate
< Indicates parameter was below laboratory equipment detection limit.
- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 1
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 1	WETLAND 1	WETLAND 1	WETLAND 1	WETLAND 1	WETLAND 1	WETLAND 1	WETLAND 1
		Laboratory ID	L2315550-4	L2321734-5	L2325524-4	L2335286-4	L2383004-1	L2383004-5	VA20A6390-003	VA20A6390-010
		Sample Date	2019-07-22	2019-07-31	2019-08-07	2019-08-22	2019-11-12	2019-11-12	2020-05-11	2020-05-11
		QA/QC					FDA	FD	FDA	FD
Anions + Nutrients										
Alkalinity, Total as CaCO3	ug/L		146000	152000	169000	205000	275000	275000	208000	216000
Bromide (Br)	ug/L		258	-	-	258	470	490	199	197
Chloride (Cl)	ug/L		10700	4100	1550	16600	75500	75700	41100	40300
Fluoride (F)	mg/L		0.106	0.104	0.109	0.14	< 0.1	< 0.1	0.108	0.111
Nitrate (as N)	ug/L		33.8	7.7	7.8	10.3	407	407	84.2	88.5
Nitrite (as N)	ug/L		2.3	< 1	< 1	< 1	280	278	49.6	45.1
Ammonia (as N)	ug/L		55.9	347	43.3	34.1	5030	5120	1570	1640
Total Kjeldahl Nitrogen	ug/L		-	-	-	34.1	5030	5120	2580	2590
Sulfate (SO4)	ug/L		1180	< 300	< 300	< 300	28800	29000	16800	16500
Total Nitrogen	ug/L		-	-	1740	1710	6360	6410	2710	2720
Phosphorus, Total Orthophosphate	ug/L		2.8	1.3	< 1	< 1	1.9	1.7	1.8	1.1
Phosphorus, Total	ug/L		87	58	<50	56	<50	<50	<50	<50
Field + Physical										
Dissolved Oxygen, field measured	mg/L		4.3	5.7	3.1	4.4	10.3	10.3	6.5	6.5
Conductivity, field measured	uS/cm		269.3	238.6	295.1	344.1	433.7	433.7	424.9	424.9
Oxidation Reduction Potential, field measured	mV		292.1	306.5	279.7	301.3	476.2	476.2	196.2	196.2
pH, field measured	pH units		7.12	7.22	7.11	7.09	6.96	6.96	7.48	7.48
pH, lab	pH		7.99	8.34	8.23	8.27	8.23	8.28	7.73	7.89
Specific conductivity, field measured	uS/cm		-	-	-	-	-	-	535.8	535.8
Temperature, field measured	deg c		18.9	15.3	18.6	15.3	1.3	1.3	14.2	14.2
Turbidity, field measured	NTU		39.7	-	17.6	20.8	-	-	-	-
Conductivity	uS/cm		-	-	292	-	785	792	538	538
Total Organic Carbon	mg/L		35.4	32.8	37.3	35.5	14.7	14.6	10.8	10.9
Hardness, Calcium Carbonate	mg/L		167	163	169	233	265	262	189	198
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	2	6.3	6.9	< 2	< 2
Chemical Oxygen Demand	mg/L		101	84	92	103	49	45	34	40
Metals, Total										
Aluminum	ug/L		2090	385	441	528	718	627	232	247
Antimony	ug/L		0.27	0.21	0.19	0.2	0.34	0.33	0.28	0.27
Arsenic	ug/L		3.77	2.13	2.8	4.18	2.04	1.97	1.93	1.85
Barium	ug/L		47.1	34.7	41.9	59.3	130	128	67.0	68.6
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		28	21	26	19	476	469	272	318
Cadmium	ug/L		0.025	0.0132	0.0154	0.0183	0.0234	0.0184	0.0161	0.0115
Calcium	ug/L		49100	49200	50300	71100	72300	72400	55100	57100
Chromium	ug/L		2.05	0.44	0.46	0.63	1.02	0.92	0.50	0.53
Cobalt	ug/L		1.28	0.4	0.54	0.66	1.54	1.56	0.72	0.71
Copper	ug/L		6.24	3.1	3.26	3.51	2.77	2.44	1.02	1.04
Iron	ug/L		3410	979	1400	2000	866	757	545	583
Lead	ug/L		0.811	0.188	0.221	0.222	0.397	0.363	0.113	0.114
Lithium	ug/L		1.3	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Magnesium	ug/L		10800	9700	10500	13300	20500	19700	12500	13300
Manganese	ug/L		366	231	497	577	538	526	86.5	85.1
Mercury	ug/L		0.0067	< 0.005	0.0072	< 0.005	0.0067	0.0058	< 0.005	< 0.005
Molybdenum	ug/L		0.99	0.868	0.856	2.69	1.75	1.74	1.24	1.24
Nickel	ug/L		4.13	1.79	1.91	2.36	5.63	5.48	3.38	3.31
Potassium	ug/L		472	172	208	1730	11100	11200	7020	7430
Selenium	ug/L		0.221	0.187	0.171	0.203	0.28	0.233	0.154	0.129
Silicon	ug/L		3070	590	770	3150	3420	3160	1010	1140
Silver	ug/L		0.017	< 0.01	< 0.01	0.013	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		3740	1530	780	5030	56200	54200	32600	34800
Strontium	ug/L		302	314	309	392	522	536	392	377
Sulphur (S)	ug/L		840	< 500	< 500	< 500	11700	10500	7230	6610
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L		0.013	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	< 0.1	< 0.1	0.22	< 0.1	< 0.1	< 0.1	0.19
Titanium	ug/L		34.7	5.14	11.7	< 9	12.1	10.5	4.19	4.88
Uranium	ug/L		0.142	0.124	0.153	0.533	0.545	0.519	0.391	0.361
Vanadium	ug/L		4.7	1.31	1.51	1.9	1.87	1.61	0.95	0.66
Zinc	ug/L		8.7	< 3	< 3	< 3	8.9	7	29.3	22.0
Zirconium	ug/L		0.35	< 0.2	0.48	< 0.6	< 0.2	0.4	0.35	< 0.2
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		1.58	0.37	0.46	0.75	2.78	2.74	1.60	1.50
Cesium	ug/L		0.266	0.05	0.058	0.037	0.069	0.062	0.022	0.024
VOCs + BTEX										
Benzene	ug/L		< 0.0005	-	-	-	-	-	-	-
Ethylbenzene	ug/L		< 0.0005	-	-	-	-	-	-	-
Styrene	ug/L		< 0.0005	-	-	-	-	-	-	-
Toluene	ug/L		< 0.00045	-	-	-	-	-	-	-
m,p-Xylenes	ug/L		< 0.00075	-	-	-	-	-	-	-
Methyl tert-Butyl Ether	ug/L		< 0.0005	-	-	-	-	-	-	-

Table Notes:
QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate
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- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 2
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

	Sample Name	WETLAND 2	WETLAND 2	WETLAND 2	WETLAND 2	WETLAND 2	WETLAND 2
	Laboratory ID	L2315550-5	L2321734-6	L-2325524-5	L-2335286-5	L2383004-2	VA20A6390-004
	Sample Date	2019-07-22	2019-07-31	2019-08-07	2019-08-22	2019-11-12	2020-05-11
	QA/QC						
Parameter	Unit						
Anions + Nutrients							
Alkalinity, Total as CaCO3	ug/L	196000	208000	213000	190000	257000	201000
Bromide (Br)	ug/L	164	76100	-	731	450	173
Chloride (Cl)	ug/L	40900	-	75500	70400	71100	39500
Fluoride (F)	mg/L	0.083	0.096	0.101	0.096	< 0.1	0.093
Nitrate (as N)	ug/L	30.2	19.8	16.3	< 5	359	40.0
Nitrite (as N)	ug/L	1.5	< 1	< 1	< 1	201	11.6
Ammonia (as N)	ug/L	37.5	49.6	470	10.7	3760	231
Total Kjeldahl Nitrogen	ug/L	-	-	-	10.7	3760	1070
Sulfate (SO4)	ug/L	17100	10300	7790	7970	25300	9080
Total Nitrogen	ug/L	-	-	649	1400	4820	1120
Phosphorus, Total Orthophosphate	ug/L	2	1.3	< 1	10.7	1.3	3.0
Phosphorus, Total	ug/L	<50	85	<50	114	<50	<50
Field + Physical							
Dissolved Oxygen, field measured	mg/L	5.5	3.3	6.6	5	9.2	8.4
Conductivity, field measured	uS/cm	425.6	523	546	490.6	408.9	390.1
Oxidation Reduction Potential, field measured	mV	302.1	291	311.5	321.3	3.88	153.9
pH, field measured	pH units	7.09	6.64	6.77	7.03	7.63	7.43
pH, lab	pH	8.12	8.47	8.16	8.14	8.2	7.77
Specific conductivity, field measured	uS/cm	-	-	-	-	-	498.2
Temperature, field measured	deg c	16.3	13.9	17.1	18.1	1.8	13.6
Turbidity, field measured	NTU	28.2	-	10.8	15.9	-	-
Conductivity	uS/cm	-	-	622	-	729	506
Total Organic Carbon	mg/L	19.1	14	14.3	27.9	13.7	10.4
Hardness, Calcium Carbonate	mg/L	223	285	286	259	250	198
Biochemical Oxygen Demand	mg/L	< 2	< 2	< 2	2.5	4.4	< 2
Chemical Oxygen Demand	mg/L	46	34	35	87	41	32
Metals, Total							
Aluminum	ug/L	393	1040	454	493	547	522
Antimony	ug/L	0.19	0.15	0.12	0.16	0.32	0.22
Arsenic	ug/L	1.36	2.95	2.57	2.47	1.8	2.05
Barium	ug/L	65	87.6	82.3	84.7	111	50.6
Beryllium	ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L	217	110	118	56	390	200
Cadmium	ug/L	0.0153	0.0317	0.0181	0.0169	0.0207	0.0249
Calcium	ug/L	65900	86200	85100	75500	68200	59100
Chromium	ug/L	0.51	1.09	0.53	0.53	0.77	0.61
Cobalt	ug/L	0.46	1.18	0.65	0.85	1.2	0.54
Copper	ug/L	3.14	3.51	2.66	2.44	2.52	2.10
Iron	ug/L	444	1750	880	1870	755	686
Lead	ug/L	0.145	0.525	0.172	0.272	0.341	0.292
Lithium	ug/L	< 1	1	< 1	< 1	< 1	< 1
Magnesium	ug/L	14200	17000	17900	17200	19400	12300
Manganese	ug/L	363	790	654	362	458	167
Mercury	ug/L	0.0054	< 0.01	0.0057	0.0066	0.0071	< 0.005
Molybdenum	ug/L	0.56	0.728	0.696	0.974	1.64	1.17
Nickel	ug/L	2.41	2.8	2.05	2.49	4.9	2.70
Potassium	ug/L	954	1180	1190	3360	9790	5380
Selenium	ug/L	0.106	0.096	0.092	0.149	0.268	0.077
Silicon	ug/L	5290	6050	5800	4490	2770	840
Silver	ug/L	< 0.01	0.01	< 0.01	0.014	< 0.01	< 0.01
Sodium	ug/L	16400	19000	19400	15700	50300	25800
Strontium	ug/L	398	497	482	469	495	373
Sulphur (S)	ug/L	6260	4020	3160	2920	9540	3910
Tellurium	ug/L	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	ug/L	9.56	25.4	11	6.8	9.62	8.30
Uranium	ug/L	0.268	0.327	0.36	0.316	0.535	0.351
Vanadium	ug/L	1.11	2.72	1.28	1.29	1.53	1.52
Zinc	ug/L	< 3	4.4	< 3	< 3	5.2	9.3
Zirconium	ug/L	0.33	0.28	0.32	0.21	0.41	0.35
Tungsten	ug/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L	0.4	0.84	0.56	0.88	2.33	1.23
Cesium	ug/L	0.03	0.113	0.047	0.038	0.053	0.044
VOCs + BTEX							
Benzene	ug/L	< 0.0005	-	-	-	-	-
Ethylbenzene	ug/L	< 0.0005	-	-	-	-	-
Styrene	ug/L	< 0.0005	-	-	-	-	-
Toluene	ug/L	< 0.00045	-	-	-	-	-
m,p-Xylenes	ug/L	< 0.00075	-	-	-	-	-
Methyl tert-Butyl Ether	ug/L	< 0.0005	-	-	-	-	-

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate

< Indicates parameter was below laboratory equipment detection limit.

- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 3	WETLAND 3	WETLAND 3	WETLAND 3	WETLAND 3
		Laboratory ID	L2315550-6	L2321734-7	L2325524-6	L-2335286-6	L2383004-3
		Sample Date	2019-07-22	2019-07-31	2019-08-07	2019-08-22	2019-11-12
		QA/QC					
Anions + Nutrients							
Alkalinity, Total as CaCO3	ug/L		181000	167000	168000	173000	159000
Bromide (Br)	ug/L		2530	-	-	2270	455
Chloride (Cl)	ug/L		217000	217000	226000	178000	59000
Fluoride (F)	mg/L		0.12	0.11	0.12	0.11	0.074
Nitrate (as N)	ug/L		201	55	< 25	44	778
Nitrite (as N)	ug/L		< 5	< 5	< 5	< 5	30.7
Ammonia (as N)	ug/L		63.1	40.6	25.1	17.1	740
Total Kjeldahl Nitrogen	ug/L		-	-	-	17.1	740
Sulfate (SO4)	ug/L		21800	18000	20800	15200	18400
Total Nitrogen	ug/L		-	-	779	1030	1810
Phosphorus, Total Orthophosphate	ug/L		< 1	< 1	< 1	< 1	< 1
Phosphorus, Total	ug/L		< 50	< 50	< 50	< 50	< 50
Field + Physical							
Dissolved Oxygen, field measured	mg/L		7.6	6.3	6	6.1	10.5
Conductivity, field measured	uS/cm		951	900	1027	747	311.4
Oxidation Reduction Potential, field measured	mV		314.7	303.1	320.6	331.9	368.1
pH, field measured	pH units		7.86	7.6	7.5	7.45	7.71
pH, lab	pH		8.29	8.42	8.3	8.31	7.94
Specific conductivity, field measured	uS/cm		-	-	-	-	-
Temperature, field measured	deg c		20.5	17.1	22.8	15.6	2.1
Turbidity, field measured	NTU		14.9	-	4.9	14.8	-
Conductivity	uS/cm		-	-	1040	-	522
Total Organic Carbon	mg/L		12.9	12.6	14.3	17.5	8.26
Hardness, Calcium Carbonate	mg/L		391	396	401	371	209
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	2.2	2
Chemical Oxygen Demand	mg/L		90	35	33	91	22
Metals, Total							
Aluminum	ug/L		470	75.3	59.2	252	389
Antimony	ug/L		0.32	0.31	0.28	0.25	0.2
Arsenic	ug/L		1.07	0.89	0.89	1.5	1.08
Barium	ug/L		142	140	144	131	59.3
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		456	409	413	269	205
Cadmium	ug/L		0.0264	0.0296	0.0112	0.0186	0.0415
Calcium	ug/L		114000	118000	120000	110000	63200
Chromium	ug/L		0.49	0.24	0.19	0.33	0.49
Cobalt	ug/L		0.34	0.2	0.17	0.27	0.48
Copper	ug/L		3.93	3.4	3.07	3.48	2.6
Iron	ug/L		372	78	92	394	451
Lead	ug/L		0.12	0.05	< 0.05	0.165	0.232
Lithium	ug/L		2.4	2.1	1.8	1.1	< 1
Magnesium	ug/L		25400	24900	24500	23300	12400
Manganese	ug/L		63.9	50.5	49.8	55.5	160
Mercury	ug/L		0.0061	< 0.005	< 0.005	< 0.005	0.006
Molybdenum	ug/L		2.06	1.88	1.77	1.7	0.864
Nickel	ug/L		3.15	2.66	2.45	2.66	2.74
Potassium	ug/L		6070	5700	5270	4900	4030
Selenium	ug/L		0.194	0.148	0.126	0.112	0.135
Silicon	ug/L		1360	810	820	2490	3440
Silver	ug/L		< 0.01	< 0.01	< 0.01	0.01	< 0.01
Sodium	ug/L		54200	49500	47600	37300	27800
Strontium	ug/L		1410	1490	1350	1090	395
Sulphur (S)	ug/L		9130	8010	7500	6260	6830
Tellurium	ug/L		< 0.2	0.21	0.33	< 0.2	< 0.2
Thallium	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	ug/L		10.6	1.62	0.85	3.15	6.6
Uranium	ug/L		0.733	0.646	0.651	0.586	0.307
Vanadium	ug/L		1.06	0.51	< 0.5	0.72	1.11
Zinc	ug/L		7.1	9.8	5.5	8.5	5.4
Zirconium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	0.33
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		0.78	0.55	0.51	0.65	1
Cesium	ug/L		0.034	< 0.01	< 0.01	0.025	0.044
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	-
VHCs							
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons	ug/L		-	-	-	-	-
VOCs + BTEX							
Benzene	ug/L		< 0.0005	-	-	-	-
Ethylbenzene	ug/L		< 0.0005	-	-	-	-
Styrene	ug/L		< 0.0005	-	-	-	-
Toluene	ug/L		< 0.00045	-	-	-	-
Xylenes, Total	ug/L		-	-	-	-	-
o-Xylene	ug/L		-	-	-	-	-
m,p-Xylenes	ug/L		< 0.00075	-	-	-	-
Methyl tert-Butyl Ether	ug/L		< 0.0005	-	-	-	-

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate

< Indicates parameter was below laboratory equipment detection limit.

- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 3
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 3	WETLAND 3	WETLAND 3	WETLAND 3
		Laboratory ID	VA20A6390-005	VA20B1764-001	VA20B1764-002	VA20B9054-001
		Sample Date	2020-05-11	2020-07-30	2020-07-30	2020-10-22
		QA/QC		FDA	FD	
Anions + Nutrients						
Alkalinity, Total as CaCO3	ug/L		254000	315000	317000	292000
Bromide (Br)	ug/L		336	316	318	234
Chloride (Cl)	ug/L		57600	65800	64900	50200
Fluoride (F)	mg/L		0.097	0.087	0.102	0.090
Nitrate (as N)	ug/L		196	234	233	784
Nitrite (as N)	ug/L		11.2	59.1	57.2	53.8
Ammonia (as N)	ug/L		232	2360	2300	840
Total Kjeldahl Nitrogen	ug/L		1060	3520	3470	1650
Sulfate (SO4)	ug/L		12700	9420	9250	6970
Total Nitrogen	ug/L		1270	3810	3760	2490
Phosphorus, Total Orthophosphate	ug/L		1.5	1.7	1.6	3.5
Phosphorus, Total	ug/L		< 50	< 50	< 50	< 50
Field + Physical						
Dissolved Oxygen, field measured	mg/L		11.2	7	7	1.5
Conductivity, field measured	uS/cm		516	734	734	427.6
Oxidation Reduction Potential, field measured	mV		296.2	309.8	309.8	240.2
pH, field measured	pH units		7.35	7.52	7.52	7.35
pH, lab	pH		7.78	8.18	8.25	8.05
Specific conductivity, field measured	uS/cm		654	761	761	699.9
Temperature, field measured	deg c		13.9	23	23	5.1
Turbidity, field measured	NTU		9.2	1.52	1.52	0.21
Conductivity	uS/cm		650	830	826	691
Total Organic Carbon	mg/L		10.7	14.0	14.1	7.92
Hardness, Calcium Carbonate	mg/L		258	301	305	273
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	< 2
Chemical Oxygen Demand	mg/L		29	36	39	< 20
Metals, Total						
Aluminum	ug/L		126	39.7	39.4	32.5
Antimony	ug/L		0.25	0.30	0.30	0.25
Arsenic	ug/L		1.95	2.41	2.44	0.55
Barium	ug/L		69.1	68.0	66.3	63.6
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		292	483	487	267
Cadmium	ug/L		0.0263	< 0.005	< 0.005	0.0654
Calcium	ug/L		76500	85300	86400	82900
Chromium	ug/L		0.34	0.60	0.51	0.34
Cobalt	ug/L		1.38	0.46	0.47	0.66
Copper	ug/L		1.64	1.05	0.78	2.44
Iron	ug/L		371	94	93	40
Lead	ug/L		0.087	< 0.05	< 0.05	< 0.05
Lithium	ug/L		< 1	< 1	< 1	< 1
Magnesium	ug/L		16200	21300	21800	16100
Manganese	ug/L		1460	76.5	77.7	961
Mercury	ug/L		< 0.005	< 0.005	< 0.005	0.0094
Molybdenum	ug/L		1.36	0.940	0.881	0.689
Nickel	ug/L		3.37	4.80	4.54	3.26
Potassium	ug/L		6720	9470	9500	5360
Selenium	ug/L		0.131	0.129	0.114	0.063
Silicon	ug/L		1080	1070	1060	2690
Silver	ug/L		< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		37800	58900	58800	40500
Strontium	ug/L		480	600	622	538
Sulphur (S)	ug/L		5560	4660	4610	2680
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L		< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	0.11	< 0.1	< 0.1
Titanium	ug/L		2.17	0.77	0.83	< 0.3
Uranium	ug/L		0.438	0.339	0.330	0.362
Vanadium	ug/L		0.66	< 0.5	< 0.5	< 0.5
Zinc	ug/L		38.7	8.7	8.3	6.9
Zirconium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		1.18	2.43	2.45	0.49
Cesium	ug/L		0.014	0.019	0.022	0.010
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L		-	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L		-	< 250	< 250	< 250
Volatile Hydrocarbons (C6-C10)	ug/L		-	< 100	< 100	< 100
VHCs						
Volatile Hydrocarbons (C6-C10)	ug/L		-	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons	ug/L		-	< 100	< 100	< 100
VOCs + BTEX						
Benzene	ug/L		-	< 0.5	< 0.5	< 0.5
Ethylbenzene	ug/L		-	< 0.5	< 0.5	< 0.5
Styrene	ug/L		-	< 0.5	< 0.5	< 0.5
Toluene	ug/L		-	< 0.5	< 0.5	< 0.5
Xylenes, Total	ug/L		-	< 0.75	< 0.75	< 0.75
o-Xylene	ug/L		-	< 0.5	< 0.5	< 0.5
m,p-Xylenes	ug/L		-	< 0.5	< 0.5	< 0.5
Methyl tert-Butyl Ether	ug/L		-	< 0.5	< 0.5	< 0.5

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Dup

< Indicates parameter was below laboratory equipment detectic

- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 4
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 4	WETLAND 4	WETLAND 4	WETLAND 4	WETLAND 4
		Laboratory ID	L2164880-1	L2315550-7	L2321734-8	L2325524-7	L2335286-7
		Sample Date	2018-09-13	2019-07-22	2019-07-31	2019-08-07	2019-08-22
		QA/QC					
Anions + Nutrients							
Alkalinity, Total as CaCO3	ug/L		518000	261000	259000	263000	262000
Bromide (Br)	ug/L		-	422	-	-	460
Chloride (Cl)	ug/L		286000	59500	58600	58800	54800
Fluoride (F)	mg/L		< 0.2	0.159	0.155	0.152	0.14
Nitrate (as N)	ug/L		72	19.1	7	< 5	94
Nitrite (as N)	ug/L		144	1.5	< 1	< 1	5.4
Ammonia (as N)	ug/L		8610	244	166	87.7	131
Total Kjeldahl Nitrogen	ug/L		-	-	-	-	131
Sulfate (SO4)	ug/L		17200	9430	7640	8340	10700
Total Nitrogen	ug/L		-	-	-	1290	1360
Phosphorus, Total Orthophosphate	ug/L		2.8	1.9	< 1	< 1	< 1
Phosphorus, Total	ug/L		222	75	<50	<50	51
Field + Physical							
Dissolved Oxygen, field measured	mg/L		-	3.4	2.3	3	4.8
Conductivity, field measured	uS/cm		-	585	563	642	565
Oxidation Reduction Potential, field measured	mV		-	326.7	244.8	329.5	246.1
pH, field measured	pH units		-	7.66	7.3	7.24	7.44
pH, lab	pH		7.9	8.35	8.57	8.4	8.46
Specific conductivity, field measured	uS/cm		-	-	-	-	-
Temperature, field measured	deg c		-	18.8	17.4	22.5	14.9
Turbidity, field measured	NTU		-	29.1	-	10.7	11.1
Conductivity	uS/cm		-	-	-	645	-
Total Organic Carbon	mg/L		51.8	22.8	19.8	19.6	15.5
Hardness, Calcium Carbonate	mg/L		390	250	236	248	249
Biochemical Oxygen Demand	mg/L		-	2.7	< 2	< 2	< 2
Chemical Oxygen Demand	mg/L		-	69	82	45	43
Discharge	m3/s		-	-	-	-	-
Metals, Total							
Aluminum	ug/L		526	690	132	61.7	182
Antimony	ug/L		0.85	0.28	0.26	0.23	0.18
Arsenic	ug/L		27.8	7.64	5.4	4.89	2.78
Barium	ug/L		953	122	111	104	104
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		2420	592	533	575	480
Cadmium	ug/L		0.0126	0.0153	< 0.005	0.0065	0.0122
Calcium	ug/L		69200	66200	62900	66200	66600
Chromium	ug/L		2.22	0.76	0.25	0.2	0.29
Cobalt	ug/L		2	0.88	0.49	0.38	0.32
Copper	ug/L		1.97	1.9	0.8	0.75	1.22
Iron	ug/L		2170	1930	1020	675	526
Lead	ug/L		0.22	0.336	0.16	0.09	0.13
Lithium	ug/L		< 1	< 1	< 1	< 1	< 1
Magnesium	ug/L		49500	20600	19200	20000	20000
Manganese	ug/L		2070	1330	789	603	112
Mercury	ug/L		0.0083	0.0067	< 0.005	< 0.005	< 0.005
Molybdenum	ug/L		2.64	1.58	1.3	1.09	1
Nickel	ug/L		17.3	4.61	3.73	3.59	3.56
Potassium	ug/L		38800	8930	8530	7920	7130
Selenium	ug/L		0.223	0.179	0.133	0.081	0.118
Silicon	ug/L		7310	4100	2780	2730	2870
Silver	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		225000	45800	42700	43300	43100
Strontium	ug/L		867	535	514	508	485
Sulphur (S)	ug/L		8540	4120	3500	3300	4620
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	0.21	< 0.2
Thallium	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		0.17	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	ug/L		8.07	12.3	2.07	1.05	2.57
Uranium	ug/L		0.631	0.349	0.287	0.284	0.325
Vanadium	ug/L		3.51	1.95	0.94	0.66	0.63
Zinc	ug/L		4.9	4	< 3	< 3	< 3
Zirconium	ug/L		0.425	< 0.2	< 0.2	< 0.2	< 0.2
Tungsten	ug/L		0.14	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		5.59	1.13	0.77	0.73	0.84
Cesium	ug/L		0.085	0.055	0.011	< 0.01	0.015
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L		-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	-
VHCs							
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	-
Volatile Petroleum Hydrocarbons	ug/L		-	-	-	-	-
VOCs + BTEX							
Benzene	ug/L		-	< 0.0005	-	-	-
Ethylbenzene	ug/L		-	< 0.0005	-	-	-
Styrene	ug/L		-	< 0.0005	-	-	-
Toluene	ug/L		-	< 0.00045	-	-	-
Xylenes, Total	ug/L		-	-	-	-	-
o-Xylene	ug/L		-	-	-	-	-
m,p-Xylenes	ug/L		-	< 0.00075	-	-	-
Methyl tert-Butyl Ether	ug/L		-	< 0.0005	-	-	-

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Duplicate Available/Field Duplicate

< Indicates parameter was below laboratory equipment detection limit.

- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 4
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 4	WETLAND 4	WETLAND 4	WETLAND 4	WETLAND 4
		Laboratory ID	L2349151-1	L2349151-2	L2383004-4	VA20A6390-006	VA20A9321-001
		Sample Date	2019-09-16	2019-09-16	2019-11-12	2020-05-11	2020-06-25
		QA/QC	FDA	FD			
Anions + Nutrients							
Alkalinity, Total as CaCO3	ug/L		284000	283000	193000	205000	240000
Bromide (Br)	ug/L		750	730	323	239	275
Chloride (Cl)	ug/L		103000	103000	43500	42700	49600
Fluoride (F)	mg/L		0.11	0.11	0.106	0.093	0.109
Nitrate (as N)	ug/L		145	141	1020	376	297
Nitrite (as N)	ug/L		40.4	42.5	12.9	5.1	5.6
Ammonia (as N)	ug/L		2810	2710	91.2	9.9	24.5
Total Kjeldahl Nitrogen	ug/L		2810	2710	91.2	661	517
Sulfate (SO4)	ug/L		24500	24700	22500	12800	14900
Total Nitrogen	ug/L		3750	3920	1510	1040	820
Phosphorus, Total Orthophosphate	ug/L		2.2	4.5	5.6	1.1	1.6
Phosphorus, Total	ug/L		<50	<50	<50	<50	<50
Field + Physical							
Dissolved Oxygen, field measured	mg/L		4.1	4.1	1.2	12	3.2
Conductivity, field measured	uS/cm		683	683	393.6	407.8	516
Oxidation Reduction Potential, field measured	mV		169.1	169.1	366.3	293.6	364.3
pH, field measured	pH units		7.52	7.52	7.66	7.7	7.35
pH, lab	pH		8.16	8.15	8.23	7.97	8.17
Specific conductivity, field measured	uS/cm		-	-	-	524.5	605
Temperature, field measured	deg c		14.1	14.1	5.1	13.3	17.2
Turbidity, field measured	NTU		-	-	-	12.1	2.76
Conductivity	uS/cm		-	-	532	520	612
Total Organic Carbon	mg/L		15.4	16.6	9.53	8.38	12.3
Hardness, Calcium Carbonate	mg/L		293	290	191	213	232
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	< 2	< 2
Chemical Oxygen Demand	mg/L		51	56	28	22	27
Discharge	m3/s		-	-	-	-	< 0.25
Metals, Total							
Aluminum	ug/L		114	159	641	156	113
Antimony	ug/L		0.23	0.22	0.25	0.19	0.22
Arsenic	ug/L		2.01	2.04	1.21	1.07	0.86
Barium	ug/L		118	112	71.8	53.8	65.8
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		556	547	251	228	363
Cadmium	ug/L		0.0133	0.0139	0.0184	0.0186	0.0146
Calcium	ug/L		83000	80700	52700	63100	67400
Chromium	ug/L		0.28	0.35	0.61	0.28	0.33
Cobalt	ug/L		0.7	0.6	0.45	0.44	0.24
Copper	ug/L		1.73	1.73	2.78	1.99	3.35
Iron	ug/L		354	343	572	206	104
Lead	ug/L		0.091	0.091	0.173	0.053	0.052
Lithium	ug/L		< 1	< 1	< 1	< 1	< 1
Magnesium	ug/L		20900	21400	14500	13400	15500
Manganese	ug/L		576	91.6	180	127	33.0
Mercury	ug/L		< 0.005	< 0.005	0.0068	< 0.005	< 0.005
Molybdenum	ug/L		1.21	1.34	0.81	0.927	1.46
Nickel	ug/L		4.38	4.63	2.61	2.37	2.39
Potassium	ug/L		8900	9390	5400	5070	4800
Selenium	ug/L		0.172	0.134	0.109	0.091	0.140
Silicon	ug/L		2920	3170	3330	970	2300
Silver	ug/L		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		52100	56100	31000	28400	36400
Strontium	ug/L		652	638	380	384	451
Sulphur (S)	ug/L		9790	9970	7630	5620	5820
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L		< 0.01	0.028	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	ug/L		< 1.5	< 2.4	11	3.51	2.06
Uranium	ug/L		0.487	0.508	0.43	0.369	0.505
Vanadium	ug/L		< 0.5	0.55	1.52	0.71	0.50
Zinc	ug/L		< 3	< 3	< 3	< 3	< 3
Zirconium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		1.82	2.03	0.88	0.66	0.42
Cesium	ug/L		0.024	0.027	0.054	0.014	0.012
Hydrocarbons							
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L		-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L		-	-	-	-	< 250
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L		-	-	-	-	-
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	< 100
VHCs							
Volatile Hydrocarbons (C6-C10)	ug/L		-	-	-	-	< 100
Volatile Petroleum Hydrocarbons	ug/L		-	-	-	-	< 100
VOCs + BTEX							
Benzene	ug/L		-	-	-	-	< 0.5
Ethylbenzene	ug/L		-	-	-	-	< 0.5
Styrene	ug/L		-	-	-	-	< 0.5
Toluene	ug/L		-	-	-	-	< 0.5
Xylenes, Total	ug/L		-	-	-	-	< 0.75
o-Xylene	ug/L		-	-	-	-	< 0.5
m,p-Xylenes	ug/L		-	-	-	-	< 0.5
Methyl tert-Butyl Ether	ug/L		-	-	-	-	< 0.5

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Dupli

< Indicates parameter was below laboratory equipment detectior

- Chemical not analyzed or criteria not defined.

Appendix C
Results of Leachate Analyses - Wetland 4
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	Unit	Sample Name	WETLAND 4	WETLAND 4	WETLAND 4	WETLAND 4
		Laboratory ID	VA20B1764-0002	VA20B3388-001	VA21C6525-001	VA21C6525-002
		Sample Date	2020-07-30	2020-08-20	2021-11-25	2021-11-25
		QA/QC			FDA	FD
Anions + Nutrients						
Alkalinity, Total as CaCO3	ug/L		245000	233000	202000	210000
Bromide (Br)	ug/L		214	-	-	-
Chloride (Cl)	ug/L		52200	40000	16800	16800
Fluoride (F)	mg/L		0.098	0.098	0.08	0.080
Nitrate (as N)	ug/L		343	242	91.8	79.6
Nitrite (as N)	ug/L		129	6.6	< 1	< 1
Ammonia (as N)	ug/L		96.7	16.7	263	264
Total Kjeldahl Nitrogen	ug/L		1070	689	714	641
Sulfate (SO4)	ug/L		9760	6370	7500	7300
Total Nitrogen	ug/L		1540	938	827	836
Phosphorus, Total Orthophosphate	ug/L		1.4	< 1	9.5	9.2
Phosphorus, Total	ug/L		<50	<50	<50	<50
Field + Physical						
Dissolved Oxygen, field measured	mg/L		8.9	4.1	5.9	5.9
Conductivity, field measured	uS/cm		593	376.5	244	244
Oxidation Reduction Potential, field measured	mV		301.3	354.4	185.3	185.3
pH, field measured	pH units		7.59	6.92	7.48	7.48
pH, lab	pH		8.24	8.01	8.28	8.26
Specific conductivity, field measured	uS/cm		635	465.4	425.7	425.7
Temperature, field measured	deg c		21.5	15.1	2.4	2.4
Turbidity, field measured	NTU		-	3.12	8.69	8.69
Conductivity	uS/cm		673	560	438	436
Total Organic Carbon	mg/L		12.8	11.2	8.36	8.48
Hardness, Calcium Carbonate	mg/L		241	209	224	221
Biochemical Oxygen Demand	mg/L		2.3	< 2	< 2	< 2
Chemical Oxygen Demand	mg/L		47	40	25	26
Discharge	m3/s		-	1	1.25	1.25
Metals, Total						
Aluminum	ug/L		58.0	155	308	264
Antimony	ug/L		0.26	0.20	< 0.1	< 0.1
Arsenic	ug/L		1.16	0.94	0.89	0.83
Barium	ug/L		55.4	34.8	57.2	58.0
Beryllium	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	ug/L		< 0.05	< 0.05	< 0.05	< 0.05
Boron	ug/L		404	301	124	130
Cadmium	ug/L		0.0104	0.0095	0.0433	0.0413
Calcium	ug/L		66400	60400	63100	61800
Chromium	ug/L		0.26	0.28	< 0.5	< 0.5
Cobalt	ug/L		0.31	0.19	0.37	0.35
Copper	ug/L		1.51	1.60	1.92	1.91
Iron	ug/L		53	166	399	349
Lead	ug/L		< 0.05	0.050	0.130	0.120
Lithium	ug/L		< 1	< 1	< 1	< 1
Magnesium	ug/L		18400	14200	16100	16200
Manganese	ug/L		13.0	19.4	454	455
Mercury	ug/L		< 0.005	< 0.005	< 0.005	< 0.005
Molybdenum	ug/L		1.63	1.13	0.467	0.462
Nickel	ug/L		3.67	2.41	1.70	1.65
Potassium	ug/L		7000	5470	4230	4290
Selenium	ug/L		0.129	0.056	0.053	0.069
Silicon	ug/L		340	1100	3290	3260
Silver	ug/L		< 0.01	< 0.01	< 0.01	< 0.01
Sodium	ug/L		50100	33400	18300	18300
Strontium	ug/L		473	375	387	388
Sulphur (S)	ug/L		4500	2810	3390	3380
Tellurium	ug/L		< 0.2	< 0.2	< 0.2	< 0.2
Thallium	ug/L		< 0.01	< 0.01	< 0.01	< 0.01
Thorium-232	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Tin	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Titanium	ug/L		1.27	< 3	4.77	4.78
Uranium	ug/L		0.447	0.343	0.322	0.332
Vanadium	ug/L		< 0.5	0.51	0.70	0.59
Zinc	ug/L		< 3	< 3	4.7	4.6
Zirconium	ug/L		< 0.2	< 0.2	0.28	0.25
Tungsten	ug/L		< 0.1	< 0.1	< 0.1	< 0.1
Rubidium	ug/L		1.33	0.84	0.61	0.55
Cesium	ug/L		0.012	0.016	0.031	0.021
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L		< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L		< 250	< 250	< 250	< 250
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L		-	-	< 400	< 400
Volatile Hydrocarbons (C6-C10)	ug/L		< 100	< 100	< 100	< 100
VHCs						
Volatile Hydrocarbons (C6-C10)	ug/L		< 100	< 100	< 100	< 100
Volatile Petroleum Hydrocarbons	ug/L		< 100	< 100	< 100	< 100
VOCs + BTEX						
Benzene	ug/L		< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	ug/L		< 0.5	< 0.5	< 0.5	< 0.5
Styrene	ug/L		< 0.5	< 0.5	< 0.5	< 0.5
Toluene	ug/L		< 0.5	< 0.5	< 0.5	< 0.5
Xylenes, Total	ug/L		< 0.75	< 0.75	< 0.5	< 0.5
o-Xylene	ug/L		< 0.5	< 0.5	< 0.3	< 0.3
m,p-Xylenes	ug/L		< 0.5	< 0.5	< 0.4	< 0.4
Methyl tert-Butyl Ether	ug/L		< 0.5	< 0.5	< 0.5	< 0.5

Table Notes:

QA/QC = Quality Assurance/Quality Control, FDA/FD = Field Dupli

< Indicates parameter was below laboratory equipment detectior

- Chemical not analyzed or criteria not defined.

4 – Soil Data

Appendix C
Results of Soil Analyses - Phytoremediation Stand
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	CSR IL	MCS Name	Unit	Sample Name: TP2	TP1	COMP 3-4-8-9	COMP 11-2-1-6
Laboratory ID				L2283536-2	L2283536-1	VA20A7365-001	VA21B1844-001
Sample Date				2019-05-30	2019-05-30	2020-05-29	2021-06-10
QA/QC							
Anions + Nutrients							
Bromide			mg/kg	-	-	< 0.5	< 0.5
Chloride (Cl), Ion			mg/L	-	-	35.7	< 20
Chloride (Cl), Ion	100	DW	mg/kg	7.63	21.3	16.5	< 12.7
Fluoride	750000	HH	mg/kg	-	-	-	< 0.5
Nitrate as N	400000	HH	mg/kg	-	-	0.061	0.098
Nitrite as N	25000	HH	mg/kg	-	-	< 0.01	< 0.01
Sulfate			mg/kg	-	-	< 10	< 10
Field + Physical							
Moisture, Percent			%	12	33.2	13.5	22.2
Saturation			%	39.3	113	46.3	63.6
pH (1:2 CACL2)			pH units	5.22	5.79	7.46	6.85
Metals							
Aluminum	250000	HH	mg/kg	22900	45800	24600	24400
Antimony	40	EH	mg/kg	0.54	0.65	0.65	0.66
Arsenic	10	AW-F	mg/kg	9.91	**15.2**	**12**	**13.6**
Barium	350	DW	mg/kg	134	**383**	164	175
Beryllium	1	AW-F	mg/kg	0.34	**1.27**	0.44	0.5
Bismuth			mg/kg	< 0.2	0.23	< 0.2	< 0.2
Boron	1000000	HH	mg/kg	< 5	< 5	< 5	< 5
Cadmium	1	AW-F	mg/kg	0.155	0.422	0.174	0.194
Calcium			mg/kg	2150	6650	5170	5470
Chromium	60	AW-F	mg/kg	25.3	38.2	25.9	26.5
Cobalt	25	AW-F	mg/kg	10.7	24.1	13	13.5
Copper	75	AW-F	mg/kg	18.7	50.1	31.9	30.4
Iron	150000	HH	mg/kg	37100	47300	36500	36700
Lead	120	DW	mg/kg	5.9	15.5	7.95	10.3
Lithium	450	HH	mg/kg	17.6	24.6	17.5	17.1
Magnesium			mg/kg	7110	7750	7300	7550
Manganese	2000	DW	mg/kg	439	**3650**	965	1120
Mercury	75	T	mg/kg	< 0.05	0.058	< 0.05	< 0.05
Molybdenum	15	DW	mg/kg	0.64	1.51	0.74	0.91
Nickel	70	DW	mg/kg	29.2	43.9	30.1	30
Phosphorus			mg/kg	672	1430	725	909
Potassium			mg/kg	700	2080	1050	1220
Selenium	1	AW-F	mg/kg	< 0.2	0.3	< 0.2	0.24
Silver	40	EH	mg/kg	< 0.1	0.39	0.13	0.14
Sodium			mg/kg	87	159	25.4	6
Sodium			mg/L	2.5	5.5	11.8	3.82
Strontium	150000	HH	mg/kg	17.7	71.9	41	43
Sulphur (H2S)			mg/kg	< 1000	< 1000	< 1000	< 1000
Thallium	25	EH	mg/kg	0.052	0.198	0.075	0.08
Tin	300	EH	mg/kg	< 2	< 2	< 2	< 2
Titanium			mg/kg	441	93.2	440	458
Tungsten	200	HH	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Uranium	30	DW	mg/kg	0.248	1.02	0.361	0.361
Vanadium	100	DW	mg/kg	55.2	78.9	60	62
Zinc	150	AW-F	mg/kg	97.8	**162**	90.2	92
Zirconium			mg/kg	< 1	1.4	< 1	< 1

Table Notes:

Standards from the Contaminated Sites Regulation (CSR) for Industrial Land Use (IL), updated April 2022.

AW-F (Freshwater Aquatic Life), DW (Drinking Water), T (Toxicity to soil invertebrates and plants), HH (Human Health), EH (Ecologicall Health)

MCS = Most Conservative Standard; QA/QC = Quality Assurance/Quality Control; FDA/FD = Field Duplicate Available/Field Duplicate

< or ND Indicates parameter was below laboratory equipment detection limit

- Chemical not analyzed or criteria not defined.

Result exceeds applicable CSR standard **744**

Detection limit exceeds applicable CSR standard ***< 2***

5 - Toxicity Data

Appendix C
Results of Toxicity Testing - Wetland 4 Outlet
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Parameter	OC-Hazelton	Unit	Sample Name		
			WETLAND 4 OUTLET	WETLAND 4 OUTLET	WETLAND 4 OUTLET
		Laboratory ID	VA21A5252-001	VA21B5003-001	VA21C6527-001
		Sample Date	2021-03-17	2021-07-20	2021-11-25
Toxicity					
Daphnia magna 48-h LC50 test	> 50	% v/v	230000	254000	242000

Table Notes:

Criteria from the Hazelton Landfill Operational Certificate (OC) No. 17226, administered by the BC Ministry of Environment and Climate Change (ENV), last updated 19 October 2021

Result exceeds applicable OC criteria **744**

6 - QAQC Data

Appendix C
Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-01-21	WETLAND 4 OUTLET 2021-01-21	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	326	322	1	n/c
Ammonia (as N)	mg/L	0.005	1.61	1.49	8	n/c
Bromide (Br)	mg/L	0.05	0.247	< 0.25	n/c	n/c
Chloride (Cl)	mg/L	0.5	40.9	40.3	1	n/c
Fluoride (F)	mg/L	0.02	0.095	< 0.1	n/c	n/c
Nitrate (as N)	mg/L	0.005	0.906	0.945	4	n/c
Nitrite (as N)	mg/L	0.001	0.0068	0.0078	14	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	4.25	3.9	9	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	2.31	2.14	8	n/c
Total Nitrogen	mg/L	0.03	2.93	2.93	0	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	2.1	< 2	n/c	n/c
Chemical Oxygen Demand	mg/L	20	24	29	n/c	0.25
Conductivity	uS/cm	2	710	703	1	n/c
Hardness, Calcium Carbonate	mg/L	0.6	319	302	5	n/c
pH	pH Units	0.1	8.39	8.38	0	n/c
Total Organic Carbon	mg/L	0.5	8.92	8.89	0	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.0674	0.072	7	n/c
Antimony	mg/L	0.0001	0.00016	0.00016	n/c	0
Arsenic	mg/L	0.0001	0.00074	0.00072	3	n/c
Barium	mg/L	0.0001	0.0764	0.0742	3	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.242	0.238	2	n/c
Cadmium	mg/L	0.000005	0.0000686	0.0000862	**23**	n/c
Calcium	mg/L	0.05	92.9	86.5	7	n/c
Cesium	mg/L	0.00001	0.000016	0.000016	n/c	0
Chromium	mg/L	0.0001	0.00041	0.00053	**26**	n/c
Cobalt	mg/L	0.0001	0.00109	0.00094	15	n/c
Copper	mg/L	0.0005	0.00144	0.00148	n/c	0.08
Iron	mg/L	0.01	0.103	0.104	1	n/c
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	21.2	20.9	1	n/c
Manganese	mg/L	0.0001	2.57	2.24	14	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000683	0.000636	7	n/c
Nickel	mg/L	0.0005	0.00297	0.00288	3	n/c
Potassium	mg/L	0.05	7.55	7.28	4	n/c
Rubidium	mg/L	0.0002	0.00091	0.00092	n/c	0.05
Selenium	mg/L	0.00005	0.000097	0.000107	n/c	0.2
Silicon	mg/L	0.1	4.24	4.16	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	33.8	33.2	2	n/c
Strontium	mg/L	0.0002	0.605	0.55	10	n/c
Sulphur (S)	mg/L	0.5	1.88	1.9	n/c	0.04
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00147	0.00141	n/c	0.2
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000377	0.000354	6	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	0.00026	< 0.0002	n/c	0.3
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives **20**

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-03-17	WETLAND 4 OUTLET 2021-03-17	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	295	295	0	n/c
Ammonia (as N)	mg/L	0.005	1.63	1.63	0	n/c
Chloride (Cl)	mg/L	0.5	39.2	39.1	0	n/c
Fluoride (F)	mg/L	0.02	0.076	0.077	n/c	0.05
Nitrate (as N)	mg/L	0.005	0.978	0.988	1	n/c
Nitrite (as N)	mg/L	0.001	0.0102	0.0136	29	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	8.94	8.95	0	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	2.48	2.49	0	n/c
Total Nitrogen	mg/L	0.03	2.96	2.92	1	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	2.1	n/c	0.05
Chemical Oxygen Demand	mg/L	20	26	28	n/c	0.1
Conductivity	uS/cm	2	655	656	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	294	303	3	n/c
pH	pH Units	0.1	8.05	8.04	0	n/c
Total Organic Carbon	mg/L	0.5	8.24	8.22	0	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.309	0.268	14	n/c
Antimony	mg/L	0.0001	0.00015	0.00014	n/c	0.1
Arsenic	mg/L	0.0001	0.00107	0.00103	4	n/c
Barium	mg/L	0.0001	0.0774	0.0752	3	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.204	0.218	7	n/c
Cadmium	mg/L	0.000005	0.0000802	0.0000775	3	n/c
Calcium	mg/L	0.05	87.5	91.6	5	n/c
Cesium	mg/L	0.00001	0.000035	0.000029	n/c	0.6
Chromium	mg/L	0.0001	0.00061	0.00056	9	n/c
Cobalt	mg/L	0.0001	0.0014	0.00136	3	n/c
Copper	mg/L	0.0005	0.002	0.00186	n/c	0.28
Iron	mg/L	0.01	0.536	0.42	24	n/c
Lead	mg/L	0.00005	0.000189	0.000131	n/c	1.16
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	18.4	18.1	2	n/c
Manganese	mg/L	0.0001	2.85	2.89	1	n/c
Mercury	mg/L	0.000005	0.0000053	< 0.000005	n/c	n/c
Molybdenum	mg/L	0.00005	0.000548	0.000528	4	n/c
Nickel	mg/L	0.0005	0.00293	0.00287	2	n/c
Potassium	mg/L	0.05	6.73	6.88	2	n/c
Rubidium	mg/L	0.0002	0.00108	0.00117	8	n/c
Selenium	mg/L	0.00005	< 0.00005	0.00007	n/c	0.4
Silicon	mg/L	0.1	4.78	4.87	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	30.5	31.2	2	n/c
Strontium	mg/L	0.0002	0.54	0.525	3	n/c
Sulphur (S)	mg/L	0.5	3.27	3.18	3	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.0077	0.00578	28	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000312	0.000312	0	n/c
Vanadium	mg/L	0.0005	0.00079	0.00072	n/c	0.14
Zinc	mg/L	0.003	0.0063	0.0065	n/c	0.067
Zirconium	mg/L	0.0002	< 0.0002	0.00027	n/c	n/c
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives 20

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-04-21 0:00	WETLAND 4 OUTLET 2021-04-21 0:00	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	376	381	1	n/c
Ammonia (as N)	mg/L	0.005	3.21	3.25	1	n/c
Chloride (Cl)	mg/L	0.5	48.2	48.2	0	n/c
Fluoride (F)	mg/L	0.02	< 0.1	< 0.1	n/c	0
Nitrate (as N)	mg/L	0.005	0.237	0.247	4	n/c
Nitrite (as N)	mg/L	0.001	0.0169	0.0105	47	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	11.2	11	2	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	4.02	4.12	2	n/c
Total Nitrogen	mg/L	0.03	4.33	4.33	0	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	31	33	n/c	0.1
Conductivity	uS/cm	2	784	792	1	n/c
Hardness, Calcium Carbonate	mg/L	0.6	312	317	2	n/c
pH	pH Units	0.1	8.27	8.2	1	n/c
Total Organic Carbon	mg/L	0.5	11.2	11.2	0	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.0816	0.0705	15	n/c
Antimony	mg/L	0.0001	0.00021	0.00021	n/c	0
Arsenic	mg/L	0.0001	0.00119	0.0011	8	n/c
Barium	mg/L	0.0001	0.0731	0.0749	2	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.422	0.439	4	n/c
Cadmium	mg/L	0.000005	0.0000287	0.0000258	11	n/c
Calcium	mg/L	0.05	93.7	96	2	n/c
Cesium	mg/L	0.00001	0.000029	0.000032	n/c	0.3
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00094	0.00094	0	n/c
Copper	mg/L	0.0005	0.00144	0.00132	n/c	0.24
Iron	mg/L	0.01	0.155	0.137	12	n/c
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	18.9	18.8	1	n/c
Manganese	mg/L	0.0001	2.36	2.39	1	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.00106	0.00108	2	n/c
Nickel	mg/L	0.0005	0.00468	0.00476	2	n/c
Potassium	mg/L	0.05	9.6	9.75	2	n/c
Rubidium	mg/L	0.0002	0.00172	0.00164	5	n/c
Selenium	mg/L	0.00005	0.00011	0.00009	n/c	0.4
Silicon	mg/L	0.1	3.1	3.16	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	42.4	43	1	n/c
Strontium	mg/L	0.0002	0.583	0.598	3	n/c
Sulphur (S)	mg/L	0.5	4.67	4.45	5	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	< 0.0024	0.00271	n/c	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.0004	0.000406	1	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	0.0034	0.0031	n/c	0.1
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives 20

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-05-12	WETLAND 4 OUTLET 2021-05-12	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	275	269	2	n/c
Ammonia (as N)	mg/L	0.005	0.264	0.269	2	n/c
Chloride (Cl)	mg/L	0.5	48.5	48.5	0	n/c
Fluoride (F)	mg/L	0.02	< 0.1	< 0.1	n/c	0
Nitrate (as N)	mg/L	0.005	1.93	1.87	3	n/c
Nitrite (as N)	mg/L	0.001	0.108	0.102	6	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	12.8	12.8	0	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	1.03	1.04	1	n/c
Total Nitrogen	mg/L	0.03	2.94	3.02	3	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	24	25	n/c	0.05
Conductivity	uS/cm	2	728	739	1	n/c
Hardness, Calcium Carbonate	mg/L	0.6	265	265	0	n/c
pH	pH Units	0.1	8.3	8.3	0	n/c
Total Organic Carbon	mg/L	0.5	9.25	9.02	3	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.0548	0.0591	8	n/c
Antimony	mg/L	0.0001	0.00017	0.00018	n/c	0.1
Arsenic	mg/L	0.0001	0.00067	0.00065	3	n/c
Barium	mg/L	0.0001	0.0571	0.0574	1	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.362	0.361	0	n/c
Cadmium	mg/L	0.000005	0.0000132	0.0000108	n/c	0.48
Calcium	mg/L	0.05	76.9	77.1	0	n/c
Cesium	mg/L	0.00001	0.000014	0.000015	n/c	0.1
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00038	0.00039	n/c	0.1
Copper	mg/L	0.0005	0.0011	0.0011	n/c	0
Iron	mg/L	0.01	0.079	0.08	1	n/c
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	17.7	17.7	0	n/c
Manganese	mg/L	0.0001	0.245	0.245	0	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000849	0.000886	4	n/c
Nickel	mg/L	0.0005	0.00351	0.00344	2	n/c
Potassium	mg/L	0.05	9.63	9.69	1	n/c
Rubidium	mg/L	0.0002	0.00131	0.0013	1	n/c
Selenium	mg/L	0.00005	0.000064	0.000057	n/c	0.14
Silicon	mg/L	0.1	1.21	1.23	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	43	43	0	n/c
Strontium	mg/L	0.0002	0.503	0.502	0	n/c
Sulphur (S)	mg/L	0.5	4.95	5.23	6	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00107	0.00108	n/c	0.033
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.0004	0.000401	0	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
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RPD or DF exceeds Golder's data quality objectives 20

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-06-10	WETLAND 4 OUTLET 2021-06-10	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	292	294	1	n/c
Ammonia (as N)	mg/L	0.005	0.0506	0.0515	2	n/c
Chloride (Cl)	mg/L	0.5	50.6	50.5	0	n/c
Fluoride (F)	mg/L	0.02	0.098	0.098	n/c	0
Nitrate (as N)	mg/L	0.005	0.74	0.706	5	n/c
Nitrite (as N)	mg/L	0.001	0.0198	0.021	6	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	6.76	6.76	0	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.935	0.968	3	n/c
Total Nitrogen	mg/L	0.03	1.74	1.64	6	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	30	32	n/c	0.1
Conductivity	uS/cm	2	661	659	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	255	261	2	n/c
pH	pH Units	0.1	8.25	8.25	0	n/c
Total Organic Carbon	mg/L	0.5	10	9.72	3	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.033	0.0302	9	n/c
Antimony	mg/L	0.0001	0.00019	0.00019	n/c	0
Arsenic	mg/L	0.0001	0.0009	0.00092	2	n/c
Barium	mg/L	0.0001	0.0463	0.0476	3	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.34	0.362	6	n/c
Cadmium	mg/L	0.000005	0.0000096	0.0000082	n/c	0.28
Calcium	mg/L	0.05	74.1	76.2	3	n/c
Cesium	mg/L	0.00001	0.00001	0.000011	n/c	0.1
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00029	0.0003	n/c	0.1
Copper	mg/L	0.0005	0.0013	0.00104	n/c	0.52
Iron	mg/L	0.01	0.068	0.064	6	n/c
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	17	17.2	1	n/c
Manganese	mg/L	0.0001	0.134	0.135	1	n/c
Mercury	mg/L	0.000005	0.0000051	< 0.000005	n/c	0.02
Molybdenum	mg/L	0.00005	0.000916	0.00095	4	n/c
Nickel	mg/L	0.0005	0.00346	0.00351	1	n/c
Potassium	mg/L	0.05	8.3	8.4	1	n/c
Rubidium	mg/L	0.0002	0.00103	0.00106	3	n/c
Selenium	mg/L	0.00005	0.000056	0.000054	n/c	0.04
Silicon	mg/L	0.1	1.21	1.24	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	45.6	46.6	2	n/c
Strontium	mg/L	0.0002	0.49	0.52	6	n/c
Sulphur (S)	mg/L	0.5	2.99	3.09	3	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00057	0.00054	n/c	0.1
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000386	0.000402	4	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
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RPD or DF exceeds Golder's data quality objectives 20

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-07-20	WETLAND 4 OUTLET 2021-07-20	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	272	273	0	n/c
Ammonia (as N)	mg/L	0.005	0.0252	0.0277	9	n/c
Chloride (Cl)	mg/L	0.5	61.6	61.9	0	n/c
Fluoride (F)	mg/L	0.02	0.103	0.101	2	n/c
Nitrate (as N)	mg/L	0.005	0.0372	0.0352	6	n/c
Nitrite (as N)	mg/L	0.001	< 0.005	< 0.005	n/c	0
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	1.62	1.62	0	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.953	0.973	2	n/c
Total Nitrogen	mg/L	0.03	0.886	0.881	1	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	2.4	2.5	n/c	0.05
Chemical Oxygen Demand	mg/L	20	41	39	n/c	0.1
Conductivity	uS/cm	2	670	667	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	230	229	0	n/c
pH	pH Units	0.1	8.37	8.36	0	n/c
Total Organic Carbon	mg/L	0.5	11.7	12.4	6	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.125	0.11	13	n/c
Antimony	mg/L	0.0001	0.00024	0.00024	n/c	0
Arsenic	mg/L	0.0001	0.00195	0.0022	12	n/c
Barium	mg/L	0.0001	0.0266	0.0296	11	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.427	0.441	3	n/c
Cadmium	mg/L	0.000005	0.0000144	0.00001	n/c	0.88
Calcium	mg/L	0.05	63.2	63.2	0	n/c
Cesium	mg/L	0.00001	0.000016	0.00002	n/c	0.4
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00034	0.00036	n/c	0.2
Copper	mg/L	0.0005	0.00142	0.00153	n/c	0.22
Iron	mg/L	0.01	0.167	0.216	**26**	n/c
Lead	mg/L	0.00005	< 0.00005	0.000065	n/c	0.3
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	17.5	17.4	1	n/c
Manganese	mg/L	0.0001	0.261	0.272	4	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.00183	0.00185	1	n/c
Nickel	mg/L	0.0005	0.0044	0.00446	1	n/c
Potassium	mg/L	0.05	8	8.05	1	n/c
Rubidium	mg/L	0.0002	0.00093	0.00096	n/c	0.15
Selenium	mg/L	0.00005	0.000101	0.000089	n/c	0.24
Silicon	mg/L	0.1	3.86	4.11	6	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	55.7	56	1	n/c
Strontium	mg/L	0.0002	0.462	0.464	0	n/c
Sulphur (S)	mg/L	0.5	1.01	0.98	n/c	0.06
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00332	0.00447	**30**	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000442	0.000457	3	n/c
Vanadium	mg/L	0.0005	0.00052	0.00063	n/c	0.22
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives **20**

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-09-28	WETLAND 4 OUTLET 2021-09-28	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	233	230	1	n/c
Ammonia (as N)	mg/L	0.005	0.0288	0.0314	9	n/c
Chloride (Cl)	mg/L	0.5	37.4	37.8	1	n/c
Fluoride (F)	mg/L	0.02	0.117	0.113	3	n/c
Nitrate (as N)	mg/L	0.005	0.666	0.664	0	n/c
Nitrite (as N)	mg/L	0.001	0.0051	0.0061	18	n/c
Phosphorus, Total Orthophosphate	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	7.86	7.81	1	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.74	0.824	11	n/c
Total Nitrogen	mg/L	0.03	1.31	1.31	0	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	34	30	n/c	0.2
Conductivity	uS/cm	2	527	535	2	n/c
Hardness, Calcium Carbonate	mg/L	0.6	205	198	3	n/c
pH	pH Units	0.1	8.44	8.42	0	n/c
Total Organic Carbon	mg/L	0.5	10.2	9.41	8	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.334	0.318	5	n/c
Antimony	mg/L	0.0001	0.00013	0.00013	n/c	0
Arsenic	mg/L	0.0001	0.0012	0.0011	9	n/c
Barium	mg/L	0.0001	0.0431	0.0421	2	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.32	0.298	7	n/c
Cadmium	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Calcium	mg/L	0.05	57.5	54.7	5	n/c
Cesium	mg/L	0.00001	0.000027	0.000026	n/c	0.1
Chromium	mg/L	0.0005	0.00053	< 0.0005	n/c	0.06
Cobalt	mg/L	0.0001	0.00023	0.00023	n/c	0
Copper	mg/L	0.0005	0.00157	0.00154	n/c	0.06
Iron	mg/L	0.01	0.386	0.377	2	n/c
Lead	mg/L	0.00005	0.000071	0.000071	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	14.9	14.8	1	n/c
Manganese	mg/L	0.0001	0.0376	0.0374	1	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000552	0.000548	1	n/c
Nickel	mg/L	0.0005	0.00267	0.00256	4	n/c
Potassium	mg/L	0.05	6.31	6.11	3	n/c
Rubidium	mg/L	0.0002	0.00081	0.00074	n/c	0.35
Selenium	mg/L	0.00005	0.000066	0.000054	n/c	0.24
Silicon	mg/L	0.1	3.76	3.72	1	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	38.7	37.8	2	n/c
Strontium	mg/L	0.0002	0.358	0.358	0	n/c
Sulphur (S)	mg/L	0.5	3.26	3.22	1	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00703	0.00736	5	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000259	0.000252	3	n/c
Vanadium	mg/L	0.0005	0.00086	0.00081	n/c	0.1
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
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FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
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RPD or DF exceeds Golder's data quality objectives 20

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 OUTLET 2021-10-18	WETLAND 4 OUTLET 2021-10-18	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	254	242	5	n/c
Ammonia (as N)	mg/L	0.005	0.0086	0.0092	n/c	0.12
Bromide (Br)	mg/L	0.05	0.167	0.167	n/c	0
Chloride (Cl)	mg/L	0.5	41.6	40.8	2	n/c
Fluoride (F)	mg/L	0.02	0.1	0.098	n/c	0.1
Nitrate (as N)	mg/L	0.005	0.734	0.74	1	n/c
Nitrite (as N)	mg/L	0.001	0.0012	0.0013	n/c	0.1
Phosphorus, Total Orthophosphate	mg/L	0.001	0.0012	< 0.001	n/c	0.2
Sulfate (SO4)	mg/L	0.3	10.8	10.6	2	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.67	0.64	5	n/c
Total Nitrogen	mg/L	0.03	1.22	1.25	2	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	25	24	n/c	0.05
Conductivity	uS/cm	2	614	603	2	n/c
Hardness, Calcium Carbonate	mg/L	0.6	232	228	2	n/c
pH	pH Units	0.1	8.37	8.35	0	n/c
Total Organic Carbon	mg/L	0.5	9.03	9.21	2	n/c
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L	400	< 400	< 400	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0
Metals, Total						
Aluminum	mg/L	0.003	0.0277	0.0254	9	n/c
Antimony	mg/L	0.0001	0.0001	0.0001	n/c	0
Arsenic	mg/L	0.0001	0.00069	0.00069	0	n/c
Barium	mg/L	0.0001	0.0466	0.046	1	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.322	0.327	2	n/c
Cadmium	mg/L	0.000005	0.0000054	< 0.000005	n/c	0.08
Calcium	mg/L	0.05	66.5	65.6	1	n/c
Cesium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00014	0.00013	n/c	0.1
Copper	mg/L	0.0005	0.00129	0.00126	n/c	0.06
Iron	mg/L	0.01	0.046	0.042	n/c	0.4
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	16	15.6	3	n/c
Manganese	mg/L	0.0001	0.0149	0.0114	**27**	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000482	0.000462	4	n/c
Nickel	mg/L	0.0005	0.00248	0.00235	n/c	0.26
Potassium	mg/L	0.05	6.02	5.89	2	n/c
Rubidium	mg/L	0.0002	0.00048	0.00051	n/c	0.15
Selenium	mg/L	0.00005	0.000074	0.00006	n/c	0.28
Silicon	mg/L	0.1	2.39	2.34	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	36.7	36.4	1	n/c
Strontium	mg/L	0.0002	0.431	0.422	2	n/c
Sulphur (S)	mg/L	0.5	4.04	3.91	3	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	< 0.0006	< 0.0006	n/c	0
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000346	0.000334	4	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L	400	< 400	< 400	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
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RPD or DF exceeds Golder's data quality objectives **20**

Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	SW-5 2021-10-22	SW-5 FD 2021-10-22	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	26.2	26.2	0	n/c
Ammonia (as N)	mg/L	0.005	0.014	0.0088	n/c	1.04
Chloride (Cl)	mg/L	0.5	39.4	39.4	0	n/c
Dissolved Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Fluoride (F)	mg/L	0.02	0.032	0.031	n/c	0.05
Nitrate (as N)	mg/L	0.005	< 0.005	< 0.005	n/c	0
Nitrite (as N)	mg/L	0.001	< 0.001	< 0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	0.46	0.43	n/c	0.1
Total Kjeldahl Nitrogen	mg/L	0.05	1.07	1.1	3	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Chemical Oxygen Demand	mg/L	20	107	111	4	n/c
Conductivity	uS/cm	2	196	196	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	42.7	41.9	2	n/c
Hardness, Calcium Carbonate (Dissolved)	mg/L	0.6	46.2	40.1	14	n/c
pH	pH Units	0.1	6.61	6.63	0	n/c
Total Organic Carbon	mg/L	0.5	33.7	32.6	3	n/c
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L	400	< 400	< 400	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
VHCs						
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0
Metals, Dissolved						
Aluminum	mg/L	0.001	0.209	0.168	22	n/c
Antimony	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Arsenic	mg/L	0.0001	0.0007	0.00054	26	n/c
Barium	mg/L	0.0001	0.0168	0.0155	8	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	< 0.01	< 0.01	n/c	0
Cadmium	mg/L	0.00005	0.0000062	0.0000051	n/c	0.022
Calcium	mg/L	0.05	14	12	15	n/c
Cesium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00032	0.00026	n/c	0.6
Copper	mg/L	0.0002	0.00099	0.00103	4	n/c
Iron	mg/L	0.01	0.84	0.712	16	n/c
Lead	mg/L	0.00005	0.00007	0.00006	n/c	0.2
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	2.72	2.46	10	n/c
Manganese	mg/L	0.0001	0.0658	0.0589	11	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Nickel	mg/L	0.0005	0.00088	0.00082	n/c	0.12
Potassium	mg/L	0.05	0.701	0.635	10	n/c
Rubidium	mg/L	0.0002	0.0004	0.00038	n/c	0.1
Selenium	mg/L	0.00005	0.000069	< 0.00005	n/c	0.38
Silicon	mg/L	0.05	2.88	2.58	11	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	24	21.9	9	n/c
Strontium	mg/L	0.0002	0.0862	0.0764	12	n/c
Sulphur (S)	mg/L	0.5	< 0.5	< 0.5	n/c	0
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00212	0.00118	57	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.001	0.0086	0.0076	12	n/c
Zirconium	mg/L	0.0002	0.00023	< 0.0002	n/c	0.15
Metals, Total						
Aluminum	mg/L	0.003	0.276	0.198	33	n/c
Antimony	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Arsenic	mg/L	0.0001	0.0008	0.00068	16	n/c
Barium	mg/L	0.0001	0.0176	0.0159	10	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	< 0.01	< 0.01	n/c	0
Cadmium	mg/L	0.00005	0.0000089	0.000007	n/c	0.038
Calcium	mg/L	0.05	12.7	12.4	2	n/c
Cesium	mg/L	0.00001	0.00001	< 0.00001	n/c	0
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00082	0.0003	93	n/c
Copper	mg/L	0.0005	0.0012	0.001	n/c	0.4
Iron	mg/L	0.01	1.4	0.931	40	n/c
Lead	mg/L	0.00005	0.000185	0.000087	n/c	1.96
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	2.66	2.66	0	n/c
Manganese	mg/L	0.0001	0.222	0.0693	105	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000057	< 0.00005	n/c	0.14
Nickel	mg/L	0.0005	0.00098	0.00086	n/c	0.24
Potassium	mg/L	0.05	0.672	0.662	1	n/c
Rubidium	mg/L	0.0002	0.00049	0.00046	n/c	0.15
Selenium	mg/L	0.00005	< 0.00005	0.000076	n/c	0.52
Silicon	mg/L	0.1	2.88	2.83	2	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	23.1	23.2	0	n/c
Strontium	mg/L	0.0002	0.079	0.0787	0	n/c
Sulphur (S)	mg/L	0.5	< 0.5	< 0.5	n/c	0
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00273	0.00164	50	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Vanadium	mg/L	0.0005	0.00056	< 0.0005	n/c	0.12
Zinc	mg/L	0.003	0.0102	0.0087	n/c	0.5
Zirconium	mg/L	0.0002	0.00033	0.00024	n/c	0.45
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives 20

Appendix C
Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	SW-09 2021-10-26	SW-09 FD 2021-10-26	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	257	257	0	n/c
Ammonia (as N)	mg/L	0.005	0.0076	0.0119	n/c	0.86
Chloride (Cl)	mg/L	0.5	45.8	45.8	0	n/c
Dissolved Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Fluoride (F)	mg/L	0.02	0.091	0.088	n/c	0.15
Nitrate (as N)	mg/L	0.005	0.103	0.0943	9	n/c
Nitrite (as N)	mg/L	0.001	< 0.001	0.001	n/c	0
Sulfate (SO4)	mg/L	0.3	7.11	7.08	0	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.517	0.521	1	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Chemical Oxygen Demand	mg/L	20	41	32	n/c	0.45
Conductivity	uS/cm	2	600	600	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	223	223	0	n/c
Hardness, Calcium Carbonate (Dissolved)	mg/L	0.6	227	231	2	n/c
pH	pH Units	0.1	8.35	8.36	0	n/c
Total Organic Carbon	mg/L	0.5	11.8	11.6	2	n/c
Metals, Dissolved						
Aluminum	mg/L	0.001	0.0081	0.0072	12	n/c
Antimony	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Arsenic	mg/L	0.0001	0.00061	0.00061	0	n/c
Barium	mg/L	0.0001	0.0435	0.0422	3	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.267	0.274	3	n/c
Cadmium	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Calcium	mg/L	0.05	62.8	65.8	5	n/c
Cesium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.0001	0.0001	n/c	0
Copper	mg/L	0.0002	0.00054	0.00054	n/c	0
Iron	mg/L	0.01	0.012	0.012	n/c	0
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	17	16.2	5	n/c
Manganese	mg/L	0.0001	0.00666	0.00537	**21**	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000405	0.000382	6	n/c
Nickel	mg/L	0.0005	0.00241	0.0024	n/c	0.02
Potassium	mg/L	0.05	6.32	6.34	0	n/c
Rubidium	mg/L	0.0002	0.00087	0.00086	n/c	0.05
Selenium	mg/L	0.00005	0.000548	0.00029	**62**	n/c
Silicon	mg/L	0.05	2.95	2.96	0	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	39.2	38.4	2	n/c
Strontium	mg/L	0.0002	0.41	0.419	2	n/c
Sulphur (S)	mg/L	0.5	2.66	2.42	9	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	< 0.0003	< 0.0003	n/c	0
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000376	0.000367	2	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.001	< 0.001	< 0.001	n/c	0
Zirconium	mg/L	0.0002	0.00024	< 0.0002	n/c	0.2
Metals, Total						
Aluminum	mg/L	0.003	0.0184	0.0144	**24**	n/c
Antimony	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Arsenic	mg/L	0.0001	0.00057	0.00057	0	n/c
Barium	mg/L	0.0001	0.0421	0.042	0	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.294	0.29	1	n/c
Cadmium	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Calcium	mg/L	0.05	63.4	63.2	0	n/c
Cesium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00011	0.00011	n/c	0
Copper	mg/L	0.0005	0.0006	0.00107	n/c	0.94
Iron	mg/L	0.01	0.022	0.022	n/c	0
Lead	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	15.8	15.8	0	n/c
Manganese	mg/L	0.0001	0.00733	0.00643	13	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000449	0.000429	5	n/c
Nickel	mg/L	0.0005	0.00236	0.00243	n/c	0.14
Potassium	mg/L	0.05	6.03	5.99	1	n/c
Rubidium	mg/L	0.0002	0.00079	0.00086	n/c	0.35
Selenium	mg/L	0.00005	0.00007	0.000059	n/c	0.22
Silicon	mg/L	0.1	3.01	3.02	0	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	37.9	38.4	1	n/c
Strontium	mg/L	0.0002	0.418	0.408	2	n/c
Sulphur (S)	mg/L	0.5	2.75	2.81	2	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00031	< 0.0003	n/c	0.033
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000355	0.000332	7	n/c
Vanadium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Zinc	mg/L	0.003	< 0.003	< 0.003	n/c	0
Zirconium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
DF is calculated when the mean concentration is less than five times the laboratory report detection limit.
FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives **20**

Appendix C
Results of Quality Assurance and Quality Control
Hazelton Waste Management Facility
Regional District of Kitimat Stikine

Sample Name / Sample Collection Date	Units	RDL	WETLAND 4 2021-11-25	WETLAND 4 FD 2021-11-25	RPD (%)	DF (unitless)
Anions + Nutrients						
Alkalinity, Total as CaCO3	mg/L	1	202	210	4	n/c
Ammonia (as N)	mg/L	0.005	0.263	0.264	0	n/c
Chloride (Cl)	mg/L	0.5	16.8	16.8	0	n/c
Fluoride (F)	mg/L	0.02	0.08	0.080	n/c	0
Nitrate (as N)	mg/L	0.005	0.0918	0.0796	14	n/c
Nitrite (as N)	mg/L	0.001	< 0.001	< 0.001	n/c	0
Phosphorus, Total Orthophosphate	mg/L	0.001	0.0095	0.0092	3	n/c
Sulfate (SO4)	mg/L	0.3	7.5	7.30	3	n/c
Total Kjeldahl Nitrogen	mg/L	0.05	0.714	0.641	11	n/c
Total Nitrogen	mg/L	0.03	0.827	0.836	1	n/c
Total Phosphorus, Unknown	mg/L	0.05	< 0.05	< 0.05	n/c	0
Physical						
Biochemical Oxygen Demand	mg/L	2	< 2	< 2	n/c	0
Chemical Oxygen Demand	mg/L	20	25	26	n/c	0.05
Conductivity	uS/cm	2	438	436	0	n/c
Hardness, Calcium Carbonate	mg/L	0.6	224	221	1	n/c
pH	pH Units	0.1	8.28	8.26	0	n/c
Total Organic Carbon	mg/L	0.5	8.36	8.48	1	n/c
Metals, Total						
Aluminum	mg/L	0.003	0.308	0.264	15	n/c
Antimony	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Arsenic	mg/L	0.0001	0.00089	0.00083	7	n/c
Barium	mg/L	0.0001	0.0572	0.0580	1	n/c
Beryllium	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Bismuth	mg/L	0.00005	< 0.00005	< 0.00005	n/c	0
Boron	mg/L	0.01	0.124	0.130	5	n/c
Cadmium	mg/L	0.000005	0.0000433	0.0000413	5	n/c
Calcium	mg/L	0.05	63.1	61.8	2	n/c
Cesium	mg/L	0.00001	0.000031	0.000021	n/c	1
Chromium	mg/L	0.0005	< 0.0005	< 0.0005	n/c	0
Cobalt	mg/L	0.0001	0.00037	0.00035	n/c	0.2
Copper	mg/L	0.0005	0.00192	0.00191	n/c	0.02
Iron	mg/L	0.01	0.399	0.349	13	n/c
Lead	mg/L	0.00005	0.000130	0.000120	n/c	0.2
Lithium	mg/L	0.001	< 0.001	< 0.001	n/c	0
Magnesium	mg/L	0.005	16.1	16.2	1	n/c
Manganese	mg/L	0.0001	0.454	0.455	0	n/c
Mercury	mg/L	0.000005	< 0.000005	< 0.000005	n/c	0
Molybdenum	mg/L	0.00005	0.000467	0.000462	1	n/c
Nickel	mg/L	0.0005	0.00170	0.00165	n/c	0.1
Potassium	mg/L	0.05	4.23	4.29	1	n/c
Rubidium	mg/L	0.0002	0.00061	0.00055	n/c	0.3
Selenium	mg/L	0.00005	0.000053	0.000069	n/c	0.32
Silicon	mg/L	0.1	3.29	3.26	1	n/c
Silver	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Sodium	mg/L	0.05	18.3	18.3	0	n/c
Strontium	mg/L	0.0002	0.387	0.388	0	n/c
Sulphur (S)	mg/L	0.5	3.39	3.38	0	n/c
Tellurium	mg/L	0.0002	< 0.0002	< 0.0002	n/c	0
Thallium	mg/L	0.00001	< 0.00001	< 0.00001	n/c	0
Thorium-232	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Tin	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Titanium	mg/L	0.0003	0.00477	0.00478	0	n/c
Tungsten	mg/L	0.0001	< 0.0001	< 0.0001	n/c	0
Uranium	mg/L	0.00001	0.000322	0.000332	3	n/c
Vanadium	mg/L	0.0005	0.00070	0.00059	n/c	0.22
Zinc	mg/L	0.003	0.0047	0.0046	n/c	0.033
Zirconium	mg/L	0.0002	0.00028	0.00025	n/c	0.15
VOCs + BTEX						
Benzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Ethylbenzene	ug/L	0.5	< 0.5	< 0.5	n/c	0
m,p-Xylenes	ug/L	0.4	< 0.4	< 0.4	n/c	0
Methyl tert-Butyl Ether	ug/L	0.5	< 0.5	< 0.5	n/c	0
o-Xylene	ug/L	0.3	< 0.3	< 0.3	n/c	0
Styrene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Toluene	ug/L	0.5	< 0.5	< 0.5	n/c	0
Xylenes, Total	ug/L	0.5	< 0.5	< 0.5	n/c	0
Hydrocarbons						
Extractable Petroleum Hydrocarbons (C10-C19)	ug/L	250	< 250	< 250	n/c	0
Extractable Petroleum Hydrocarbons (C10-C32)	ug/L	400	< 400	< 400	n/c	0
Extractable Petroleum Hydrocarbons (C19-C32)	ug/L	250	< 250	< 250	n/c	0
Volatile Hydrocarbons (C6-C10)	ug/L	100	< 100	< 100	n/c	0
Volatile Petroleum Hydrocarbons	ug/L	100	< 100	< 100	n/c	0

Notes:
RPD = Relative percent difference; the difference between two values divided by the mean of the two values.
RPD is calculated when the mean concentration is greater than five times the laboratory report detection limit.
DF = Difference factor; the absolute difference between two values divided by the laboratory report detection limit.
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FDA = field duplicate available, FD = field duplicate, QA/QC = quality assurance/quality control
RDL = Report Detection Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
< Indicates parameter was below the laboratory RDL; n/c = Not Calculated
RPD or DF exceeds Golder's data quality objectives **20**

APPENDIX D

Laboratory Reports

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A1321**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Date Analysis Commenced	: 23-Jan-2021
C-O-C number	: ----	Issue Date	: 25-Jan-2021 14:54
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Inorganics, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Woochan Song	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
µg/L	micrograms per litre
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.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH-03	----	----	----	----
					Client sampling date / time	21-Jan-2021 12:30	----	----	----	----
						VA21A1321-001	--------	--------	--------	--------
						Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		257	----	----	----	----
conductivity	----	E100	2.0	µS/cm		843	----	----	----	----
pH	----	E108	0.10	pH units		8.48	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		243	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<0.0050	----	----	----	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L		<0.250 DLDS	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		<2.50 DLDS	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		<0.100 DLDS	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.404	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.132	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0293	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		193	----	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		30.5	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0040	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		0.00914	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00044	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0290	----	----	----	----
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		0.070	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.000167	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		70.8	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	----	----	----	----
chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L		<0.00010	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		<0.00010	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00078	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		<0.010	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-03	----	----	----	----
					Client sampling date / time	21-Jan-2021 12:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A1321-001	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0017	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		16.0	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.00164	----	----	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.00435	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		2.23	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00044	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000424	----	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		3.86	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	----	----	----	----
sodium, dissolved	17341-25-2	E421	0.050	mg/L		95.7	----	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.956	----	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		70.5	----	----	----	----
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		0.00020	----	----	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00039	----	----	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		0.00014	----	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.00226	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0051	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Field	----	----	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		136	----	----	----	----
Volatile Organic Compounds [Fuels]										

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-03	----	----	----	----
					Client sampling date / time	21-Jan-2021 12:30	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A1321-001	--------	--------	--------	--------
						Result	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	----	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	----	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	----	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%		102	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%		80.2	----	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		630	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L		1800	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	----	----	----	----
VPHw	----	EC580A	100	µg/L		<100	----	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%		99.8	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		89.7	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A1321**	Page	: 1 of 10
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Hazelton WMF Groundwater	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Issue Date	: 25-Jan-2021 14:54
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Analysis Holding Time Compliance

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-03	E559	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-03	E298	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
BH-03	E235.Br-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-03	E235.Cl	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
BH-03	E235.F	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
BH-03	E235.NO3-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
BH-03	E235.NO2-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-03	E235.SO4	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-03	E318	21-Jan-2021	24-Jan-2021	28 days	2 days	✓	25-Jan-2021	25 days	0 days	✓
Dissolved Metals : Dissolved Chromium in Water by CRC ICPMS (Low Level)										
HDPE dissolved (nitric acid)										
BH-03	E421.Cr-L	21-Jan-2021	25-Jan-2021	180 days	3 days	✓	25-Jan-2021	176 days	0 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-03	E509	21-Jan-2021	24-Jan-2021	28 days	3 days	✓	24-Jan-2021	24 days	0 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-03	E421	21-Jan-2021	25-Jan-2021	180 days	3 days	✓	25-Jan-2021	176 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-03	E601A	21-Jan-2021	24-Jan-2021	14 days	2 days	✓	25-Jan-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-03	E581.VH+F1	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
BH-03	E355-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
BH-03	E290	21-Jan-2021	----	----	----		23-Jan-2021	14 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE										
BH-03	E100	21-Jan-2021	----	----	----		23-Jan-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
BH-03	E108	21-Jan-2021	----	----	----		23-Jan-2021	0.25 hrs	51 hrs	× EHTR-FM
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-03	E611A	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144357	0	17	0.0	5.0	×
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144333	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	144501	1	1	100.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	144444	1	3	33.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	144502	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
pH by Meter	E108	144295	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144319	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144356	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	4	25.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144357	1	17	5.8	5.0	✓
BC PHC - EPH by GC-FID	E601A	144321	1	11	9.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144333	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	144501	1	1	100.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	144444	1	3	33.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	144502	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
pH by Meter	E108	144295	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144319	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144356	1	16	6.2	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	4	25.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144357	1	17	5.8	5.0	✓
BC PHC - EPH by GC-FID	E601A	144321	1	11	9.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144333	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	144501	1	1	100.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	144444	1	3	33.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	144502	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144319	1	1	100.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144356	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	4	25.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	144357	0	17	0.0	5.0	×
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144333	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Dissolved Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L	144501	1	1	100.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	144444	1	3	33.3	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	144502	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144319	0	1	0.0	5.0	×
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144356	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	4	25.0	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 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.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved 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 Chromium in Water by CRC ICPMS (Low Level)	E421.Cr-L Vancouver - Environmental	Water	APHA 3030 B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as $CaCO_3$), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21A1321**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Hazelton WMF Groundwater	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Date Analysis Commenced	: 23-Jan-2021
C-O-C number	: ----	Issue Date	: 25-Jan-2021 14:56
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Inorganics, Burnaby, British Columbia
Brieanna Allen	Department Manager - Organics	Organics, Burnaby, British Columbia
Jashan Kaur	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Woochan Song	Lab Assistant	Metals, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 144294)											
VA21A1323-002	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	322	334	3.78%	20%	----
Physical Tests (QC Lot: 144295)											
VA21A1323-002	Anonymous	pH	----	E108	0.10	pH units	8.38	8.40	0.238%	4%	----
Physical Tests (QC Lot: 144296)											
VA21A1323-002	Anonymous	conductivity	----	E100	2.0	µS/cm	703	716	1.83%	10%	----
Anions and Nutrients (QC Lot: 144297)											
VA21A1321-001	BH-03	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144298)											
VA21A1321-001	BH-03	chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144299)											
VA21A1321-001	BH-03	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144300)											
VA21A1321-001	BH-03	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.132	0.133	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144301)											
VA21A1321-001	BH-03	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0293	0.0327	0.0034	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144302)											
VA21A1321-001	BH-03	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	193	193	0.143%	20%	----
Anions and Nutrients (QC Lot: 144319)											
VA21A1321-001	BH-03	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.404	0.410	0.006	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 144356)											
VA21A1242-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	3.57	3.56	0.01	Diff <2x LOR	----
Dissolved Metals (QC Lot: 144444)											
VA21A0873-003	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 144501)											
VA21A1321-001	BH-03	chromium, dissolved	7440-47-3	E421.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 144502)											
VA21A1321-001	BH-03	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0040	0.0034	0.0006	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00914	0.00936	2.34%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00044	0.00044	0.000001	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0290	0.0285	1.82%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 144502) - continued											
VA21A1321-001	BH-03	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	0.070	0.073	0.003	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.000167	0.000170	2.14%	20%	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	70.8	73.8	4.23%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00078	0.00082	0.00004	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0017	0.0018	0.00008	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	16.0	16.3	1.63%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00164	0.00159	3.19%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00435	0.00455	4.39%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.23	2.25	1.08%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00044	0.00051	0.00006	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000424	0.000457	0.000032	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.86	3.82	0.873%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	95.7	95.8	0.0796%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.956	1.00	4.54%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	70.5	69.5	1.33%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	0.00020	0.00021	0.000006	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00039	<0.00030	0.00009	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	0.00014	0.00014	0.000002	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00226	0.00217	4.02%	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	0.0051	0.0050	0.0002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 144333)											
VA21A1062-001	Anonymous	chemical oxygen demand [COD]	----	E559	20000	mg/L	108000 µg/L	112	4	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*
Volatile Organic Compounds (QC Lot: 144451)											
VA21A1321-001	BH-03	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 144450)											
VA21A1321-001	BH-03	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 144294)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 144296)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 144297)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 144298)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 144299)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 144300)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 144301)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 144302)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 144319)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 144357)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 144356)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 144444)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 144501)						
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	<0.00010	----
Dissolved Metals (QCLot: 144502)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 144502) - continued						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Aggregate Organics (QCLot: 144333)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 144451)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 144451) - continued						
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 144321)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 144450)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 144294)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 144295)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 144296)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 144297)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144298)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144299)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 144300)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144301)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144302)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 144319)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 144357)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	97.5	85.0	115	----
Organic / Inorganic Carbon (QCLot: 144356)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
Dissolved Metals (QCLot: 144501)									
chromium, dissolved	7440-47-3	E421.Cr-L	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Dissolved Metals (QCLot: 144502)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 144502) - continued									
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100.0	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	107	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	110	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.9	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	103	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	70.0	130	----
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	109	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	106	80.0	120	----
sodium, dissolved	17341-25-2	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	110	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	106	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	110	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	110	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.9	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Aggregate Organics (QCLot: 144333)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	100	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 144451)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	84.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	87.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	95.5	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	92.3	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	91.5	70.0	130	----
Hydrocarbons (QCLot: 144321)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	113	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	114	70.0	130	----
Hydrocarbons (QCLot: 144450)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	74.9	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 144297)										
VA21A1323-001	Anonymous	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 144298)										
VA21A1323-001	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 144299)										
VA21A1323-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.486 mg/L	0.5 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 144300)										
VA21A1323-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 144301)										
VA21A1323-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.502 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 144302)										
VA21A1323-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
Organic / Inorganic Carbon (QCLot: 144356)										
VA21A1242-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 144444)										
VA21A0873-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 144501)										
VA21A1321-001	BH-03	chromium, dissolved	7440-47-3	E421.Cr-L	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----
Dissolved Metals (QCLot: 144502)										
VA21A1321-001	BH-03	aluminum, dissolved	7429-90-5	E421	0.201 mg/L	0.2 mg/L	101	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0210 mg/L	0.02 mg/L	105	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	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00916 mg/L	0.01 mg/L	91.6	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	97.8	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	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 144502) - continued										
VA21A1321-001	BH-03	copper, dissolved	7440-50-8	E421	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.98 mg/L	2 mg/L	98.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0957 mg/L	0.1 mg/L	95.7	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	98.8	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.00 mg/L	4 mg/L	100.0	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.33 mg/L	10 mg/L	93.3	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00344 mg/L	0.004 mg/L	85.9	70.0	130	----
		sodium, dissolved	17341-25-2	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	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0215 mg/L	0.02 mg/L	107	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00415 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.387 mg/L	0.4 mg/L	96.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0426 mg/L	0.04 mg/L	106	70.0	130	----
Aggregate Organics (QCLot: 144333)										
VA21A1116-001	Anonymous	chemical oxygen demand [COD]	----	E559	458 mg/L	500 mg/L	91.6	75.0	125	----
Volatile Organic Compounds (QCLot: 144451)										
VA21A1321-001	BH-03	benzene	71-43-2	E611A	96.7 µg/L	100 µg/L	96.7	60.0	140	----
		ethylbenzene	100-41-4	E611A	86.4 µg/L	100 µg/L	86.4	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	105 µg/L	100 µg/L	105	60.0	140	----
		styrene	100-42-5	E611A	86.9 µg/L	100 µg/L	86.9	60.0	140	----
		toluene	108-88-3	E611A	98.0 µg/L	100 µg/L	98.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	189 µg/L	200 µg/L	94.6	60.0	140	----

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
Volatile Organic Compounds (QCLot: 144451) - continued										
VA21A1321-001	BH-03	xylene, o-	95-47-6	E611A	93.1 µg/L	100 µg/L	93.1	60.0	140	----
Hydrocarbons (QCLot: 144450)										
VA21A1321-001	BH-03	VHw (C6-C10)	----	E581.VH+F1	4170 µg/L	6310 µg/L	66.1	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☑ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca;
Email 3	mglover@rdks.bc.ca; nveikle@rdks.bc.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton WMF Groundwater
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)		
AFE/Cost Center:		PO#
Major/Minor Code:		Routing Code:
Requisitioner:		
Location:		

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Metals	F/P Dissolved Mercury	Alkalinity	Chloride	Fluoride, Sulphate, Hardness	P Ammonia	Nitrate	Nitrite	P TOC	P COD	pH	Conductivity	P Total Kjeldahl Nitrogen	P EPH	P BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	~~BH-01~~			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	~~BH-02~~			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	BH-03	21-01-21	12:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	~~BH-4B~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~BH-5B~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~SGW-1~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~SGW-2~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~SGW-3~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~SGW-4~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~SGW-5~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~DUP~~			Water	R	R	R	R	R	R	R	R	R	R								
	~~Travel Blank~~			Water	R	R	R	R		R												

Terrace Shipping
1 Coolers
___ Carbouys

Environmental Division
Vancouver
Work Order Reference
VA21A1321

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS REC

Frozen ☐ SIF Observations
Ice Packs ☐ Ice Cubes ☐ Custody seal intact ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C		
3.6					5	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date:	Time:	Received by: Chris	Date: 22 Jan 21	Time: 0945	Received by: ice pack	Date: JAN 23 2021	Time: 11 am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A1323**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Wetland 4	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Date Analysis Commenced	: 23-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021 11:41
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
µg/L	micrograms per litre
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.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Field Blank	----	----
					Client sampling date / time: 21-Jan-2021 14:40	21-Jan-2021 12:00	21-Jan-2021 15:00	----	----
					VA21A1323-001	VA21A1323-002	VA21A1323-004	--------	--------
					Result	Result	Result	----	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	326	322	<1.0	----	----
conductivity	----	E100	2.0	µS/cm	710	703	<2.0	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	319	302	<0.60	----	----
pH	----	E108	0.10	pH units	8.39	8.38	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	1.61	1.49	<0.0050	----	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.247	<0.250 DLDS	<0.050	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	40.9	40.3	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.095	<0.100 DLDS	<0.020	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.31	2.14	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.906	0.945	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0068	0.0078	<0.0010	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	2.93	2.93	<0.030	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	4.25	3.90	<0.30	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	8.92	8.89	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0674	0.0720	<0.0030	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00016	0.00016	<0.00010	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00074	0.00072	<0.00010	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0764	0.0742	<0.00010	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
boron, total	7440-42-8	E420	0.010	mg/L	0.242	0.238	<0.010	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000686	0.0000862	<0.0000050	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	92.9	86.5	<0.050	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000016	0.000016	<0.000010	----	----
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00041	0.00053	<0.00010	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00109	0.00094	<0.00010	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wetland 4	DUP	Field Blank	----	----
					Client sampling date / time	21-Jan-2021 14:40	21-Jan-2021 12:00	21-Jan-2021 15:00	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A1323-001	VA21A1323-002	VA21A1323-004	--------	--------
						Result	Result	Result	----	----
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L		0.00144	0.00148	<0.00050	----	----
iron, total	7439-89-6	E420	0.010	mg/L		0.103	0.104	<0.010	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		21.2	20.9	<0.0050	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		2.57	2.24	<0.00010	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000683	0.000636	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00297	0.00288	<0.00050	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		7.55	7.28	<0.050	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00091	0.00092	<0.00020	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000097	0.000107	<0.000050	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		4.24	4.16	<0.10	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
sodium, total	17341-25-2	E420	0.050	mg/L		33.8	33.2	<0.050	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.605	0.550	<0.00020	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		1.88	1.90	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00147	0.00141	<0.00030	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000377	0.000354	<0.000010	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		0.00026	<0.00020	<0.00020	----	----
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		2.1	<2.0	<2.0	----	----
chemical oxygen demand [COD]	----	E559	20	mg/L		24	29	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Field Blank	----	----
Client sampling date / time					21-Jan-2021 14:40	21-Jan-2021 12:00	21-Jan-2021 15:00	----	----
					VA21A1323-001	**VA21A1323-002**	**VA21A1323-004**	--------	--------
					Result	Result	Result	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	<0.40	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	<0.30	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	<0.50	<0.50	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%	103	102	100	----	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%	105	97.5	102	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	<250	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	----	----
VPHw	----	EC580A	100	µg/L	<100	<100	<100	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%	88.0	90.8	89.0	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	113	102	115	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A1323**	Page	: 1 of 16
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Hazelton WMF Wetland 4	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Issue Date	: 01-Feb-2021 11:41
C-O-C number	: ----		
Sampler	: H. 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.

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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD] DUP	E550	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD] Field Blank	E550	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD] Wetland 4	E550	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	21-Jan-2021	----	----	----		25-Jan-2021	28 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	21-Jan-2021	----	----	----		25-Jan-2021	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	21-Jan-2021	----	----	----		25-Jan-2021	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Wetland 4	E298	21-Jan-2021	----	----	----		25-Jan-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
DUP	E298	21-Jan-2021	----	----	----		25-Jan-2021	28 days	4 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
DUP	E235.Br-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Field Blank	E235.Br-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.Br-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP	E378-U	21-Jan-2021	----	----	----		24-Jan-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE DUP	E235.F	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Wetland 4	E235.F	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO3-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	21-Jan-2021	----	----	----		24-Jan-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	21-Jan-2021	----	----	----		24-Jan-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	21-Jan-2021	24-Jan-2021	28 days	2 days	✓	25-Jan-2021	25 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	21-Jan-2021	24-Jan-2021	28 days	3 days	✓	25-Jan-2021	24 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	21-Jan-2021	24-Jan-2021	28 days	2 days	✓	25-Jan-2021	25 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	21-Jan-2021	24-Jan-2021	28 days	2 days	✓	25-Jan-2021	25 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	21-Jan-2021	24-Jan-2021	28 days	3 days	✓	25-Jan-2021	24 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	21-Jan-2021	27-Jan-2021	14 days	5 days	✓	27-Jan-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	21-Jan-2021	27-Jan-2021	14 days	5 days	✓	27-Jan-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	21-Jan-2021	27-Jan-2021	14 days	5 days	✓	27-Jan-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	21-Jan-2021	24-Jan-2021	14 days	2 days	✓	24-Jan-2021	11 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Wetland 4	E581.VH+F1	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E355-L	21-Jan-2021	----	----	----		24-Jan-2021	28 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
DUP	E290	21-Jan-2021	----	----	----		23-Jan-2021	14 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE										
Field Blank	E290	21-Jan-2021	----	----	----		23-Jan-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Wetland 4	E290	21-Jan-2021	----	----	----		23-Jan-2021	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
DUP	E100	21-Jan-2021	----	----	----		23-Jan-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Field Blank	E100	21-Jan-2021	----	----	----		23-Jan-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Wetland 4	E100	21-Jan-2021	----	----	----		23-Jan-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE										
Wetland 4	E108	21-Jan-2021	----	----	----		23-Jan-2021	0.25 hrs	49 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE										
DUP	E108	21-Jan-2021	----	----	----		23-Jan-2021	0.25 hrs	51 hrs	× EHTR-FM
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid)										
DUP	E420.Cr-L	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid)										
Field Blank	E420.Cr-L	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid)										
Wetland 4	E420.Cr-L	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
DUP	E508	21-Jan-2021	----	----	----		26-Jan-2021	28 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Field Blank	E508	21-Jan-2021	----	----	----		26-Jan-2021	28 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Wetland 4	E508	21-Jan-2021	----	----	----		26-Jan-2021	28 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
DUP	E420	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Wetland 4	E420	21-Jan-2021	----	----	----		26-Jan-2021	180 days	4 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	21-Jan-2021	24-Jan-2021	14 days	2 days	✓	24-Jan-2021	11 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
DUP	E611A	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	21-Jan-2021	24-Jan-2021	14 days	3 days	✓	24-Jan-2021	10 days	0 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144442	1	3	33.3	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	144318	1	3	33.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144590	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	144303	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
pH by Meter	E108	144295	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	144772	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144443	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	144832	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	144773	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	144447	1	3	33.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144441	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	5	20.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144442	1	3	33.3	5.0	✓
BC PHC - EPH by GC-FID	E601A	145261	1	15	6.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	144318	1	3	33.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144590	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	144303	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
pH by Meter	E108	144295	1	3	33.3	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	144772	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144443	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	144832	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	144773	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	144447	1	3	33.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144441	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	5	20.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	144294	1	4	25.0	5.0	✓
Ammonia by Fluorescence	E298	144442	1	3	33.3	5.0	✓
BC PHC - EPH by GC-FID	E601A	145261	1	15	6.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	144318	1	3	33.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144590	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Conductivity in Water	E100	144296	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	144303	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	144772	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144443	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	144832	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	144773	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	144447	1	3	33.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144441	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	5	20.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	144442	1	3	33.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	144299	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	144451	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	144590	1	15	6.6	5.0	✓
Chloride in Water by IC	E235.Cl	144298	1	4	25.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	144303	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	144297	1	4	25.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	144300	1	4	25.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	144301	1	4	25.0	5.0	✓
Sulfate in Water by IC	E235.SO4	144302	1	4	25.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	144772	1	4	25.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	144443	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	144832	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	144773	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	144447	1	3	33.3	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	144441	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	144450	1	5	20.0	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 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.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21A1323**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Hazelton WMF Wetland 4	Date Samples Received	: 23-Jan-2021 11:00
PO	: ----	Date Analysis Commenced	: 23-Jan-2021
C-O-C number	: ----	Issue Date	: 01-Feb-2021 11:41
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
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General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 144294)											
VA21A1323-002	DUP	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	322	334	3.78%	20%	----
Physical Tests (QC Lot: 144295)											
VA21A1323-002	DUP	pH	----	E108	0.10	pH units	8.38	8.40	0.238%	4%	----
Physical Tests (QC Lot: 144296)											
VA21A1323-002	DUP	conductivity	----	E100	2.0	µS/cm	703	716	1.83%	10%	----
Anions and Nutrients (QC Lot: 144297)											
VA21A1321-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144298)											
VA21A1321-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144299)											
VA21A1321-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144300)											
VA21A1321-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.132	0.133	0.0013	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144301)											
VA21A1321-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0293	0.0327	0.0034	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144302)											
VA21A1321-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	193	193	0.143%	20%	----
Anions and Nutrients (QC Lot: 144303)											
VA21A1323-001	Wetland 4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	0.0010	0.000007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144442)											
VA21A1323-001	Wetland 4	ammonia, total (as N)	7664-41-7	E298	0.250	mg/L	1.61	1.58	0.0337	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 144443)											
VA21A1323-001	Wetland 4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.31	2.18	6.04%	20%	----
Anions and Nutrients (QC Lot: 144447)											
VA21A1323-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.060	mg/L	2.93	2.89	1.34%	20%	----
Organic / Inorganic Carbon (QC Lot: 144441)											
VA21A1323-001	Wetland 4	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	8.92	9.01	1.03%	20%	----
Total Metals (QC Lot: 144772)											
VA21A1323-001	Wetland 4	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00041	0.00036	0.00005	Diff <2x LOR	----
Total Metals (QC Lot: 144773)											
VA21A1323-001	Wetland 4	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0674	0.0644	4.68%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 144773) - continued											
VA21A1323-001	Wetland 4	antimony, total	7440-36-0	E420	0.00010	mg/L	0.00016	0.00015	0.000003	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00074	0.00073	0.00001	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0764	0.0756	1.00%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.242	0.243	0.567%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000686	0.0000698	1.79%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	92.9	91.0	2.05%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000016	0.000016	0.0000001	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00109	0.00106	2.70%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00144	0.00140	0.00004	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.103	0.104	0.620%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	21.2	21.0	1.42%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	2.57	2.59	0.618%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000683	0.000692	1.27%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00297	0.00293	0.00004	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	7.55	7.55	0.0427%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00091	0.00088	0.00003	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000097	0.000093	0.000004	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	4.24	4.18	1.41%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	33.8	33.6	0.673%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.605	0.592	2.26%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	1.88	1.80	0.08	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00147	0.00128	0.00019	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000377	0.000370	1.80%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 144773) - continued											
VA21A1323-001	Wetland 4	zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00026	<0.00020	0.00006	Diff <2x LOR	----
Total Metals (QC Lot: 144832)											
VA21A1323-001	Wetland 4	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 144318)											
VA21A1323-001	Wetland 4	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	2.1	<2.0	4.88%	30%	----
Aggregate Organics (QC Lot: 144590)											
VA21A1263-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 144451)											
VA21A1321-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 144450)											
VA21A1321-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.00%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 144294)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 144296)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 144297)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 144298)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 144299)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 144300)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 144301)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 144302)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 144303)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 144442)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 144443)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 144447)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 144441)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 144772)						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
Total Metals (QCLot: 144773)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 144773) - continued						
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 144832)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 144318)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 144318) - continued						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 144590)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 144451)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 144450)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 145261)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 144294)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 144295)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 144296)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 144297)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144298)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144299)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 144300)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144301)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 144302)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 144303)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 144442)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 144443)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 144447)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.1	75.0	125	----
Organic / Inorganic Carbon (QCLot: 144441)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	97.8	80.0	120	----
Total Metals (QCLot: 144772)									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Total Metals (QCLot: 144773)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 144773) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	113	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	108	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	108	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	110	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	107	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	109	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	106	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	119	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	112	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	112	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	109	80.0	120	----
sodium, total	17341-25-2	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	115	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	103	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	109	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.4	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.8	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	109	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	108	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 144832)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Aggregate Organics (QCLot: 144318)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	96.5	85.0	115	----
Aggregate Organics (QCLot: 144590)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	99.3	85.0	115	----
Volatile Organic Compounds (QCLot: 144451)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	84.9	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	87.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	95.5	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	92.3	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	91.5	70.0	130	----
Hydrocarbons (QCLot: 144450)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	74.9	70.0	130	----
Hydrocarbons (QCLot: 145261)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	106	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	106	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 144297)										
VA21A1323-001	Wetland 4	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 144298)										
VA21A1323-001	Wetland 4	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 144299)										
VA21A1323-001	Wetland 4	bromide	24959-67-9	E235.Br-L	0.486 mg/L	0.5 mg/L	97.2	75.0	125	----
Anions and Nutrients (QCLot: 144300)										
VA21A1323-001	Wetland 4	nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 144301)										
VA21A1323-001	Wetland 4	nitrite (as N)	14797-65-0	E235.NO2-L	0.502 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 144302)										
VA21A1323-001	Wetland 4	sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 144303)										
VA21A1323-002	DUP	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0304 mg/L	0.03 mg/L	101	70.0	130	----
Anions and Nutrients (QCLot: 144442)										
VA21A1323-002	DUP	ammonia, total (as N)	7664-41-7	E298	10.2 mg/L	10 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 144443)										
VA21A1323-002	DUP	Kjeldahl nitrogen, total [TKN]	----	E318	2.57 mg/L	2.5 mg/L	103	70.0	130	----
Anions and Nutrients (QCLot: 144447)										
VA21A1323-002	DUP	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 144441)										
VA21A1323-002	DUP	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 144772)										
VA21A1323-001	Wetland 4	chromium, total	7440-47-3	E420.Cr-L	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
Total Metals (QCLot: 144773)										
VA21A1323-001	Wetland 4	aluminum, total	7429-90-5	E420	0.195 mg/L	0.2 mg/L	97.7	70.0	130	----
		antimony, total	7440-36-0	E420	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 144773) - continued										
VA21A1323-001	Wetland 4	beryllium, total	7440-41-7	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00937 mg/L	0.01 mg/L	93.7	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00408 mg/L	0.004 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0103 mg/L	0.01 mg/L	103	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0197 mg/L	0.02 mg/L	98.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	98.8	70.0	130	----
		lead, total	7439-92-1	E420	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		lithium, total	7439-93-2	E420	0.0947 mg/L	0.1 mg/L	94.7	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		nickel, total	7440-02-0	E420	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		phosphorus, total	7723-14-0	E420	11.0 mg/L	10 mg/L	110	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		selenium, total	7782-49-2	E420	0.0434 mg/L	0.04 mg/L	108	70.0	130	----
		silicon, total	7440-21-3	E420	8.92 mg/L	10 mg/L	89.2	70.0	130	----
		silver, total	7440-22-4	E420	0.00403 mg/L	0.004 mg/L	101	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	20.5 mg/L	20 mg/L	103	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		thallium, total	7440-28-0	E420	0.00384 mg/L	0.004 mg/L	95.9	70.0	130	----
		thorium, total	7440-29-1	E420	0.0217 mg/L	0.02 mg/L	108	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		titanium, total	7440-32-6	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		uranium, total	7440-61-1	E420	0.00404 mg/L	0.004 mg/L	101	70.0	130	----
		vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	0.393 mg/L	0.4 mg/L	98.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
Total Metals (QCLot: 144832)										
VA21A1323-002	DUP	mercury, total	7439-97-6	E508	0.000110 mg/L	0.0001 mg/L	110	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
Aggregate Organics (QCLot: 144590)										
VA21A1263-002	Anonymous	chemical oxygen demand [COD]	----	E559	497 mg/L	500 mg/L	99.4	75.0	125	----
Volatile Organic Compounds (QCLot: 144451)										
VA21A1321-001	Anonymous	benzene	71-43-2	E611A	96.7 µg/L	100 µg/L	96.7	60.0	140	----
		ethylbenzene	100-41-4	E611A	86.4 µg/L	100 µg/L	86.4	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	105 µg/L	100 µg/L	105	60.0	140	----
		styrene	100-42-5	E611A	86.9 µg/L	100 µg/L	86.9	60.0	140	----
		toluene	108-88-3	E611A	98.0 µg/L	100 µg/L	98.0	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	189 µg/L	200 µg/L	94.6	60.0	140	----
		xylene, o-	95-47-6	E611A	93.1 µg/L	100 µg/L	93.1	60.0	140	----
Hydrocarbons (QCLot: 144450)										
VA21A1321-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	4170 µg/L	6310 µg/L	66.1	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☑ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca; nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca;

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton WMF Wetland 4
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
	Wetland 4	21-01-21	2:40 pm	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	21-01-21	12:00pm	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	21-01-21	2:56 pm	Water	R	R	R	R	R				R									2
	Field Blank	21-01-21	3:00pm	Water	R	R	R	R	R				R			R		R	R			9

Terrace Shipping
#1 Coolers
#___ Carbouys

Environmental Division
Vancouver
Work Order Reference
VA21A1323

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS REC

Frozen ☐ SIF Observations

Ice Packs ☑ Ice Cubes ☐ Custody seal intact

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.4				3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
				22 Jan 21	0945	ice pack	JA 23 2021	11 am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A4846**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Forceman Facility F5 Sand Cyclone	Date Samples Received	: 16-Mar-2021 10:45
PO	: ----	Date Analysis Commenced	: 17-Mar-2021
C-O-C number	: ----	Issue Date	: 29-Mar-2021 14:44
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Gloria Chan	Lab Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	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*
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*
RRV	*Reported result verified by repeat analysis.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: F5 - Sand Cyclone	DUP	Field Blank	Travel Blank	----
Client sampling date / time					15-Mar-2021 10:54	15-Mar-2021 12:00	15-Mar-2021 11:04	15-Mar-2021	----
					VA21A4846-001	VA21A4846-002	VA21A4846-003	VA21A4846-004	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm	2.2 RRV	2.5 RRV	<2.0	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	<0.60	<0.60	<0.60	----
pH	----	E108	0.10	pH units	5.55	5.57	5.45	5.40	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0159	0.0189	<0.0050	<0.0050	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	<0.050	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.142	0.208	<0.050	<0.050	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0250	0.0250	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.141	0.194	<0.030	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.32	0.31	<0.30	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.61	0.76	<0.50	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0176	0.0184	<0.0030	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.00040	0.00042	<0.00010	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000263	0.0000237	<0.0000050	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	0.123	0.114	<0.050	<0.050	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	0.00011	0.00015	<0.00010	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: F5 - Sand Cyclone	DUP	Field Blank	Travel Blank	----
					Client sampling date / time: 15-Mar-2021 10:54	15-Mar-2021 12:00	15-Mar-2021 11:04	15-Mar-2021	----
					VA21A4846-001	VA21A4846-002	VA21A4846-003	VA21A4846-004	--------
					Result	Result	Result	Result	----
Total Metals									
copper, total	7440-50-8	E420	0.00050	mg/L	0.00370	0.00452	<0.00050	----	----
iron, total	7439-89-6	E420	0.010	mg/L	0.041	0.045	<0.010	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.000287	0.000305	<0.000050	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	0.0176	0.0159	<0.0050	<0.0050	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00236	0.00240	<0.00010	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	0.000127	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	0.169	0.223	<0.050	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	0.00028	<0.00020	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	<0.10	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
sodium, total	17341-25-2	E420	0.050	mg/L	0.122	0.152	<0.050	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.00061	0.00055	<0.00020	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	0.00012	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00046	0.00055	<0.00030	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0114	0.0137	<0.0030	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
Aggregate Organics									
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	<2.0	----	----
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	<20	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A4846**	Page	: 1 of 15
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Forceman Facility F5 Sand Cyclone	Date Samples Received	: 16-Mar-2021 10:45
PO	: ----	Issue Date	: 29-Mar-2021 14:44
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
DUP	E550	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
F5 - Sand Cyclone	E550	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Field Blank	E550	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E559	15-Mar-2021	----	----	----		19-Mar-2021	28 days	4 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
F5 - Sand Cyclone	E559	15-Mar-2021	----	----	----		19-Mar-2021	28 days	4 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E559	15-Mar-2021	----	----	----		19-Mar-2021	28 days	4 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
DUP	E298	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) F5 - Sand Cyclone	E298	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) Travel Blank	E298	15-Mar-2021	17-Mar-2021	3 days	1 days	✓	17-Mar-2021	28 days	0 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE DUP	E235.Br-L	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE F5 - Sand Cyclone	E235.Br-L	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Field Blank	E235.Br-L	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE DUP	E235.Cl	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE F5 - Sand Cyclone	E235.Cl	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Field Blank	E235.Cl	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP	E378-U	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE F5 - Sand Cyclone	E378-U	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Field Blank	E378-U	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Travel Blank	E378-U	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE DUP	E235.F	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE F5 - Sand Cyclone	E235.F	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE F5 - Sand Cyclone	E235.NO3-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO3-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
F5 - Sand Cyclone	E235.NO2-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO2-L	15-Mar-2021	----	----	----		17-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
F5 - Sand Cyclone	E235.SO4	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	15-Mar-2021	----	----	----		17-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	15-Mar-2021	25-Mar-2021	28 days	9 days	✓	27-Mar-2021	18 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
F5 - Sand Cyclone	E318	15-Mar-2021	25-Mar-2021	28 days	9 days	✓	27-Mar-2021	18 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Field Blank	E318	15-Mar-2021	25-Mar-2021	28 days	9 days	✓	27-Mar-2021	18 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (lab preserved)										
Travel Blank	E318	15-Mar-2021	25-Mar-2021	3 days	9 days	× EHT	27-Mar-2021	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	18-Mar-2021	25 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
F5 - Sand Cyclone	E366	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	18-Mar-2021	25 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	18-Mar-2021	25 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
F5 - Sand Cyclone	E355-L	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Field Blank	E355-L	15-Mar-2021	17-Mar-2021	28 days	2 days	✓	17-Mar-2021	25 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
DUP	E290	15-Mar-2021	----	----	----		18-Mar-2021	14 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE F5 - Sand Cyclone	E290	15-Mar-2021	----	----	----		18-Mar-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	15-Mar-2021	----	----	----		18-Mar-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	15-Mar-2021	----	----	----		18-Mar-2021	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE F5 - Sand Cyclone	E100	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	15-Mar-2021	----	----	----		18-Mar-2021	0.25 hrs	67 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	15-Mar-2021	----	----	----		18-Mar-2021	0.25 hrs	70 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE F5 - Sand Cyclone	E108	15-Mar-2021	----	----	----		18-Mar-2021	0.25 hrs	71 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Field Blank	E108	15-Mar-2021	----	----	----		18-Mar-2021	0.25 hrs	71 hrs	× EHTR-FM
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) DUP	E420.Cr-L	15-Mar-2021	----	----	----		18-Mar-2021	180 days	2 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) F5 - Sand Cyclone	E420.Cr-L	15-Mar-2021	----	----	----		18-Mar-2021	180 days	3 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) Field Blank	E420.Cr-L	15-Mar-2021	----	----	----		18-Mar-2021	180 days	3 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) F5 - Sand Cyclone	E508	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	15-Mar-2021	----	----	----		18-Mar-2021	28 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	15-Mar-2021	----	----	----		18-Mar-2021	180 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	15-Mar-2021	----	----	----		18-Mar-2021	180 days	2 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
F5 - Sand Cyclone	E420	15-Mar-2021	----	----	----		18-Mar-2021	180 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	15-Mar-2021	----	----	----		18-Mar-2021	180 days	3 days	✓

Legend & Qualifier Definitions

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

EHT: Exceeded ALS recommended hold time prior to analysis.

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	164810	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	164770	1	6	16.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	164912	1	11	9.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	164817	1	7	14.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	166187	1	7	14.2	5.0	✓
Chloride in Water by IC	E235.Cl	164812	1	16	6.2	5.0	✓
Conductivity in Water	E100	164809	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	164819	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	164815	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	164813	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	164814	1	16	6.2	5.0	✓
pH by Meter	E108	164808	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	164811	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	165092	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168659	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	165125	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	165091	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	164768	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	164775	1	3	33.3	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	164810	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	164770	1	6	16.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	164912	1	11	9.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	164817	1	7	14.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	166187	1	7	14.2	5.0	✓
Chloride in Water by IC	E235.Cl	164812	1	16	6.2	5.0	✓
Conductivity in Water	E100	164809	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	164819	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	164815	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	164813	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	164814	1	16	6.2	5.0	✓
pH by Meter	E108	164808	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	164811	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	165092	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168659	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	165125	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	165091	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	164768	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	164775	1	3	33.3	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	164810	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	164770	1	6	16.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	164912	1	11	9.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	164817	1	7	14.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	166187	1	7	14.2	5.0	✓
Chloride in Water by IC	E235.Cl	164812	1	16	6.2	5.0	✓
Conductivity in Water	E100	164809	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	164819	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	164815	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	164813	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	164814	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	164811	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	165092	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168659	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	165125	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	165091	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	164768	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	164775	1	3	33.3	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	164770	1	6	16.6	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	164817	1	7	14.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	166187	1	7	14.2	5.0	✓
Chloride in Water by IC	E235.Cl	164812	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	164819	1	12	8.3	5.0	✓
Fluoride in Water by IC	E235.F	164815	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	164813	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	164814	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	164811	1	16	6.2	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	165092	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168659	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	165125	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	165091	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	164768	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	164775	1	3	33.3	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	“Hardness (as CaCO3), from total Ca/Mg” is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.

QUALITY CONTROL REPORT

Work Order	: **VA21A4846**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H 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	: Forceman Facility F5 Sand Cyclone	Date Samples Received	: 16-Mar-2021 10:45
PO	: ----	Date Analysis Commenced	: 17-Mar-2021
C-O-C number	: ----	Issue Date	: 29-Mar-2021 14:44
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Gloria Chan	Lab Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 164808)											
VA21A4846-001	F5 - Sand Cyclone	pH	----	E108	0.10	pH units	5.55	5.58	0.539%	4%	----
Physical Tests (QC Lot: 164809)											
VA21A4846-001	F5 - Sand Cyclone	conductivity	----	E100	2.0	µS/cm	2.2	2.2	0.03	Diff <2x LOR	----
Physical Tests (QC Lot: 164810)											
VA21A4846-001	F5 - Sand Cyclone	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164768)											
VA21A4846-001	F5 - Sand Cyclone	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.141	0.140	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164770)											
VA21A4846-001	F5 - Sand Cyclone	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0159	0.0162	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164811)											
VA21A4846-001	F5 - Sand Cyclone	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.32	0.35	0.02	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164812)											
VA21A4846-001	F5 - Sand Cyclone	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164813)											
VA21A4846-001	F5 - Sand Cyclone	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0250	0.0298	0.0048	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164814)											
VA21A4846-001	F5 - Sand Cyclone	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164815)											
VA21A4846-001	F5 - Sand Cyclone	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164817)											
VA21A4846-001	F5 - Sand Cyclone	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 164819)											
KS2100741-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0015	0.0015	0.000006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 168659)											
KS2100824-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	3.47	3.54	1.90%	20%	----
Organic / Inorganic Carbon (QC Lot: 164775)											
VA21A4846-001	F5 - Sand Cyclone	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.61	0.53	0.08	Diff <2x LOR	----
Total Metals (QC Lot: 165091)											
CG2100383-004	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0097	0.0107	0.0010	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00019	0.00019	0.0000010	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00129	0.00132	2.04%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 165091) - continued											
CG2100383-004	Anonymous	barium, total	7440-39-3	E420	0.00010	mg/L	0.0140	0.0134	4.95%	20%	----
		beryllium, total	7440-41-7	E420	0.020	mg/L	<0.020 µg/L	<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	0.058	0.058	0.0003	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0050	mg/L	0.273 µg/L	0.000264	3.37%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	321	320	0.465%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000107	0.000109	1.35%	20%	----
		cobalt, total	7440-48-4	E420	0.10	mg/L	26.6 µg/L	0.0270	1.17%	20%	----
		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	0.844	0.870	3.06%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000118	0.000117	0.0000003	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.160	0.159	0.728%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	178	180	1.40%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.648	0.656	1.21%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0144	0.0145	0.521%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0908	0.0920	1.22%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	7.40	7.48	1.10%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00794	0.00790	0.538%	20%	----
		selenium, total	7782-49-2	E420	0.050	mg/L	3.81 µg/L	0.00386	1.54%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	3.35	3.29	2.06%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	30.9	31.5	1.94%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.612	0.611	0.0895%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	377	379	0.562%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000119	0.000118	0.604%	20%	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.0170	0.0166	1.98%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0314	0.0318	1.10%	20%	----
		zirconium, total	7440-67-7	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*
Total Metals (QC Lot: 165092)											
CG2100383-004	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Total Metals (QC Lot: 165125)											
VA21A4809-004	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000198	0.0000201	0.0000003	Diff <2x LOR	----
Aggregate Organics (QC Lot: 164912)											
VA21A4846-001	F5 - Sand Cyclone	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.00%	30%	----
Aggregate Organics (QC Lot: 166187)											
VA21A4846-001	F5 - Sand Cyclone	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 164809)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 164810)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 164768)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 164770)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 164811)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 164812)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 164813)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 164814)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 164815)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 164817)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 164819)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 168659)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 164775)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 165091)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 165091) - continued						
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	----
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 165092)						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
Total Metals (QCLot: 165125)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 164912)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 164912) - continued						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 166187)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 164808)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 164809)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.8	90.0	110	----
Physical Tests (QCLot: 164810)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 164768)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 164770)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	96.3	85.0	115	----
Anions and Nutrients (QCLot: 164811)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 164812)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 164813)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 164814)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 164815)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 164817)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 164819)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.4	80.0	120	----
Anions and Nutrients (QCLot: 168659)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 164775)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.3	80.0	120	----
Total Metals (QCLot: 165091)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	96.2	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	97.3	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 165091) - continued									
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	93.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	87.2	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	95.8	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.0	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	96.1	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	95.2	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.6	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	99.1	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	97.4	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.8	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	93.4	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	96.8	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	103	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	97.4	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	97.9	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	95.2	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	95.6	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	97.8	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.2	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	92.3	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.0	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	93.9	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	95.3	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	91.6	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	94.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.4	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	97.6	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	94.3	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.5	80.0	120	----
Total Metals (QCLot: 165092)									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 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
Total Metals (QCLot: 165125)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.2	80.0	120	----
Aggregate Organics (QCLot: 164912)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	103	85.0	115	----
Aggregate Organics (QCLot: 166187)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	110	85.0	115	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 164768)										
VA21A4846-002	DUP	nitrogen, total	7727-37-9	E366	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
Anions and Nutrients (QCLot: 164770)										
VA21A4846-002	DUP	ammonia, total (as N)	7664-41-7	E298	0.205 mg/L	0.2 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 164811)										
VA21A4846-002	DUP	sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 164812)										
VA21A4846-002	DUP	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 164813)										
VA21A4846-002	DUP	nitrate (as N)	14797-55-8	E235.NO3-L	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 164814)										
VA21A4846-002	DUP	nitrite (as N)	14797-65-0	E235.NO2-L	0.508 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 164815)										
VA21A4846-002	DUP	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 164817)										
VA21A4846-002	DUP	bromide	24959-67-9	E235.Br-L	0.509 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 164819)										
VA21A4846-001	F5 - Sand Cyclone	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0340 mg/L	0.03 mg/L	113	70.0	130	----
Anions and Nutrients (QCLot: 168659)										
KS2100824-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	ND mg/L	2.5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 164775)										
VA21A4846-002	DUP	carbon, total organic [TOC]	----	E355-L	4.84 mg/L	5 mg/L	96.8	70.0	130	----
Total Metals (QCLot: 165091)										
CG2100383-004	Anonymous	aluminum, total	7429-90-5	E420	0.220 mg/L	0.2 mg/L	110	70.0	130	----
		antimony, total	7440-36-0	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0222 mg/L	0.02 mg/L	111	70.0	130	----
		barium, total	7440-39-3	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00849 mg/L	0.01 mg/L	84.9	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
Total Metals (QCLot: 165091) - continued										
CG2100383-004	Anonymous	boron, total	7440-42-8	E420	0.094 mg/L	0.1 mg/L	93.7	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00385 mg/L	0.004 mg/L	96.3	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0108 mg/L	0.01 mg/L	108	70.0	130	----
		cobalt, total	7440-48-4	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		copper, total	7440-50-8	E420	0.0181 mg/L	0.02 mg/L	90.6	70.0	130	----
		iron, total	7439-89-6	E420	2.11 mg/L	2 mg/L	106	70.0	130	----
		lead, total	7439-92-1	E420	0.0170 mg/L	0.02 mg/L	84.8	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0224 mg/L	0.02 mg/L	112	70.0	130	----
		nickel, total	7440-02-0	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		phosphorus, total	7723-14-0	E420	12.8 mg/L	10 mg/L	128	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0225 mg/L	0.02 mg/L	112	70.0	130	----
		selenium, total	7782-49-2	E420	0.0508 mg/L	0.04 mg/L	127	70.0	130	----
		silicon, total	7440-21-3	E420	10.8 mg/L	10 mg/L	108	70.0	130	----
		silver, total	7440-22-4	E420	0.00372 mg/L	0.004 mg/L	92.9	70.0	130	----
		sodium, total	17341-25-2	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	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.00345 mg/L	0.004 mg/L	86.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		tin, total	7440-31-5	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		titanium, total	7440-32-6	E420	0.0470 mg/L	0.04 mg/L	117	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.116 mg/L	0.1 mg/L	116	70.0	130	----
		zinc, total	7440-66-6	E420	0.365 mg/L	0.4 mg/L	91.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0456 mg/L	0.04 mg/L	114	70.0	130	----
Total Metals (QCLot: 165092)										
CG2100383-004	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.0443 mg/L	0.04 mg/L	111	70.0	130	----
Total Metals (QCLot: 165125)										
VA21A4809-005	Anonymous	mercury, total	7439-97-6	E508	0.0000973 mg/L	0.0001 mg/L	97.3	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Aggregate Organics (QCLot: 166187)										
VA21A4846-002	DUP	chemical oxygen demand [COD]	----	E559	538 mg/L	500 mg/L	108	75.0	125	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca; mglover@rdks.bc.ca
Email 3	mhaley@rdks.bc.ca;
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days)	4 day [P4-20%] ☐
	3 day [P3-25%] ☐
	2 day [P2-50%] ☐
EMERGENCY	1 Business day [E1 - 100%] ☐
	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☑
Date and Time Required for all E&P TATs:	
For tests that can not be performed according to the service level selected, you will be contacted.	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Forceman Facility F5 Sand Cyclone	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): **ALS Contact:** **Sampler:** H.Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity / Conductivity	Chloride, Fluoride	Total Nitrogen	Sulphate	Hardness	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	BOD	pH	Total Kjeldahl Nitrogen	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P						P			P		P			P			
	F5 - sand cyclone	15-03-21	10:54	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	DUP	15-03-21	12:00	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	Field Blank	15-03-21	11:04	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	Travel Blank	15-03-21	—	Water		R				R	R				R			R				

Environmental Division
Vancouver
Work Order Reference
VA21A4846

Telephone : +1 604 253 4188

Terrace Shipping
1 Coolers
___ Carbouys

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.7				8°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date:	Time:	Received by: Chris	Date: 15 Mar 21	Time: 1300	Received by: JB	Date: 16/03/2021	Time: 1045

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A5252**	Page	: 1 of 2
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Date Analysis Commenced	: 05-Apr-2021
C-O-C number	: ----	Issue Date	: 14-Apr-2021 11:25
Sampler	: H Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Erin Gatdula	Account Manager Assistant	External Subcontracting, 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

<: less than.

>: greater than.

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

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

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

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					*Client sample ID*	**Wetland 4 Outlet**	----	----	----	----
					Client sampling date / time	17-Mar-2021 13:14	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*	**VA21A5252-001**	--------	--------	--------	--------	
					Result	----	----	----	----	
Bioassays										
Daphnia magna LC50	----	DAP-LC50-48	-	-	See attached	----	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A5252**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton EQ LC50	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Issue Date	: 14-Apr-2021 11:25
C-O-C number	: ----		
Sampler	: H Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

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)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bioassays : Survival/LC50 Daphnia Magna 48 hours										
HDPE carboy LC50										
Wetland 4 Outlet	DAP-LC50-48	17-Mar-2021	----	----	----		05-Apr-2021	----	----	

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

- **No Quality Control data available for this section.**

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
Survival/LC50 Daphnia Magna 48 hours	DAP-LC50-48 Nautilus Environmental (Burnaby) - 8664 Commerce Court Burnaby British Columbia Canada V5A 4N7	Water	EPS1/RM/14	See attached report.

QUALITY CONTROL REPORT

Work Order	: **VA21A5252**	Page	: 1 of 2
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton EQ LC50	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Date Analysis Commenced	: 05-Apr-2021
C-O-C number	: ----	Issue Date	: 14-Apr-2021 11:25
Sampler	: H Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Erin Gatdula	Account Manager Assistant	External Subcontracting, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Acute Toxicity Test Results

Sample VA21A5252-001 Wetland 4 Outlet,
collected March 17, 2021

Final Report

April 5, 2021

Submitted to: **ALS Environmental**
Burnaby, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

SAMPLE INFORMATION

Sample ID	Dates			Receipt temperature
	Collected	Received	*Daphnia magna* test initiation	
VA21A5252-001 Wetland 4 Outlet	17-Mar-21 at 1314h	22-Mar-21 at 1730h	23-Mar-21 at 1455h	9.6-9.8°C

TESTS

- *Daphnia magna* 48-h LC50 test

RESULTS

Toxicity test results

Sample ID	LC50 (% v/v)
VA21A5252-001 Wetland 4 Outlet	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	*Daphnia magna*
Reference toxicant LC50 (95% CL)	4.5 (3.8 – 5.4) g/L NaCl[1]
Reference toxicant historical mean (2 SD range)	6.1 (4.5 – 8.1) g/L NaCl
Reference toxicant CV	15%
Organism health history	Acceptable[2]
Protocol deviations	Yes (see below)[3]
Water quality range deviations	None
Control performance	Acceptable
Test performance	Incomplete compliance (see below)

[1] Test date: March 17, 2021, LC = Lethal Concentration, SD = Standard Deviation, CL = Confidence Limits, CV = Coefficient of Variation

[2] The *Daphnia magna* reference toxicant test result was slightly outside of 2 standard deviations of the historical mean. This deviation was likely due to the very narrow CV of the baseline data, increasing the chances of point estimates falling outside of 2SD of the historical mean as in this case, or also possibly due to natural variability as this result was the first of 20 to fall outside 2 standard deviations of the historical mean.

[3] The sample arrived at Nautilus Environmental on March 22, 2021 at 1730h. Due to the late time, no technicians were available to prepare the *D. magna* test organisms and sample for testing until the following day (March 23, 2021), at which the 5-day sample holding time was exceeded. The client was notified of the deviation and gave confirmation to proceed with testing.

Report By:
Marcus Lee-Fraizer, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P. Bio.
Senior Analyst

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	*Daphnia magna*
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.9.4
Test endpoint	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Daphnia magna Summary Sheet

Client: ALS Environmental
Work Order No.: 210501

Start Date/Time: Mar 23/2021 @ 1455L
Test Species: *Daphnia magna*
Set up by: MH / RES.

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤2 daphnids exibit immobility and/or mortality in any single control replicate.

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Sample Information:

Sample ID: VACLA5252-001 Wetland 4 Outlet.
Sample Date: Mar 17/2021
Date Received: Mar 22/2021
Sample Volume: 2 x 1L

Test Organism Information:

Broodstock No.: 030321C
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmDC70
Stock Solution ID: 21NaCl
Date Initiated: Mar 17/2021
48-h LC50 (95% CL): 4.5 (3.8-5.4) g/LNaCL

Reference Toxicant Mean and Historical Range: 6.1 (4.5-8.1) g/L NaCL
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be > 100% (v/v).

Reviewed by: [signature]
Date reviewed: March 29, 2021

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client: ACS
Sample ID: VAZ1A3252-001 Wetland 4 Outlet
Work Order No.: 210501
CER #: 5
Start Date/Time: Mar 23/2021 @ 1455L
Test Organism: D.magna
Organisms/volume: 10/200mL
Set up by: MH / RZS.

Thermometer: CER 95 pH meter/probe: 6/6 DO meter/probe: 6/6 Cond./Salinity meter/probe: 6/6

Concentration % (v/v)	Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	18.5	19.0	9.1	8.3	8.7	7.9	7.9	8.1	350	355
	B														
	C														
	D														
6.25	A	10	10	0	18.5	18.5	19.0	9.1	8.3	8.7	7.7	7.9	8.1	369	370
	B														
	C														
	D														
12.5	A	10	10	0	18.5	18.5	19.0	9.0	8.3	8.6	7.6	7.9	8.2	388	390
	B														
	C														
	D														
25	A	10	10	0	18.5	18.5	19.0	8.8	8.3	8.6	7.5	7.9	8.3	426	424
	B														
	C														
	D														
50	A	10	10	0	18.5	18.5	19.0	8.7	8.2	8.5	7.4	7.9	8.4	502	497
	B														
	C														
	D														
100	A	10	10	0	18.5	18.5	19.0	7.9	8.0	8.4	7.2	7.8	8.4	668	650
	B														
	C														
	D														
Technician Initials		MH	MH	MH	MH	MH	MH	MH	MH	MH	MH	MH	MH	MH	MH

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	96	80
Highest conc.	290	292
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	7.9		
pH	7.2		
Cond (µS/cm)	668		
Salinity (ppt)	0.3		

Sample Description: ~~Control~~ MH clear pale yellow liquid, no odour, few particulates

Comments:

Mortality: Heartbeat checked under microscope N/A

Batch#: 030321C 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: Date reviewed: March 29, 2021

APPENDIX C – Chain-of-custody form

Chain of Custody

Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

11592

Destination Lab:	**Nautilus Environmental (Burnaby)**
Address:	8664 Commerce Court Burnaby BC Canada V5A 4N7
Client:	Regional District of Kitimat-Stikine
Work Order Number:	**VA21A5252**
Original Receipt Date/Time	Instructions Received
19/03/2021 19:30	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: alsev.datasublet@alsglobal.com Invoice: alsev.datasublet@alsglobal.com Electronic Data: alsev.datasublet@alsglobal.com

Attention: Amber Springer

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
VA21A5252-001	Wetland 4 Outlet	Water	HDPE carboy LC50	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	14-04-2021	17/03/2021 13:14	
VA21A5252-001	Wetland 4 Outlet	Water	HDPE carboy LC50			14-04-2021	17/03/2021 13:14	

WO: 210501

2 x 1L

Dm LC50

Rec: Mar 22/21 @ 1730 h.

9.6 - 9.8 °C.

HEC.

END OF REPORT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca; mglover@rdks.bc.ca
Email 3	mhaley@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)
- 4 day [P4-20%] ☐
- 3 day [P3-25%] ☐
- 2 day [P2-50%] ☐

EMERGENCY
- 1 Business day [E1 - 100%] ☐
- Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton EQ LC50	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Amber Springer	Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Acute toxicity LC50 Daphnia magna	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Wetland 4 Outlet	21-Mar-17	1:14pm	Effluent	R			

Environmental Division
Vancouver
Work Order Reference
VA21A5252

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☑ Ice Cubes ☐	Custody seal intact	Yes ☐	No	☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: March 18th 2021	Time:	Received by: JB	Date: March 18/21	Time: 2:30	Received by: TL	Date: MAR 19 2021	Time: 7:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A5251**	Page	: 1 of 6
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Wetland 4	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Date Analysis Commenced	: 20-Mar-2021
C-O-C number	: ----	Issue Date	: 29-Mar-2021 15:04
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
µg/L	micrograms per litre
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.

Sample Comments

Sample	Client Id	*Comment*
VA21A5251-005	Seep Outside Wetland 3	Sample 5: Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Seep Outside Wetland 3
					Client sampling date / time	17-Mar-2021 13:34	17-Mar-2021 12:00	17-Mar-2021	17-Mar-2021 13:45	17-Mar-2021 14:17
						VA21A5251-001	VA21A5251-002	VA21A5251-003	VA21A5251-004	VA21A5251-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		295	295	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm		655	656	----	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		294	303	<0.60	<0.60	291
pH	----	E108	0.10	pH units		8.05	8.04	----	----	8.02
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		1.63	1.63	<0.0050	<0.0050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		39.2	39.1	<0.50	<0.50	63.5
fluoride	16984-48-8	E235.F	0.020	mg/L		0.076	0.077	<0.020	<0.020	0.078
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		2.48	2.49	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.978	0.988	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0102	0.0136	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L		2.96	2.92	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		8.94	8.95	<0.30	<0.30	2.62
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		8.24	8.22	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.309	0.268	<0.0030	<0.0030	0.864
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00015	0.00014	<0.00010	<0.00010	0.00012
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00107	0.00103	<0.00010	<0.00010	0.00922
barium, total	7440-39-3	E420	0.00010	mg/L		0.0774	0.0752	<0.00010	<0.00010	0.0987
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		0.204	0.218	<0.010	<0.010	0.143
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000802	0.0000775	<0.0000050	<0.0000050	0.0000238
calcium, total	7440-70-2	E420	0.050	mg/L		87.5	91.6	<0.050	<0.050	86.1
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000035	0.000029	<0.000010	<0.000010	0.000073
chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L		0.00061	0.00056	<0.00010	<0.00010	0.00116
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00140	0.00136	<0.00010	<0.00010	0.00264
copper, total	7440-50-8	E420	0.00050	mg/L		0.00200	0.00186	<0.00050	<0.00050	0.00246

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Seep Outside Wetland 3
					Client sampling date / time	17-Mar-2021 13:34	17-Mar-2021 12:00	17-Mar-2021	17-Mar-2021 13:45	17-Mar-2021 14:17
						VA21A5251-001	VA21A5251-002	VA21A5251-003	VA21A5251-004	VA21A5251-005
						Result	Result	Result	Result	Result
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L		0.536	0.420	<0.010	<0.010	3.84
lead, total	7439-92-1	E420	0.000050	mg/L		0.000189	0.000131	<0.000050	<0.000050	0.000595
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	0.0011
magnesium, total	7439-95-4	E420	0.0050	mg/L		18.4	18.1	<0.0050	<0.0050	18.5
manganese, total	7439-96-5	E420	0.00010	mg/L		2.85	2.89	<0.00010	<0.00010	3.44
mercury, total	7439-97-6	E508	0.0000050	mg/L		0.0000053	<0.0000050	<0.0000050	<0.0000050	<0.0000500 DLM
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000548	0.000528	<0.000050	<0.000050	0.000728
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00293	0.00287	<0.00050	<0.00050	0.00318
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	0.089
potassium, total	7440-09-7	E420	0.050	mg/L		6.73	6.88	<0.050	<0.050	3.92
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00108	0.00117	<0.00020	<0.00020	0.00085
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000070	<0.000050	<0.000050	0.000051
silicon, total	7440-21-3	E420	0.10	mg/L		4.78	4.87	<0.10	<0.10	6.03
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000013
sodium, total	17341-25-2	E420	0.050	mg/L		30.5	31.2	<0.050	<0.050	24.3
strontium, total	7440-24-6	E420	0.00020	mg/L		0.540	0.525	<0.00020	<0.00020	0.563
sulfur, total	7704-34-9	E420	0.50	mg/L		3.27	3.18	<0.50	<0.50	0.88
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00770	0.00578	<0.00030	<0.00030	0.0266
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000312	0.000312	<0.000010	<0.000010	0.000364
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00079	0.00072	<0.00050	<0.00050	0.00234
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0063	0.0065	<0.0030	<0.0030	0.0065
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	0.00027	<0.00020	<0.00020	0.00031
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	2.1	----	<2.0	----
chemical oxygen demand [COD]	----	E559	20	mg/L		26	28	----	----	----
Volatile Organic Compounds [Fuels]										

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Seep Outside Wetland 3
					Client sampling date / time	17-Mar-2021 13:34	17-Mar-2021 12:00	17-Mar-2021	17-Mar-2021 13:45	17-Mar-2021 14:17
						VA21A5251-001	VA21A5251-002	VA21A5251-003	VA21A5251-004	VA21A5251-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	----	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	----	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	0.50	%		117	115	----	111	----
difluorobenzene, 1,4-	540-36-3	E611A	0.50	%		112	108	----	108	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	----	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	----	<100	----
HEPHw	----	EC600A	250	µg/L		<250	----	----	----	----
LEPHw	----	EC600A	250	µg/L		<250	----	----	----	----
VPHw	----	EC580A	100	µg/L		<100	<100	----	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50	%		93.7	96.1	----	92.0	98.2
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		110	120	----	118	----
Polycyclic Aromatic Hydrocarbons										
acenaphthene	83-32-9	E641A	0.010	µg/L		<0.010	----	----	----	----
acenaphthylene	208-96-8	E641A	0.010	µg/L		<0.010	----	----	----	----
acridine	260-94-6	E641A	0.010	µg/L		<0.010	----	----	----	----
anthracene	120-12-7	E641A	0.010	µg/L		<0.010	----	----	----	----
benz(a)anthracene	56-55-3	E641A	0.010	µg/L		<0.010	----	----	----	----
benzo(a)pyrene	50-32-8	E641A	0.0050	µg/L		<0.0050	----	----	----	----
benzo(b+j)fluoranthene	----	E641A	0.010	µg/L		<0.010	----	----	----	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L		<0.015	----	----	----	----
benzo(g,h,i)perylene	191-24-2	E641A	0.010	µg/L		<0.010	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	Seep Outside Wetland 3
					Client sampling date / time: 17-Mar-2021 13:34	17-Mar-2021 12:00	17-Mar-2021	17-Mar-2021 13:45	17-Mar-2021 14:17
					VA21A5251-001	VA21A5251-002	VA21A5251-003	VA21A5251-004	VA21A5251-005
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons									
benzo(k)fluoranthene	207-08-9	E641A	0.010	µg/L	<0.010	----	----	----	----
chrysene	218-01-9	E641A	0.010	µg/L	<0.010	----	----	----	----
dibenz(a,h)anthracene	53-70-3	E641A	0.0050	µg/L	<0.0050	----	----	----	----
fluoranthene	206-44-0	E641A	0.010	µg/L	<0.010	----	----	----	----
fluorene	86-73-7	E641A	0.010	µg/L	<0.010	----	----	----	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.010	µg/L	<0.010	----	----	----	----
methylnaphthalene, 1-	90-12-0	E641A	0.010	µg/L	<0.010	----	----	----	----
methylnaphthalene, 2-	91-57-6	E641A	0.010	µg/L	<0.010	----	----	----	----
naphthalene	91-20-3	E641A	0.050	µg/L	<0.050	----	----	----	----
phenanthrene	85-01-8	E641A	0.020	µg/L	<0.020	----	----	----	----
pyrene	129-00-0	E641A	0.010	µg/L	<0.010	----	----	----	----
quinoline	6027-02-7	E641A	0.050	µg/L	<0.050	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	E641A	0.010	%	84.8	----	----	----	----
naphthalene-d8	1146-65-2	E641A	0.010	%	93.0	----	----	----	----
phenanthrene-d10	1517-22-2	E641A	0.010	%	96.9	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A5251**	Page	: 1 of 18
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Wetland 4	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Issue Date	: 29-Mar-2021 15:04
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

Key

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

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 15:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 15:00 is used for calculation purposes.

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	17-Mar-2021	----	----	----		20-Mar-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	17-Mar-2021	----	----	----		20-Mar-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	17-Mar-2021	----	----	----		20-Mar-2021	3 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	17-Mar-2021	----	----	----		25-Mar-2021	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	17-Mar-2021	----	----	----		25-Mar-2021	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	25-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	25-Mar-2021	20 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	25-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
Travel Blank	E298	17-Mar-2021	20-Mar-2021	3 days	2 days	✓	21-Mar-2021	28 days	0 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Seep Outside Wetland 3	E235.Cl	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	17-Mar-2021	----	----	----		20-Mar-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Field Blank	E235.F	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Seep Outside Wetland 3	E235.F	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Travel Blank	E235.F	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Wetland 4	E235.F	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO3-L	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	17-Mar-2021	----	----	----		20-Mar-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Seep Outside Wetland 3	E235.SO4	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	17-Mar-2021	24-Mar-2021	28 days	6 days	✓	26-Mar-2021	21 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	17-Mar-2021	24-Mar-2021	28 days	6 days	✓	26-Mar-2021	21 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	26-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	26-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	17-Mar-2021	25-Mar-2021	28 days	7 days	✓	26-Mar-2021	20 days	0 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)										
Travel Blank	E366	17-Mar-2021	20-Mar-2021	3 days	2 days	✓	23-Mar-2021	28 days	2 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	17-Mar-2021	24-Mar-2021	14 days	6 days	✓	25-Mar-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	17-Mar-2021	24-Mar-2021	14 days	7 days	✓	25-Mar-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	17-Mar-2021	24-Mar-2021	14 days	7 days	✓	25-Mar-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Seep Outside Wetland 3	E601A	17-Mar-2021	24-Mar-2021	14 days	7 days	✓	25-Mar-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Field Blank	E581.VH+F1	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Wetland 4	E581.VH+F1	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP	E355-L	17-Mar-2021	25-Mar-2021	28 days	8 days	✓	26-Mar-2021	19 days	0 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E355-L	17-Mar-2021	25-Mar-2021	28 days	8 days	✓	26-Mar-2021	19 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	17-Mar-2021	----	----	----		20-Mar-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	17-Mar-2021	----	----	----		20-Mar-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	17-Mar-2021	----	----	----		20-Mar-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	17-Mar-2021	----	----	----		20-Mar-2021	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	17-Mar-2021	----	----	----		20-Mar-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE Seep Outside Wetland 3	E108	17-Mar-2021	----	----	----		20-Mar-2021	0.25 hrs	68 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	17-Mar-2021	----	----	----		20-Mar-2021	0.25 hrs	69 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	17-Mar-2021	----	----	----		20-Mar-2021	0.25 hrs	71 hrs	× EHTR-FM
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate) Wetland 4	E641A	17-Mar-2021	24-Mar-2021	14 days	6 days	✓	24-Mar-2021	40 days	0 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) DUP	E420.Cr-L	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) Field Blank	E420.Cr-L	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid) Seep Outside Wetland 3	E420.Cr-L	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE - total (lab preserved)										
Travel Blank	E420.Cr-L	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Chromium in Water by CRC ICPMS (Low Level)										
HDPE total (nitric acid)										
Wetland 4	E420.Cr-L	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Field Blank	E508	17-Mar-2021	----	----	----		24-Mar-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Travel Blank	E508	17-Mar-2021	----	----	----		24-Mar-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Wetland 4	E508	17-Mar-2021	----	----	----		24-Mar-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
DUP	E508	17-Mar-2021	----	----	----		24-Mar-2021	28 days	7 days	✓
Total Metals : Total Mercury in Water by CVAAS										
HDPE total (nitric acid)										
Seep Outside Wetland 3	E508	17-Mar-2021	----	----	----		25-Mar-2021	28 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
DUP	E420	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Seep Outside Wetland 3	E420	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Wetland 4	E420	17-Mar-2021	----	----	----		22-Mar-2021	180 days	4 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
DUP	E611A	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	17-Mar-2021	27-Mar-2021	14 days	9 days	✓	27-Mar-2021	4 days	0 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	166522	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	166570	2	16	12.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	166696	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	169931	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	168894	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	166525	1	11	9.0	5.0	✓
Conductivity in Water	E100	166523	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	166530	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	166524	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	166527	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	166528	1	8	12.5	5.0	✓
pH by Meter	E108	166521	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	166529	1	11	9.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	166919	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168151	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	168337	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	166920	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	166573	2	22	9.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	168765	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	169930	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	166522	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	166570	2	16	12.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	168242	2	39	5.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	166696	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	169931	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	168894	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	166525	1	11	9.0	5.0	✓
Conductivity in Water	E100	166523	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	166530	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	166524	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	166527	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	166528	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	168243	1	7	14.2	5.0	✓
pH by Meter	E108	166521	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	166529	1	11	9.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	166919	1	15	6.6	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168151	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	168337	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	166920	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	166573	2	22	9.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	168765	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	169930	1	17	5.8	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	166522	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	166570	2	16	12.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	168242	2	39	5.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	166696	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	169931	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	168894	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	166525	1	11	9.0	5.0	✓
Conductivity in Water	E100	166523	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	166530	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	166524	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	166527	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	166528	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	168243	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	166529	1	11	9.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	166919	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168151	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	168337	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	166920	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	166573	2	22	9.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	168765	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	169930	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	166570	2	16	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	169931	1	17	5.8	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	168894	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	166525	1	11	9.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	166530	1	10	10.0	5.0	✓
Fluoride in Water by IC	E235.F	166524	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	166527	1	8	12.5	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	166528	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	166529	1	11	9.0	5.0	✓
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L	166919	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	168151	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Mercury in Water by CVAAS	E508	168337	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	166920	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	166573	2	22	9.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	168765	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	169930	1	17	5.8	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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
Total Chromium in Water by CRC ICPMS (Low Level)	E420.Cr-L Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Vancouver - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Vancouver - Environmental	Water	BC MOE Lab Manual (LEPH and HEPH) (mod)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21A5251**	Page	: 1 of 16
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Wetland 4	Date Samples Received	: 19-Mar-2021 19:30
PO	: ----	Date Analysis Commenced	: 20-Mar-2021
C-O-C number	: ----	Issue Date	: 29-Mar-2021 15:04
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 166521)											
VA21A5200-003	Anonymous	pH	----	E108	0.10	pH units	8.27	8.27	0.00%	4%	----
Physical Tests (QC Lot: 166522)											
VA21A5200-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	271	266	1.60%	20%	----
Physical Tests (QC Lot: 166523)											
VA21A5200-003	Anonymous	conductivity	----	E100	2.0	µS/cm	521	520	0.192%	10%	----
Anions and Nutrients (QC Lot: 166524)											
VA21A5200-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	1.41	1.42	0.0872%	20%	----
Anions and Nutrients (QC Lot: 166525)											
VA21A5200-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	28.8	28.8	0.0509%	20%	----
Anions and Nutrients (QC Lot: 166527)											
VA21A5200-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 166528)											
VA21A5200-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 166529)											
VA21A5200-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	5.20	5.22	0.244%	20%	----
Anions and Nutrients (QC Lot: 166530)											
VA21A5200-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0082	0.0085	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 166570)											
VA21A5165-025	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 166573)											
VA21A5154-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.185	0.191	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 168151)											
KS2100816-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.081	<0.050	0.031	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 168600)											
VA21A5182-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.156	0.156	0.338%	20%	----
Anions and Nutrients (QC Lot: 168761)											
VA21A5251-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.150	mg/L	2.96	2.97	0.484%	20%	----
Organic / Inorganic Carbon (QC Lot: 168765)											
KS2100829-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.64	0.59	0.05	Diff <2x LOR	----
Total Metals (QC Lot: 166919)											
KS2100797-001	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 166920)											
KS2100797-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00042	0.00039	0.00003	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0838	0.0804	4.12%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000140	0.0000097	0.0000043	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	22.2	23.0	3.68%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000142	0.000142	0.732%	20%	----
		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	0.240	0.235	2.28%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0044	0.0045	0.00008	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.100	mg/L	13.8	13.8	0.217%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.204	0.198	2.72%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000303	0.000275	0.000028	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00081	0.00078	0.00003	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.077	0.074	0.003	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.100	mg/L	0.779	0.755	0.024	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00087	0.00092	0.00005	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	5.42	5.30	2.38%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	3.67	3.60	2.01%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.181	0.185	1.93%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	1.70	1.72	0.02	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00014	0.00014	0.000003	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00246	0.00242	1.83%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 166920) - continued											
KS2100797-001	Anonymous	vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0044	0.0041	0.0003	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 168337)											
KS2100797-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 168908)											
FJ2100134-001	Anonymous	mercury, total	7439-97-6	E508	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 166696)											
VA21A5251-001	Wetland 4	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.00%	30%	----
Aggregate Organics (QC Lot: 168894)											
VA21A5165-020	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 169931)											
VA21A5185-001	Anonymous	benzene	71-43-2	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.00050	µg/L	0.00336 mg/L	3.32	1.25%	30%	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.00050	µg/L	<0.00050 mg/L	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.00050	µg/L	0.00052 mg/L	0.51	0.009	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.00050	µg/L	0.0331 mg/L	31.6	4.73%	30%	----
		xylene, m+p-	179601-23-1	E611A	0.00050	µg/L	0.0117 mg/L	10.9	7.02%	30%	----
		xylene, o-	95-47-6	E611A	0.00050	µg/L	0.00569 mg/L	5.51	3.30%	30%	----
Hydrocarbons (QC Lot: 169930)											
VA21A5185-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	0.10	µg/L	<0.10 mg/L	<100	0.00%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 166522)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 166523)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 166524)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 166525)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 166527)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 166528)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 166529)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 166530)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 166570)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 166573)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 168151)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 168600)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 168761)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 168765)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 166919)						
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	<0.00010	----
Total Metals (QCLot: 166920)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 166920) - continued						
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 168337)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 168337) - continued						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 168908)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 166696)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 168894)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 169931)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 168242)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 168551)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 169930)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Polycyclic Aromatic Hydrocarbons (QCLot: 168243)						
acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	<0.010	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	<0.015	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 168243) - continued						
fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
quinoline	6027-02-7	E641A	0.05	µg/L	<0.050	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 166521)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 166522)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 166523)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.4	90.0	110	----
Anions and Nutrients (QCLot: 166524)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 166525)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 166527)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 166528)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 166529)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 166530)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	97.4	80.0	120	----
Anions and Nutrients (QCLot: 166570)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.7	85.0	115	----
Anions and Nutrients (QCLot: 166573)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 168151)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 168600)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.12 mg/L	97.3	85.0	115	----
Anions and Nutrients (QCLot: 168761)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	105	75.0	125	----
Organic / Inorganic Carbon (QCLot: 168765)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	102	80.0	120	----
Total Metals (QCLot: 166919)									
chromium, total	7440-47-3	E420.Cr-L	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 166920)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.7	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	95.3	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	97.9	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	103	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	109	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.0	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	92.8	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.6	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.4	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	100	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.4	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	96.1	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.8	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	94.3	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	96.6	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	97.1	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	105	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	96.8	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.6	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.2	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	106	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	96.8	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 168337)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	91.0	80.0	120	----
Total Metals (QCLot: 168908)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	96.3	80.0	120	----
Aggregate Organics (QCLot: 166696)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	100	85.0	115	----
Aggregate Organics (QCLot: 168894)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	99.0	85.0	115	----
Volatile Organic Compounds (QCLot: 169931)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	95.1	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	79.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	99.4	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	82.4	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.5	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	122	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	80.9	70.0	130	----
Hydrocarbons (QCLot: 168242)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	95.6	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	92.0	70.0	130	----
Hydrocarbons (QCLot: 168551)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	104	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	101	70.0	130	----
Hydrocarbons (QCLot: 169930)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	102	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 168243)									
acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	94.7	60.0	130	----
acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	98.9	60.0	130	----
acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	108	60.0	130	----
benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	109	60.0	130	----
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	99.0	60.0	130	----
benzo(b+j)fluoranthene	----	E641A	0.01	µg/L	0.5 µg/L	86.2	60.0	130	----
benzo(b+j+k)fluoranthene	----	E641A	0.015	µg/L	1 µg/L	89.0	60.0	130	----
benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	90.0	60.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 168243) - continued									
benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	91.8	60.0	130	----
chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	106	60.0	130	----
dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	101	60.0	130	----
fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	87.2	60.0	130	----
methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	85.8	60.0	130	----
naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	88.2	50.0	130	----
phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	104	60.0	130	----
pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
quinoline	6027-02-7	E641A	0.05	µg/L	0.5 µg/L	115	60.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 166524)										
VA21A5200-002	Anonymous	fluoride	16984-48-8	E235.F	5.04 mg/L	5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 166525)										
VA21A5200-002	Anonymous	chloride	16887-00-6	E235.Cl	516 mg/L	500 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 166527)										
VA21A5200-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	12.9 mg/L	12.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 166528)										
VA21A5200-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.42 mg/L	2.5 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 166529)										
VA21A5200-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	518 mg/L	500 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 166530)										
VA21A5200-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0307 mg/L	0.03 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 166570)										
VA21A5251-003	Travel Blank	ammonia, total (as N)	7664-41-7	E298	0.196 mg/L	0.2 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 166573)										
VA21A5251-003	Travel Blank	nitrogen, total	7727-37-9	E366	0.410 mg/L	0.4 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 168151)										
VA21A5187-005	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.55 mg/L	2.5 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 168600)										
VA21A5182-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.194 mg/L	0.2 mg/L	96.9	75.0	125	----
Anions and Nutrients (QCLot: 168761)										
VA21A5251-002	DUP	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 168765)										
KS2100832-005	Anonymous	carbon, total organic [TOC]	----	E355-L	5.04 mg/L	5 mg/L	101	70.0	130	----
Total Metals (QCLot: 166919)										
KS2100797-001	Anonymous	chromium, total	7440-47-3	E420.Cr-L	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
Total Metals (QCLot: 166920)										
KS2100797-001	Anonymous	aluminum, total	7429-90-5	E420	0.188 mg/L	0.2 mg/L	93.8	70.0	130	----
		antimony, total	7440-36-0	E420	0.0212 mg/L	0.02 mg/L	106	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 166920) - continued										
KS2100797-001	Anonymous	arsenic, total	7440-38-2	E420	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		boron, total	7440-42-8	E420	0.096 mg/L	0.1 mg/L	95.5	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00361 mg/L	0.004 mg/L	90.4	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		copper, total	7440-50-8	E420	0.0181 mg/L	0.02 mg/L	90.5	70.0	130	----
		iron, total	7439-89-6	E420	1.83 mg/L	2 mg/L	91.6	70.0	130	----
		lead, total	7439-92-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		lithium, total	7439-93-2	E420	0.0979 mg/L	0.1 mg/L	97.9	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		nickel, total	7440-02-0	E420	0.0357 mg/L	0.04 mg/L	89.3	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.45 mg/L	10 mg/L	94.5	70.0	130	----
		potassium, total	7440-09-7	E420	4.05 mg/L	4 mg/L	101	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		selenium, total	7782-49-2	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		silicon, total	7440-21-3	E420	8.48 mg/L	10 mg/L	84.8	70.0	130	----
		silver, total	7440-22-4	E420	0.00420 mg/L	0.004 mg/L	105	70.0	130	----
		sodium, total	17341-25-2	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	19.4 mg/L	20 mg/L	96.8	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		thallium, total	7440-28-0	E420	0.00399 mg/L	0.004 mg/L	99.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		tin, total	7440-31-5	E420	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		titanium, total	7440-32-6	E420	0.0360 mg/L	0.04 mg/L	90.1	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		uranium, total	7440-61-1	E420	0.00416 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		zinc, total	7440-66-6	E420	0.380 mg/L	0.4 mg/L	95.1	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0438 mg/L	0.04 mg/L	110	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 168337)										
KS2100797-002	Anonymous	mercury, total	7439-97-6	E508	0.0000920 mg/L	0.0001 mg/L	92.0	70.0	130	----
Total Metals (QCLot: 168908)										
FJ2100134-002	Anonymous	mercury, total	7439-97-6	E508	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Aggregate Organics (QCLot: 168894)										
VA21A5165-021	Anonymous	chemical oxygen demand [COD]	----	E559	569 mg/L	500 mg/L	114	75.0	125	----
Volatile Organic Compounds (QCLot: 169931)										
VA21A5198-002	Anonymous	benzene	71-43-2	E611A	105 µg/L	100 µg/L	105	60.0	140	----
		ethylbenzene	100-41-4	E611A	84.1 µg/L	100 µg/L	84.1	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		styrene	100-42-5	E611A	90.1 µg/L	100 µg/L	90.1	60.0	140	----
		toluene	108-88-3	E611A	91.7 µg/L	100 µg/L	91.7	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	251 µg/L	200 µg/L	125	60.0	140	----
		xylene, o-	95-47-6	E611A	88.0 µg/L	100 µg/L	88.0	60.0	140	----
Hydrocarbons (QCLot: 169930)										
VA21A5185-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5380 µg/L	6310 µg/L	85.3	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☑ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca; nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca;
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days): 4 day [P4-20%]	☐
3 day [P3-25%]	☐
2 day [P2-50%]	☐
EMERGENCY: 1 Business day [E1 - 100%]	☐
Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]	☑
Date and Time Required for all E&P TATs:	
For tests that can not be performed according to the service level selected, you will be contacted.	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton WMF Wetland 4	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: H. Shinton

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals (P)	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia (P)	Nitrate, Nitrite	LEPH, HEPH (P)	TOC	Orthophosphorus (P)	COD	pH (P)	BOD & Conductivity	Total Kjeldahl Nitrogen (P)	EPH (P)	BTEX/VPH (P)	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Wetland 4	17-Mar-21	1:34pm	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	17-Mar-21	12:00pm	Effluent	R	R	R	R	R	R		R	R	R	R	R	R	R	R			9
	Travel Blank	17-Mar-21	------	Water	R	R	R	R	R				R									2
	Field Blank	17-Mar-21	1:45	Water	R	R	R	R	R				R			R		R	R			9
	Seep Outside Wetland 3	17-Mar-21	2:17	Effluent	R		R				R				R			R				

Environmental Division
Vancouver
Work Order Reference
VA21A5251

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☑	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
8.9	5.9			6			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: March 18th 2021	Time:	Received by:	Date: March 18/21	Time: 2:30	Received by:	Date: MAR 19 2021	Time: 730

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A7736**	Page	: 1 of 10
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 24-Apr-2021 12:49
PO	: ----	Date Analysis Commenced	: 27-Apr-2021
C-O-C number	: ----	Issue Date	: 03-May-2021 11:39
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 8		
No. of samples analysed	: 8		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Clarie Tejano	Laboratory Assistant	Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Gloria Chan	Lab Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
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*
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.*
DTMF	*Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW02	SW-05	SW-06	SW-07
					Client sampling date / time	21-Apr-2021 16:00	21-Apr-2021 12:50	22-Apr-2021 11:50	22-Apr-2021 14:00	22-Apr-2021 15:10
						VA21A7736-001	VA21A7736-002	VA21A7736-003	VA21A7736-004	VA21A7736-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		22.2	51.5	16.6	15.0	22.6
conductivity	----	E100	2.0	µS/cm		43.9	97.9	90.9	90.1	93.8
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		19.6	45.3	25.1	24.5	28.0
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		19.0	45.3	24.4	24.1	27.3
pH	----	E108	0.10	pH units		6.71	6.96	6.58	6.72	7.24
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0062	0.0059	0.0130	0.0414	0.0124
chloride	16887-00-6	E235.Cl	0.50	mg/L		<0.50	<0.50	15.3	15.3	14.0
fluoride	16984-48-8	E235.F	0.020	mg/L		0.029	0.044	0.034	0.031	0.033
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.387	0.277	0.661	0.647	0.608
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	0.0177	<0.0050	0.0466	0.0181
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	0.0012
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	<0.30	<0.30	<0.30	<0.30
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		11.1	11.1	21.4	23.0	21.9
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.183	0.181	0.180	0.193	0.200
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00041	0.00029	0.00055	0.00040	0.00059
barium, total	7440-39-3	E420	0.00010	mg/L		0.00890	0.0101	0.00996	0.00888	0.0101
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000112	0.0000111	0.0000166	0.0000120	0.0000096
calcium, total	7440-70-2	E420	0.050	mg/L		5.20	12.7	7.09	7.07	8.06
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00020	0.00011	0.00016	0.00015	0.00019
copper, total	7440-50-8	E420	0.00050	mg/L		0.00218	0.00129	0.00148	0.00142	0.00159
iron, total	7439-89-6	E420	0.010	mg/L		0.356	0.211	0.405	0.391	0.610

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW02	SW-05	SW-06	SW-07
					Client sampling date / time	21-Apr-2021 16:00	21-Apr-2021 12:50	22-Apr-2021 11:50	22-Apr-2021 14:00	22-Apr-2021 15:10
						VA21A7736-001	VA21A7736-002	VA21A7736-003	VA21A7736-004	VA21A7736-005
						Result	Result	Result	Result	Result
Total Metals										
lead, total	7439-92-1	E420	0.000050	mg/L		0.000054	<0.000050	0.000126	0.000141	0.000102
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		1.45	3.30	1.62	1.56	1.74
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0266	0.00843	0.0288	0.0304	0.0390
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000087	0.000057	0.000914	0.000066	0.000078
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00071	0.00054	0.00082	0.00078	0.00083
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L		0.806	0.424	0.658	0.611	0.696
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00059	0.00023	0.00038	0.00045	0.00039
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000084	0.000086	0.000075	0.000062	0.000067
silicon, total	7440-21-3	E420	0.10	mg/L		2.75	4.18	1.18	2.33	1.77
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, total	17341-25-2	E420	0.050	mg/L		1.28	2.42	8.84	8.58	8.75
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0378	0.0715	0.0487	0.0476	0.0553
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00246	0.00271	0.00140	0.00140	0.00166
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	0.000011	<0.000010	0.000012	0.000014
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	0.00053	0.00063
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0034	<0.0030	0.0063	<0.0030	<0.0030
zirconium, total	7440-67-7	E420	0.00020	mg/L		0.00023	0.00030	0.00030	0.00036	0.00033
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.160	0.147	0.204	0.204	0.213
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00040	0.00026	0.00051	0.00041	0.00063
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.00897	0.00961	0.0102	0.00919	0.00998

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW02	SW-05	SW-06	SW-07
					Client sampling date / time	21-Apr-2021 16:00	21-Apr-2021 12:50	22-Apr-2021 11:50	22-Apr-2021 14:00	22-Apr-2021 15:10
						VA21A7736-001	VA21A7736-002	VA21A7736-003	VA21A7736-004	VA21A7736-005
						Result	Result	Result	Result	Result
Dissolved Metals										
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000153	0.0000066	0.0000101	0.0000136	0.0000111
calcium, dissolved	7440-70-2	E421	0.050	mg/L		5.38	12.8	7.34	7.17	8.29
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	<0.000010	<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		0.00018	<0.00010	0.00016	0.00016	0.00015
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00275	0.00088	0.00145	0.00116	0.00135
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.297	0.169	0.406	0.399	0.565
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	<0.000050	0.000097	0.000119	0.000070
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		1.50	3.23	1.64	1.61	1.77
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0271	0.00754	0.0283	0.0316	0.0289
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		0.000080	<0.000050	0.000349	0.000072	0.000901 DTMF
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00059	<0.00050	0.00061	0.00064	0.00069
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		0.867	0.410	0.692	0.665	0.752
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00059	<0.00020	0.00047	0.00052	0.00047
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	0.000053	0.000070	0.000089	0.000062
silicon, dissolved	7440-21-3	E421	0.050	mg/L		2.90	4.09	1.23	2.48	1.80
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	17341-25-2	E421	0.050	mg/L		1.32	2.26	8.61	8.76	8.54
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.0356	0.0700	0.0455	0.0464	0.0514
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00222	0.00259	0.00220 DTMF	0.00201 DTMF	0.00283 DTMF

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW02	SW-05	SW-06	SW-07
					Client sampling date / time	21-Apr-2021 16:00	21-Apr-2021 12:50	22-Apr-2021 11:50	22-Apr-2021 14:00	22-Apr-2021 15:10
						VA21A7736-001	VA21A7736-002	VA21A7736-003	VA21A7736-004	VA21A7736-005
						Result	Result	Result	Result	Result
Dissolved Metals										
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		<0.000010	<0.000010	0.000011	0.000013	0.000014
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00059
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0048	0.0013	0.0046	0.0022	0.0024
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		0.00036	<0.00040 DLM	0.00041	0.00041	0.00039
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	Field
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		28	26	62	62	59

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-08	SW-09	SW-10	----	----
					Client sampling date / time	22-Apr-2021 14:30	21-Apr-2021 12:50	21-Apr-2021 15:10	----	----
						VA21A7736-006	VA21A7736-007	VA21A7736-008	--------	--------
						Result	Result	Result	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		8.4	273	7.7	----	----
conductivity	----	E100	2.0	µS/cm		107	629	25.1	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		22.6	240	11.5	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		22.1	237	11.6	----	----
pH	----	E108	0.10	pH units		6.32	8.09	5.96	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0562	0.472	0.0588	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		23.8	38.1	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.026	0.092	0.028	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.607	1.11	0.769	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0174	1.32	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0012	0.0502	<0.0010	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	8.02	<0.30	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		23.5	12.2	22.3	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.100	0.232	0.430	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	0.00014	<0.00010	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00040	0.00075	0.00038	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.00738	0.0468	0.00924	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.301	<0.010	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000092	0.0000158	0.0000206	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		6.12	70.2	3.34	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	0.000020	0.000022	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00018	0.00044	0.00030	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.00062	0.00140	0.00131	----	----
iron, total	7439-89-6	E420	0.010	mg/L		0.418	0.236	1.06	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		0.000284	0.000086	0.000177	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-08	SW-09	SW-10	----	----
					Client sampling date / time	22-Apr-2021 14:30	21-Apr-2021 12:50	21-Apr-2021 15:10	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A7736-006	VA21A7736-007	VA21A7736-008	--------	--------
						Result	Result	Result	----	----
Total Metals										
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		1.65	15.0	0.797	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0399	0.130	0.0281	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	0.0000106	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		<0.000050	0.000565	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		<0.00050	0.00297	0.00072	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	0.050	0.184	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		0.531	7.37	0.734	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00044	0.00130	0.00100	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000064	0.000076	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		1.76	3.44	2.70	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
sodium, total	17341-25-2	E420	0.050	mg/L		11.8	33.3	1.13	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0449	0.459	0.0251	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	2.86	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00083	0.00209	0.00669	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	0.000388	0.000032	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	0.00083	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0047	<0.0030	0.0036	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	0.00029	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0998	0.0268	0.417	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	0.00013	<0.00010	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00036	0.00066	0.00040	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.00778	0.0462	0.00868	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-08	SW-09	SW-10	----	----
					Client sampling date / time	22-Apr-2021 14:30	21-Apr-2021 12:50	21-Apr-2021 15:10	----	----
						VA21A7736-006	VA21A7736-007	VA21A7736-008	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	0.289	<0.010	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000084	0.0000075	0.0000194	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		6.30	70.9	3.30	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	0.000017	0.000021	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00018	0.00029	0.00027	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00031	0.00165	0.00291 DTC	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.394	0.040	0.946	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.000236	<0.000050	0.000129	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		1.68	15.3	0.794	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0401	0.0124	0.0285	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		0.0000050	<0.0000050	0.0000057	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		<0.000050	0.000627	<0.000050	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		<0.00050	0.00262	0.00059	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	0.141	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		0.561	7.57	0.776	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00050	0.00132	0.00102	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	0.000071	0.000079	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		1.74	3.31	2.78	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	0.000012	----	----
sodium, dissolved	17341-25-2	E421	0.050	mg/L		11.6	34.3	1.11	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.0438	0.457	0.0234	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	2.62	<0.50	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00097	0.00051	0.00805	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-08	SW-09	SW-10	----	----
					Client sampling date / time	22-Apr-2021 14:30	21-Apr-2021 12:50	21-Apr-2021 15:10	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A7736-006	VA21A7736-007	VA21A7736-008	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		<0.000010	0.000401	0.000033	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	0.00076	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0029	<0.0010	0.0040	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	<0.00020	0.00060	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	----	----
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		65	26	71	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A7736**	Page	: 1 of 21
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton Surface Water	Date Samples Received	: 24-Apr-2021 12:49
PO	: ----	Issue Date	: 03-May-2021 11:39
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 8		
No. of samples analysed	: 8		

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.

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW02	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-09	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-06	E559	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-07	E559	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-08	E559	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-01	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-05	E559	22-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-10	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-05	E298	22-Apr-2021	27-Apr-2021	----	5 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-06	E298	22-Apr-2021	27-Apr-2021	----	5 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-07	E298	22-Apr-2021	27-Apr-2021	----	5 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-08	E298	22-Apr-2021	27-Apr-2021	----	5 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-01	E298	21-Apr-2021	27-Apr-2021	----	6 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW02	E298	21-Apr-2021	27-Apr-2021	----	6 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-09	E298	21-Apr-2021	27-Apr-2021	----	6 days	✓	28-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-10	E298	21-Apr-2021	27-Apr-2021	----	6 days	✓	28-Apr-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-05	E235.Cl	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-06	E235.Cl	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-07	E235.Cl	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-08	E235.Cl	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-01	E235.Cl	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW02	E235.Cl	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-09	E235.Cl	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE SW-10	E235.Cl	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-05	E235.F	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-06	E235.F	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-07	E235.F	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-08	E235.F	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-01	E235.F	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW02	E235.F	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-09	E235.F	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-10	E235.F	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-05	E235.NO3-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-06	E235.NO3-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-07	E235.NO3-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-08	E235.NO3-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-01	E235.NO3-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW02	E235.NO3-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-09	E235.NO3-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-10	E235.NO3-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-05	E235.NO2-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-06	E235.NO2-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-07	E235.NO2-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-08	E235.NO2-L	22-Apr-2021	----	----	----		27-Apr-2021	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-01	E235.NO2-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW02	E235.NO2-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-09	E235.NO2-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-10	E235.NO2-L	21-Apr-2021	----	----	----		27-Apr-2021	3 days	7 days	× EHTL
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-05	E235.SO4	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-06	E235.SO4	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-07	E235.SO4	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-08	E235.SO4	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-01	E235.SO4	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW02	E235.SO4	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-09	E235.SO4	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-10	E235.SO4	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-05	E318	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-06	E318	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-07	E318	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-08	E318	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-01	E318	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW02	E318	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-09	E318	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-10	E318	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-05	E509	22-Apr-2021	30-Apr-2021	----	8 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-06	E509	22-Apr-2021	30-Apr-2021	----	8 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-07	E509	22-Apr-2021	30-Apr-2021	----	8 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-08	E509	22-Apr-2021	30-Apr-2021	----	8 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-01	E509	21-Apr-2021	30-Apr-2021	----	9 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW02	E509	21-Apr-2021	30-Apr-2021	----	9 days	✓	30-Apr-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-09	E509	21-Apr-2021	30-Apr-2021	----	9 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-10	E509	21-Apr-2021	30-Apr-2021	----	9 days	✓	30-Apr-2021	28 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-07	E421	22-Apr-2021	28-Apr-2021	----	6 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-01	E421	21-Apr-2021	28-Apr-2021	----	7 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-05	E421	22-Apr-2021	28-Apr-2021	----	7 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-06	E421	22-Apr-2021	28-Apr-2021	----	7 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-08	E421	22-Apr-2021	28-Apr-2021	----	7 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-10	E421	21-Apr-2021	28-Apr-2021	----	7 days	✓	28-Apr-2021	180 days	1 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW02	E421	21-Apr-2021	28-Apr-2021	----	8 days	✓	28-Apr-2021	180 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-09	E421	21-Apr-2021	28-Apr-2021	----	8 days	✓	28-Apr-2021	180 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-05	E355-L	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-06	E355-L	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-07	E355-L	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-08	E355-L	22-Apr-2021	27-Apr-2021	----	5 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-01	E355-L	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW02	E355-L	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-09	E355-L	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-10	E355-L	21-Apr-2021	27-Apr-2021	----	6 days	✓	27-Apr-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE SW-01	E290	21-Apr-2021	----	----	----		27-Apr-2021	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-05	E290	22-Apr-2021	----	----	----		27-Apr-2021	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-06	E290	22-Apr-2021	----	----	----		27-Apr-2021	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-07	E290	22-Apr-2021	----	----	----		27-Apr-2021	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-08	E290	22-Apr-2021	----	----	----		27-Apr-2021	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW02	E290	21-Apr-2021	----	----	----		27-Apr-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-09	E290	21-Apr-2021	----	----	----		27-Apr-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-10	E290	21-Apr-2021	----	----	----		27-Apr-2021	14 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-01	E100	21-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE SW-05	E100	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-06	E100	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-07	E100	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-08	E100	22-Apr-2021	----	----	----		27-Apr-2021	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE SW02	E100	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-09	E100	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-10	E100	21-Apr-2021	----	----	----		27-Apr-2021	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE SW-07	E108	22-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	120 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-06	E108	22-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	121 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE SW-08	E108	22-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	121 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-05	E108	22-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	123 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-01	E108	21-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	143 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-10	E108	21-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	144 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW02	E108	21-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	146 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-09	E108	21-Apr-2021	----	----	----		27-Apr-2021	0.25 hrs	146 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-05	E508	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-06	E508	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-07	E508	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-08	E508	22-Apr-2021	----	----	----		30-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-01	E508	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW02	E508	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-09	E508	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-10	E508	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-05	E420	22-Apr-2021	----	----	----		29-Apr-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-06	E420	22-Apr-2021	----	----	----		29-Apr-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-07	E420	22-Apr-2021	----	----	----		29-Apr-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-08	E420	22-Apr-2021	----	----	----		29-Apr-2021	180 days	8 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-01	E420	21-Apr-2021	----	----	----		29-Apr-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW02	E420	21-Apr-2021	----	----	----		29-Apr-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-09	E420	21-Apr-2021	----	----	----		29-Apr-2021	180 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-10	E420	21-Apr-2021	----	----	----		29-Apr-2021	180 days	9 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.

EHT: Exceeded ALS recommended hold time prior to analysis.

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	185987	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	185759	1	18	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	185991	1	14	7.1	5.0	✓
Conductivity in Water	E100	185989	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	188270	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	186843	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	185990	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	185992	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	185993	1	14	7.1	5.0	✓
pH by Meter	E108	185988	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	185994	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	185757	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	188478	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	187345	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	185758	1	18	5.5	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	185987	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	185759	1	18	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	185991	1	14	7.1	5.0	✓
Conductivity in Water	E100	185989	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	188270	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	186843	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	185990	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	185992	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	185993	1	14	7.1	5.0	✓
pH by Meter	E108	185988	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	185994	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	185757	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	188478	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	187345	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	185758	1	18	5.5	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	185987	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	185759	1	18	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Chloride in Water by IC	E235.Cl	185991	1	14	7.1	5.0	✓
Conductivity in Water	E100	185989	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	188270	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	186843	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	185990	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	185992	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	185993	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	185994	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	185757	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	188478	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	187345	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	185758	1	18	5.5	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	185759	1	18	5.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	185991	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	188270	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	186843	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	185990	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	185992	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	185993	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	185994	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	185757	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	188478	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	187345	1	19	5.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	185758	1	18	5.5	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), dissolved” is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	“Hardness (as $CaCO_3$), from total Ca/Mg” is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. “Total Hardness” refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

QUALITY CONTROL REPORT

Work Order	: **VA21A7736**	Page	: 1 of 18
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton Surface Water	Date Samples Received	: 24-Apr-2021 12:49
PO	: ----	Date Analysis Commenced	: 27-Apr-2021
C-O-C number	: ----	Issue Date	: 03-May-2021 11:39
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 8		
No. of samples analysed	: 8		

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.

Signatories	*Position*	*Laboratory Department*
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Clarie Tejano	Laboratory Assistant	Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Gloria Chan	Lab Analyst	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia

General Comments

The 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 185987)											
VA21A7736-003	SW-05	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	16.6	17.1	2.97%	20%	----
Physical Tests (QC Lot: 185988)											
VA21A7736-003	SW-05	pH	----	E108	0.10	pH units	6.58	6.60	0.303%	4%	----
Physical Tests (QC Lot: 185989)											
VA21A7736-003	SW-05	conductivity	----	E100	2.0	µS/cm	90.9	90.7	0.220%	10%	----
Anions and Nutrients (QC Lot: 185757)											
VA21A7565-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.200	0.188	0.011	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185759)											
VA21A7565-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185990)											
VA21A7780-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185991)											
VA21A7780-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185992)											
VA21A7780-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0103	0.0112	0.0008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185993)											
VA21A7780-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 185994)											
VA21A7780-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	24.4	24.4	0.0797%	20%	----
Organic / Inorganic Carbon (QC Lot: 185758)											
VA21A7565-002	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	4.85	4.73	0.12	Diff <2x LOR	----
Total Metals (QC Lot: 187345)											
CG2101043-010	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00014	0.00014	0.00000004	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00098	0.00098	0.0000006	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0109	0.0110	1.08%	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	0.049	0.049	0.0003	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000220	0.000235	6.38%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	261	257	1.54%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 187345) - continued											
CG2101043-010	Anonymous	cesium, total	7440-46-2	E420	0.000010	mg/L	0.000077	0.000077	0.00000009	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	0.0212	0.0216	1.67%	20%	----
		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	0.616	0.597	3.11%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000124	0.000137	0.000014	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.103	0.104	0.392%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	160	163	1.64%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.574	0.584	1.72%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0184	0.0186	1.23%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.0718	0.0723	0.678%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	6.50	6.56	1.01%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00590	0.00605	2.66%	20%	----
		selenium, total	7782-49-2	E420	0.050	mg/L	1.04 µg/L	0.00104	0.518%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.81	2.80	0.344%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	20.8	20.7	0.767%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.496	0.498	0.392%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	327	325	0.492%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000088	0.000091	0.000004	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.0152	0.0153	0.634%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0240	0.0273	0.0033	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 188478)											
KS2101196-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 186843)											
CG2101067-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0020	mg/L	<0.0020	0.0029	0.0009	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00020	mg/L	0.00232	0.00227	2.00%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 186843) - continued											
CG2101067-001	Anonymous	arsenic, dissolved	7440-38-2	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00020	mg/L	0.0200	0.0200	0.360%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.040	mg/L	<0.040 µg/L	<0.000040	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.020	mg/L	0.097	0.101	0.004	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0100	mg/L	0.584 µg/L	0.000585	0.144%	20%	----
		calcium, dissolved	7440-70-2	E421	0.100	mg/L	521	549	5.22%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000020	mg/L	0.000678	0.000676	0.284%	20%	----
		chromium, dissolved	7440-47-3	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.20	mg/L	57.1 µg/L	0.0585	2.44%	20%	----
		copper, dissolved	7440-50-8	E421	0.00040	mg/L	0.00046	0.00050	0.00005	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.020	mg/L	0.026	0.027	0.0004	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000100	mg/L	0.000191	0.000216	0.000026	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0020	mg/L	1.05	1.09	3.87%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	226	229	1.23%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.437	0.444	1.55%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000100	mg/L	0.00525	0.00535	1.97%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00100	mg/L	0.359	0.365	1.75%	20%	----
		phosphorus, dissolved	7723-14-0	E421	0.100	mg/L	0.151	0.163	0.012	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	18.5	18.6	0.603%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00040	mg/L	0.0308	0.0322	4.40%	20%	----
		selenium, dissolved	7782-49-2	E421	0.100	mg/L	43.1 µg/L	0.0427	0.912%	20%	----
		silicon, dissolved	7440-21-3	E421	0.100	mg/L	2.69	2.82	4.78%	20%	----
		silver, dissolved	7440-22-4	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.100	mg/L	31.6	31.7	0.189%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00040	mg/L	1.49	1.49	0.242%	20%	----
		sulfur, dissolved	7704-34-9	E421	1.00	mg/L	394	403	2.34%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000020	mg/L	0.000182	0.000182	0.0000008	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000020	mg/L	0.0351	0.0355	0.996%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 186843) - continued											
CG2101067-001	Anonymous	zinc, dissolved	7440-66-6	E421	0.0020	mg/L	0.0550	0.0554	0.821%	20%	----
		zirconium, dissolved	7440-67-7	E421	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 188270)											
VA21A7736-001	SW-01	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 188598)											
KS2101229-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	37	33	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
Physical Tests (QCLot: 185987)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 185989)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 185757)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 185759)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 185990)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 185991)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 185992)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 185993)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 185994)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Organic / Inorganic Carbon (QCLot: 185758)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 187345)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 187345) - continued						
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	MBRR
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 188478)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 186843)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 186843) - continued						
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 188270)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 188598)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Qualifiers

Qualifier	Description
MBRR	Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 185987)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	105	85.0	115	----
Physical Tests (QCLot: 185988)									
pH	----	E108	----	pH units	7 pH units	99.6	98.0	102	----
Physical Tests (QCLot: 185989)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	102	90.0	110	----
Anions and Nutrients (QCLot: 185757)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	86.1	75.0	125	----
Anions and Nutrients (QCLot: 185759)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.9	85.0	115	----
Anions and Nutrients (QCLot: 185990)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.7	90.0	110	----
Anions and Nutrients (QCLot: 185991)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 185992)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 185993)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 185994)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Organic / Inorganic Carbon (QCLot: 185758)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	112	80.0	120	----
Total Metals (QCLot: 187345)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.2	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	96.5	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	96.0	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	99.0	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	96.0	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.4	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	97.6	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.5	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 187345) - continued									
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	97.6	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	99.5	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.8	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.4	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.1	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	96.9	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.3	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	95.1	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	97.4	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	119	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.5	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	93.8	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	93.0	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	85.4	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	99.8	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	97.0	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	92.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.8	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	94.5	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	91.6	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	94.9	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.4	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	97.4	80.0	120	----
Total Metals (QCLot: 188478)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Dissolved Metals (QCLot: 186843)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.6	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.3	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	97.4	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 186843) - continued									
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	97.3	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	92.8	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.2	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.6	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	92.8	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.1	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.6	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.8	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.3	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.8	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.3	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.1	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	113	70.0	130	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	97.9	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	96.2	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.7	80.0	120	----
sodium, dissolved	17341-25-2	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	96.8	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	86.2	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	98.3	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.0	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	96.2	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	95.2	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.6	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	98.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.2	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	94.3	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.8	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 188598)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	102	85.0	115	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 185757)										
VA21A7565-003	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.17 mg/L	2.5 mg/L	86.7	70.0	130	----
Anions and Nutrients (QCLot: 185759)										
VA21A7565-003	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.204 mg/L	0.2 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 185990)										
VA21A7780-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 185991)										
VA21A7780-002	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 185992)										
VA21A7780-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.63 mg/L	2.5 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 185993)										
VA21A7780-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.494 mg/L	0.5 mg/L	98.8	75.0	125	----
Anions and Nutrients (QCLot: 185994)										
VA21A7780-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	106 mg/L	100 mg/L	106	75.0	125	----
Organic / Inorganic Carbon (QCLot: 185758)										
VA21A7565-003	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 187345)										
CG2101043-010	Anonymous	aluminum, total	7429-90-5	E420	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		antimony, total	7440-36-0	E420	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	99.3	70.0	130	----
		barium, total	7440-39-3	E420	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0372 mg/L	0.04 mg/L	92.9	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00826 mg/L	0.01 mg/L	82.6	70.0	130	----
		boron, total	7440-42-8	E420	0.092 mg/L	0.1 mg/L	92.3	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00384 mg/L	0.004 mg/L	95.9	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	0.00961 mg/L	0.01 mg/L	96.1	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	ND mg/L	0.02 mg/L	ND	70.0	130	----
		copper, total	7440-50-8	E420	0.0176 mg/L	0.02 mg/L	87.9	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
Total Metals (QCLot: 187345) - continued										
CG2101043-010	Anonymous	iron, total	7439-89-6	E420	1.90 mg/L	2 mg/L	95.0	70.0	130	----
		lead, total	7439-92-1	E420	0.0175 mg/L	0.02 mg/L	87.7	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0210 mg/L	0.02 mg/L	105	70.0	130	----
		nickel, total	7440-02-0	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		selenium, total	7782-49-2	E420	0.0436 mg/L	0.04 mg/L	109	70.0	130	----
		silicon, total	7440-21-3	E420	8.87 mg/L	10 mg/L	88.7	70.0	130	----
		silver, total	7440-22-4	E420	0.00377 mg/L	0.004 mg/L	94.2	70.0	130	----
		sodium, total	17341-25-2	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	0.0399 mg/L	0.04 mg/L	99.9	70.0	130	----
		thallium, total	7440-28-0	E420	0.00334 mg/L	0.004 mg/L	83.5	70.0	130	----
		thorium, total	7440-29-1	E420	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		titanium, total	7440-32-6	E420	0.0385 mg/L	0.04 mg/L	96.4	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0176 mg/L	0.02 mg/L	88.0	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		zinc, total	7440-66-6	E420	0.357 mg/L	0.4 mg/L	89.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
Total Metals (QCLot: 188478)										
VA21A7736-001	SW-01	mercury, total	7439-97-6	E508	0.0000996 mg/L	0.0001 mg/L	99.6	70.0	130	----
Dissolved Metals (QCLot: 186843)										
CG2101067-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.391 mg/L	0.4 mg/L	97.8	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0762 mg/L	0.08 mg/L	95.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0173 mg/L	0.02 mg/L	86.6	70.0	130	----
		boron, dissolved	7440-42-8	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
Dissolved Metals (QCLot: 186843) - continued										
CG2101067-001	Anonymous	cadmium, dissolved	7440-43-9	E421	0.00739 mg/L	0.008 mg/L	92.4	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0766 mg/L	0.08 mg/L	95.7	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0348 mg/L	0.04 mg/L	86.9	70.0	130	----
		iron, dissolved	7439-89-6	E421	3.72 mg/L	4 mg/L	93.0	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0364 mg/L	0.04 mg/L	91.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	ND mg/L	0.2 mg/L	ND	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		nickel, dissolved	7440-02-0	E421	ND mg/L	0.08 mg/L	ND	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	21.8 mg/L	20 mg/L	109	70.0	130	----
		potassium, dissolved	7440-09-7	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0867 mg/L	0.08 mg/L	108	70.0	130	----
		silicon, dissolved	7440-21-3	E421	18.3 mg/L	20 mg/L	91.3	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00756 mg/L	0.008 mg/L	94.4	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0818 mg/L	0.08 mg/L	102	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00732 mg/L	0.008 mg/L	91.4	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0761 mg/L	0.08 mg/L	95.2	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	ND mg/L	0.008 mg/L	ND	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.754 mg/L	0.8 mg/L	94.3	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0820 mg/L	0.08 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 188270)										
VA21A7736-002	SW02	mercury, dissolved	7439-97-6	E509	0.0000951 mg/L	0.0001 mg/L	95.1	70.0	130	----
Aggregate Organics (QCLot: 188598)										
KS2101229-002	Anonymous	chemical oxygen demand [COD]	----	E559	501 mg/L	500 mg/L	100	75.0	125	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 - Page of

Environmental Division Vancouver
Work Order Reference
VA21A7736

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca, mhaley@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca, nveikle@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton Surface Water
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): 7736

ALS Contact: Sampler: H. Shinton

Select Service Level Bi (rcharges may apply)

Regular [R] ☑ S

PRIORITY (Business Days): 4 day [P4-20%] ☐ ges apply

3 day [P3-25%] ☐

2 day [P2-50%] ☐ holiday [E2 -200% ☐ oly)]

Date and Time Required fo

For tests that can not be performed

Indicate Filtered (

Terrace Shipping ☐ Ground ☑ Air
2 Coolers
___ Carboys

ALS Sample # (lab use only)	Sample Identification and/or Co (This description will appear on th	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	P	F/P													P	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					Total Metals	Dissolved Metals	Alkalinity	Chloride	Fluoride, sulphate, hardness	Ammonia	Nitrate	Nitrite	Total Kjeldahl Nitrogen	TOC	pH	COD	Conductivity	EPH	BTEX / VPH			
	SW-01	21-APR-21	16:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW02	21-APR-21	12:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-05	22-APR-21	11:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-06	22-APR-21	14:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-07	22-APR-21	15:10	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-08	22-APR-21	14:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-09	21-APR-21	12:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-10	21-APR-21	15:10	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	[redacted]																					10
	[redacted]				R					R					R		R					4
	[redacted]							R														10

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☑	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.1	3.9						4.2 avg 3.6

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: April 23rd 2021	Time:	Received by: Chris	Date: 23 Apr 21	Time: 0900	Received by: cm	Date: 24 April 2021	Time: 11:35 am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A7734**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 24-Apr-2021 11:35
PO	: ----	Date Analysis Commenced	: 25-Apr-2021
C-O-C number	: ----	Issue Date	: 05-May-2021 12:45
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time: 21-Apr-2021 13:45	21-Apr-2021 12:00	21-Apr-2021	21-Apr-2021 13:45	----
					VA21A7734-001	VA21A7734-002	VA21A7734-003	VA21A7734-004	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	376	381	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm	784	792	----	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	312	317	<0.60	<0.60	----
pH	----	E108	0.10	pH units	8.27	8.20	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	3.21	3.25	<0.0050	<0.0050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	48.2	48.2	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 DLDS	<0.100 DLDS	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	4.02	4.12	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.237	0.247	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0169	0.0105	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	4.33	4.33	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	11.2	11.0	<0.30	<0.30	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	11.2	11.2	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0816	0.0705	<0.0030	<0.0030	----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00021	0.00021	<0.00010	<0.00010	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00119	0.00110	<0.00010	<0.00010	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0731	0.0749	<0.00010	<0.00010	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
boron, total	7440-42-8	E420	0.010	mg/L	0.422	0.439	<0.010	<0.010	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000287	0.0000258	<0.0000050	<0.0000050	----
calcium, total	7440-70-2	E420	0.050	mg/L	93.7	96.0	<0.050	<0.050	----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000029	0.000032	<0.000010	<0.000010	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00094	0.00094	<0.00010	<0.00010	----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00144	0.00132	<0.00050	<0.00050	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time	21-Apr-2021 13:45	21-Apr-2021 12:00	21-Apr-2021	21-Apr-2021 13:45	----
						VA21A7734-001	VA21A7734-002	VA21A7734-003	VA21A7734-004	--------
						Result	Result	Result	Result	----
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L		0.155	0.137	<0.010	<0.010	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		18.9	18.8	<0.0050	<0.0050	----
manganese, total	7439-96-5	E420	0.00010	mg/L		2.36	2.39	<0.00010	<0.00010	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.00106	0.00108	<0.000050	<0.000050	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00468	0.00476	<0.00050	<0.00050	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E420	0.050	mg/L		9.60	9.75	<0.050	<0.050	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00172	0.00164	<0.00020	<0.00020	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000110	0.000090	<0.000050	<0.000050	----
silicon, total	7440-21-3	E420	0.10	mg/L		3.10	3.16	<0.10	<0.10	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
sodium, total	17341-25-2	E420	0.050	mg/L		42.4	43.0	<0.050	<0.050	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.583	0.598	<0.00020	<0.00020	----
sulfur, total	7704-34-9	E420	0.50	mg/L		4.67	4.45	<0.50	<0.50	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00240 DLM	0.00271	<0.00030	<0.00030	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000400	0.000406	<0.000010	<0.000010	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0034	0.0031	<0.0030	<0.0030	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	<2.0	----	<2.0	----
chemical oxygen demand [COD]	----	E559	20	mg/L		31	33	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A7734**	Page	: 1 of 13
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 24-Apr-2021 11:35
PO	: ----	Issue Date	: 05-May-2021 12:45
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	21-Apr-2021	----	----	----		25-Apr-2021	3 days	4 days	× EHTL
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	21-Apr-2021	----	----	----		25-Apr-2021	3 days	4 days	× EHTL
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	21-Apr-2021	----	----	----		25-Apr-2021	3 days	4 days	× EHTL
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	21-Apr-2021	01-May-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	21-Apr-2021	01-May-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	21-Apr-2021	01-May-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved)										
Travel Blank	E298	21-Apr-2021	30-Apr-2021	3 days	10 days	× EHTL	01-May-2021	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	21-Apr-2021	----	----	----		30-Apr-2021	3 days	10 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	21-Apr-2021	----	----	----		30-Apr-2021	3 days	10 days	× EHTL
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	21-Apr-2021	----	----	----		30-Apr-2021	3 days	10 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Wetland 4	E378-U	21-Apr-2021	----	----	----		30-Apr-2021	3 days	10 days	× EHTL
Anions and Nutrients : Fluoride in Water by IC										
HDPE DUP	E235.F	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Wetland 4	E235.F	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	21-Apr-2021	----	----	----		29-Apr-2021	3 days	9 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO3-L	21-Apr-2021	----	----	----		29-Apr-2021	3 days	9 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	21-Apr-2021	----	----	----		29-Apr-2021	3 days	9 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO2-L	21-Apr-2021	----	----	----		29-Apr-2021	3 days	9 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE DUP	E235.SO4	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Field Blank	E235.SO4	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Wetland 4	E235.SO4	21-Apr-2021	----	----	----		29-Apr-2021	28 days	9 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) DUP	E318	21-Apr-2021	01-May-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E318	21-Apr-2021	01-May-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) DUP	E366	21-Apr-2021	30-Apr-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E366	21-Apr-2021	30-Apr-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E366	21-Apr-2021	30-Apr-2021	----	10 days	✓	03-May-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (lab preserved)										
Travel Blank	E366	21-Apr-2021	30-Apr-2021	3 days	10 days	× EHTL	03-May-2021	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	21-Apr-2021	01-May-2021	----	10 days	✓	02-May-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E355-L	21-Apr-2021	01-May-2021	----	10 days	✓	02-May-2021	28 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
DUP	E290	21-Apr-2021	----	----	----		30-Apr-2021	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Field Blank	E290	21-Apr-2021	----	----	----		30-Apr-2021	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Travel Blank	E290	21-Apr-2021	----	----	----		30-Apr-2021	14 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Wetland 4	E290	21-Apr-2021	----	----	----		30-Apr-2021	14 days	9 days	✓
Physical Tests : Conductivity in Water										
HDPE										
DUP	E100	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Physical Tests : Conductivity in Water										
HDPE										
Field Blank	E100	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	21-Apr-2021	----	----	----		30-Apr-2021	28 days	9 days	✓
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	21-Apr-2021	----	----	----		30-Apr-2021	0.25 hrs	208 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	21-Apr-2021	----	----	----		30-Apr-2021	0.25 hrs	210 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	21-Apr-2021	----	----	----		29-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	21-Apr-2021	----	----	----		29-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	21-Apr-2021	----	----	----		29-Apr-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	21-Apr-2021	----	----	----		29-Apr-2021	28 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	21-Apr-2021	----	----	----		27-Apr-2021	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	21-Apr-2021	----	----	----		27-Apr-2021	180 days	6 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	21-Apr-2021	----	----	----		27-Apr-2021	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Wetland 4	E420	21-Apr-2021	----	----	----		27-Apr-2021	180 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	187832	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	188559	2	15	13.3	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	185028	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	187827	1	14	7.1	5.0	✓
Conductivity in Water	E100	187834	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	187835	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	187826	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	187829	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	187830	1	13	7.6	5.0	✓
pH by Meter	E108	187833	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	187831	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	188862	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	187501	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	185090	1	15	6.6	5.0	✓
Total Nitrogen by Colourimetry	E366	188556	2	12	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	188863	1	4	25.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	187832	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	188559	2	15	13.3	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	185028	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	187827	1	14	7.1	5.0	✓
Conductivity in Water	E100	187834	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	187835	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	187826	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	187829	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	187830	1	13	7.6	5.0	✓
pH by Meter	E108	187833	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	187831	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	188862	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	187501	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	185090	1	15	6.6	5.0	✓
Total Nitrogen by Colourimetry	E366	188556	2	12	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	188863	1	4	25.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	187832	1	14	7.1	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Ammonia by Fluorescence	E298	188559	2	15	13.3	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	185028	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	187827	1	14	7.1	5.0	✓
Conductivity in Water	E100	187834	1	5	20.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	187835	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	187826	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	187829	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	187830	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	187831	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	188862	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	187501	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	185090	1	15	6.6	5.0	✓
Total Nitrogen by Colourimetry	E366	188556	2	12	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	188863	1	4	25.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	188559	2	15	13.3	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	188598	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	187827	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	187835	1	4	25.0	5.0	✓
Fluoride in Water by IC	E235.F	187826	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	187829	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	187830	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	187831	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	188862	1	5	20.0	5.0	✓
Total Mercury in Water by CVAAS	E508	187501	1	9	11.1	5.0	✓
Total Metals in Water by CRC ICPMS	E420	185090	1	15	6.6	5.0	✓
Total Nitrogen by Colourimetry	E366	188556	2	12	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	188863	1	4	25.0	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

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 Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21A7734**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 24-Apr-2021 11:35
PO	: ----	Date Analysis Commenced	: 25-Apr-2021
C-O-C number	: ----	Issue Date	: 05-May-2021 12:45
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 187832)											
VA21A7734-001	Wetland 4	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	376	380	1.03%	20%	----
Physical Tests (QC Lot: 187833)											
VA21A7734-001	Wetland 4	pH	----	E108	0.10	pH units	8.27	8.21	0.728%	4%	----
Physical Tests (QC Lot: 187834)											
VA21A7734-001	Wetland 4	conductivity	----	E100	2.0	µS/cm	784	792	1.02%	10%	----
Anions and Nutrients (QC Lot: 187826)											
VA21A7734-001	Wetland 4	fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 187827)											
VA21A7734-001	Wetland 4	chloride	16887-00-6	E235.Cl	2.50	mg/L	48.2	48.2	0.0356%	20%	----
Anions and Nutrients (QC Lot: 187829)											
VA21A7734-001	Wetland 4	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.237	0.272	13.7%	20%	----
Anions and Nutrients (QC Lot: 187830)											
VA21A7734-001	Wetland 4	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0169	0.0099	0.0070	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 187831)											
VA21A7734-001	Wetland 4	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	11.2	11.0	0.25	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 187835)											
VA21A7734-001	Wetland 4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 188556)											
VA21A7734-003	Travel Blank	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 188559)											
VA21A7734-003	Travel Blank	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 188860)											
VA21A7734-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.150	mg/L	4.33	4.41	1.90%	20%	----
Anions and Nutrients (QC Lot: 188861)											
VA21A7727-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 188862)											
VA21A7727-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.183	0.158	0.025	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 188863)											
VA21A7727-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	7.56	7.61	0.664%	20%	----
Total Metals (QC Lot: 185090)											
WR2100366-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0724	0.0736	1.54%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 185090) - continued											
WR2100366-001	Anonymous	antimony, total	7440-36-0	E420	0.00010	mg/L	0.00035	0.00036	0.00001	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00288	0.00298	3.51%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0269	0.0277	2.67%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.014	0.013	0.0004	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.00226	0.00230	1.74%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	102	104	1.44%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000444	0.000449	1.05%	20%	----
		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	0.00059	0.00061	0.00002	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00238	0.00244	0.00006	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	1.97	1.99	1.15%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.00302	0.00303	0.307%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0109	0.0110	1.19%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	15.7	16.0	2.39%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.384	0.391	1.84%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0114	0.0115	0.744%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00283	0.00253	0.00030	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.057	<0.050	0.007	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	29.2	30.0	2.54%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0336	0.0346	2.90%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.00470	0.00448	4.76%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.78	2.81	0.779%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000015	0.000016	0.0000009	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	53.6	55.2	2.94%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	1.02	1.03	1.62%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	140	139	0.754%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.000024	0.000024	0.00000001	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00118	0.00129	0.00012	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00030	0.00030	0.000002	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00103	0.00103	0.170%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 185090) - continued											
WR2100366-001	Anonymous	vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.176	0.179	2.16%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 187501)											
VA21A7716-007	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 185028)											
VA21A7580-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 188598)											
KS2101229-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	37	33	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
Physical Tests (QCLot: 187832)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 187834)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 187826)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 187827)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 187829)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 187830)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 187831)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 187835)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 188556)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 188559)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 188860)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 188861)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 188862)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 188863)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 185090)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 185090) - continued						
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 187501)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 185028)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 188598)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 187832)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
Physical Tests (QCLot: 187833)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 187834)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.2	90.0	110	----
Anions and Nutrients (QCLot: 187826)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.5	90.0	110	----
Anions and Nutrients (QCLot: 187827)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 187829)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 187830)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 187831)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 187835)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 188556)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 188559)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 188860)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 188861)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.8	85.0	115	----
Anions and Nutrients (QCLot: 188862)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	99.8	75.0	125	----
Organic / Inorganic Carbon (QCLot: 188863)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	106	80.0	120	----
Total Metals (QCLot: 185090)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 185090) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	112	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	107	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	99.8	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	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	101	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	105	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.8	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	106	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	104	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, total	17341-25-2	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	106	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	109	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	95.3	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	99.1	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.1	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 187501)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	92.4	80.0	120	----
Aggregate Organics (QCLot: 185028)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	96.6	85.0	115	----
Aggregate Organics (QCLot: 188598)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	102	85.0	115	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 187826)										
VA21A7734-002	DUP	fluoride	16984-48-8	E235.F	5.10 mg/L	5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 187827)										
VA21A7734-002	DUP	chloride	16887-00-6	E235.Cl	523 mg/L	500 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 187829)										
VA21A7734-002	DUP	nitrate (as N)	14797-55-8	E235.NO3-L	13.0 mg/L	12.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 187830)										
VA21A7734-002	DUP	nitrite (as N)	14797-65-0	E235.NO2-L	2.50 mg/L	2.5 mg/L	99.9	75.0	125	----
Anions and Nutrients (QCLot: 187831)										
VA21A7734-002	DUP	sulfate (as SO4)	14808-79-8	E235.SO4	524 mg/L	500 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 187835)										
VA21A7734-002	DUP	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0327 mg/L	0.03 mg/L	109	70.0	130	----
Anions and Nutrients (QCLot: 188556)										
VA21A8052-001	Anonymous	nitrogen, total	7727-37-9	E366	0.390 mg/L	0.4 mg/L	97.4	70.0	130	----
Anions and Nutrients (QCLot: 188559)										
VA21A8053-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.213 mg/L	0.2 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 188860)										
VA21A7734-002	DUP	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 188861)										
VA21A7727-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.201 mg/L	0.2 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 188862)										
VA21A7727-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.43 mg/L	2.5 mg/L	97.1	70.0	130	----
Organic / Inorganic Carbon (QCLot: 188863)										
VA21A7727-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 185090)										
WR2100366-001	Anonymous	aluminum, total	7429-90-5	E420	0.185 mg/L	0.2 mg/L	92.5	70.0	130	----
		antimony, total	7440-36-0	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 185090) - continued										
WR2100366-001	Anonymous	beryllium, total	7440-41-7	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00908 mg/L	0.01 mg/L	90.8	70.0	130	----
		boron, total	7440-42-8	E420	0.107 mg/L	0.1 mg/L	107	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00362 mg/L	0.004 mg/L	90.4	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	0.00980 mg/L	0.01 mg/L	98.0	70.0	130	----
		chromium, total	7440-47-3	E420	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0183 mg/L	0.02 mg/L	91.4	70.0	130	----
		iron, total	7439-89-6	E420	1.84 mg/L	2 mg/L	91.8	70.0	130	----
		lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.3	70.0	130	----
		lithium, total	7439-93-2	E420	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		nickel, total	7440-02-0	E420	0.0376 mg/L	0.04 mg/L	94.1	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.7 mg/L	10 mg/L	107	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		selenium, total	7782-49-2	E420	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		silicon, total	7440-21-3	E420	9.23 mg/L	10 mg/L	92.3	70.0	130	----
		silver, total	7440-22-4	E420	0.00369 mg/L	0.004 mg/L	92.2	70.0	130	----
		sodium, total	17341-25-2	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	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		thallium, total	7440-28-0	E420	0.00355 mg/L	0.004 mg/L	88.8	70.0	130	----
		thorium, total	7440-29-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		tin, total	7440-31-5	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		titanium, total	7440-32-6	E420	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		uranium, total	7440-61-1	E420	0.00370 mg/L	0.004 mg/L	92.4	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0975 mg/L	0.1 mg/L	97.5	70.0	130	----
		zinc, total	7440-66-6	E420	0.367 mg/L	0.4 mg/L	91.8	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
Total Metals (QCLot: 187501)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 187501) - continued										
VA21A7716-008	Anonymous	mercury, total	7439-97-6	E508	0.0000952 mg/L	0.0001 mg/L	95.2	70.0	130	----
Aggregate Organics (QCLot: 188598)										
KS2101229-002	Anonymous	chemical oxygen demand [COD]	----	E559	501 mg/L	500 mg/L	100	75.0	125	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: hshinton@rdks.bc.ca
Email 2: mhaley@rdks.bc.ca; nveikle@rdks.bc.ca
Email 3: mglover@rdks.bc.ca;

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: anne-maries@rdks.bc.ca
Email 2: mhaley@rdks.bc.ca, nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐
EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	
Job #:	Hazelton WMF Treated Leachate at Wetland 4
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
	Wetland 4	21-APR-21	13:45	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	21-APR-21	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	21-APR-21	—	Water	R	R	R	R	R				R									2
	Field Blank	21-APR-21	13:45	Water	R	R	R	R	R				R			R		R	R			9

Terrace Shipping
1 Coolers Ground ☐
____ Carbouys Air ☑

Environmental Division
Vancouver
Work Order Reference
VA21A7734

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add (electro
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Wa
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.8							4.2 avg 3.8

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Hannah Shinton	April 23rd 2021	

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
hrts	23 Apr 21	0900

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
cm	24 April 2021	11:35 am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A8201**	Page	: 1 of 4
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 30-Apr-2021 11:55
PO	: ----	Date Analysis Commenced	: 04-May-2021
C-O-C number	: ----	Issue Date	: 07-May-2021 13:06
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, 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*
µg/L	micrograms per litre

<: 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*
SUR-ND	*Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.*

Analytical Results

Sub-Matrix: Effluent (Matrix: Water)				Client sample ID	Wetland 4 @ Weir Outlet	----	----	----	----
				Client sampling date / time	28-Apr-2021 10:33	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21A8201-004	--------	--------	--------	--------
					Result	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	----	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	----	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	102	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	102	----	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	----	----	----
VPHw	----	EC580A	100	µg/L	<100	----	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50.0	%	80.6	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	60.3 SUR-ND	----	----	----	----

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-05	SW-07	SW-09	SW-01	----
					Client sampling date / time	28-Apr-2021 10:00	28-Apr-2021 09:37	28-Apr-2021 10:20	28-Apr-2021 11:09	----
						VA21A8201-001	VA21A8201-002	VA21A8201-003	VA21A8201-005	--------
						Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		109	90.5	100.0	93.1	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		102	101	102	101	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	<250	<250	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	<250	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	----
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	50.0	%		92.5	72.3	103	80.0	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		77.6	72.6	101	112	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A8201**	Page	: 1 of 6
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton Surface Water	Date Samples Received	: 30-Apr-2021 11:55
PO	: ----	Issue Date	: 07-May-2021 13:06
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

Key

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

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.
- Test sample Surrogate recovery outliers exist for all regular sample matrices - please see following pages for full details.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Regular Sample Surrogates

Sub-Matrix: **Effluent**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Result	Limits	Comment
Samples Submitted							
Hydrocarbons Surrogates	VA21A8201-004	Wetland 4 @ Weir Outlet	dichlorotoluene, 3,4-	97-75-0	60.3 %	70.0-130 %	Recovery less than lower data quality objective

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-01	E601A	28-Apr-2021	04-May-2021	14 days	7 days	✓	05-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-05	E601A	28-Apr-2021	04-May-2021	14 days	7 days	✓	05-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-07	E601A	28-Apr-2021	04-May-2021	14 days	7 days	✓	05-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-09	E601A	28-Apr-2021	04-May-2021	14 days	7 days	✓	05-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4 @ Weir Outlet	E601A	28-Apr-2021	04-May-2021	14 days	7 days	✓	05-May-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SW-01	E581.VH+F1	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SW-05	E581.VH+F1	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-07	E581.VH+F1	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-09	E581.VH+F1	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Wetland 4 @ Weir Outlet	E581.VH+F1	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SW-01	E611A	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SW-05	E611A	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SW-07	E611A	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SW-09	E611A	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Wetland 4 @ Weir Outlet	E611A	28-Apr-2021	06-May-2021	----	9 days	✓	06-May-2021	14 days	1 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BTEX by Headspace GC-MS	E611A	192132	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	192131	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
BC PHC - EPH by GC-FID	E601A	190520	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	192132	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	192131	1	12	8.3	5.0	✓
Method Blanks (MB)							
BC PHC - EPH by GC-FID	E601A	190520	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	192132	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	192131	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
BTEX by Headspace GC-MS	E611A	192132	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	192131	1	12	8.3	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21A8201**	Page	: 1 of 5
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton Surface Water	Date Samples Received	: 30-Apr-2021 11:55
PO	: ----	Date Analysis Commenced	: 04-May-2021
C-O-C number	: ----	Issue Date	: 07-May-2021 13:06
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

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
Volatile Organic Compounds (QC Lot: 192132)											
VA21A8201-001	SW-05	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 192131)											
VA21A8201-001	SW-05	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 192132)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 190520)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 192131)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 192132)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	105	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	102	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	97.9	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	86.5	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	114	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	102	70.0	130	----
Hydrocarbons (QCLot: 190520)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	116	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	115	70.0	130	----
Hydrocarbons (QCLot: 192131)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	110	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 192132)										
VA21A8201-003	SW-09	benzene	71-43-2	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		ethylbenzene	100-41-4	E611A	109 µg/L	100 µg/L	109	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		styrene	100-42-5	E611A	93.3 µg/L	100 µg/L	93.3	60.0	140	----
		toluene	108-88-3	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	218 µg/L	200 µg/L	109	60.0	140	----
		xylene, o-	95-47-6	E611A	108 µg/L	100 µg/L	108	60.0	140	----
Hydrocarbons (QCLot: 192131)										
VA21A8201-002	SW-07	VHw (C6-C10)	----	E581.VH+F1	8000 µg/L	6310 µg/L	127	60.0	140	----

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca, mhaley@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca, nveikle@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	Hazelton Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	EPH	BTEX / VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	SW-05	28-APR-21	10:00	Water	R	R			
	SW-07	28-APR-21	9:37	Water	R	R			
	SW-09	28-APR-21	10:20	Water	R	R			
	Wetland 4 @ Weir Outlet	28-APR-21	10:33	Effluent	R	R			
	SW-01	28-APR-21	11:09	Water	R	R			

Environmental Division Vancouver
Work Order Reference
VA21A8201

Telephone : +1 604 253 4188

Terrace Shipping
#1 Coolers Ground ☐
#___ Carbouys Air ☑

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
7.2	-8 C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: April 29th, 2021	Time:	Received by: JB	Date: April 29/21	Time: 10:50	Received by: JG	Date: 30 Apr 21	Time: 11:55 AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21A9247**	Page	: 1 of 8
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 14-May-2021 07:50
PO	: ----	Date Analysis Commenced	: 14-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021 12:38
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Extractions	Organics, 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

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*
µg/L	micrograms per litre
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*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	----	----	----	----
					Client sampling date / time	12-May-2021 11:47	----	----	----	----
					VA21A9247-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		275	----	----	----	----
conductivity	----	E100	2.0	µS/cm		728	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		265	----	----	----	----
pH	----	E108	0.10	pH units		8.30	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.264	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		48.5	----	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		<0.100 DLDS	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		1.03	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		1.93	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.108	----	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L		2.94	----	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		<0.0010	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		12.8	----	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		9.25	----	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0548	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00017	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00067	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0571	----	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L		0.362	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000132	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		76.9	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000014	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00038	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.00110	----	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	----	----	----	----
					Client sampling date / time: 12-May-2021 11:47	----	----	----	----
					VA21A9247-001	--------	--------	--------	--------
					Result	----	----	----	----
Total Metals									
iron, total	7439-89-6	E420	0.010	mg/L	0.079	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	17.7	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.245	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000849	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00351	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	9.63	----	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00131	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000064	----	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	1.21	----	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----
sodium, total	17341-25-2	E420	0.050	mg/L	43.0	----	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.503	----	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	4.95	----	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	----	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	----	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00107	----	----	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	----	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000400	----	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	----	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----
Aggregate Organics									
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	----	----	----	----
chemical oxygen demand [COD]	----	E559	20	mg/L	24	----	----	----	----
Volatile Organic Compounds [Fuels]									

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	----	----	----	----
					Client sampling date / time: 12-May-2021 11:47	----	----	----	----
					VA21A9247-001	--------	--------	--------	--------
					Result	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	----	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	----	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	100.0	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	114	----	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----	----	----	----
VPHw	----	EC580A	100	µg/L	<100	----	----	----	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	89.2	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	98.3	----	----	----	----

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: DUP	Travel Blank	Field Blank	----	----
					Client sampling date / time: 12-May-2021 12:00	12-May-2021	12-May-2021 12:10	----	----
					VA21A9247-002	VA21A9247-003	VA21A9247-004	--------	--------
					Result	Result	Result	----	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	269	<1.0	<1.0	----	----
conductivity	----	E100	2.0	µS/cm	739	----	<2.0	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	265	<0.60	<0.60	----	----
pH	----	E108	0.10	pH units	8.30	----	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.269	<0.0050	<0.0050	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	48.5	<0.50	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 DLDS	<0.020	<0.020	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.04	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.87	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.102	----	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	3.02	<0.030	<0.030	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	12.8	<0.30	<0.30	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	9.02	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0591	<0.0030	<0.0030	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00018	<0.00010	<0.00010	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00065	<0.00010	<0.00010	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0574	<0.00010	<0.00010	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
boron, total	7440-42-8	E420	0.010	mg/L	0.361	<0.010	<0.010	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000108	<0.0000050	<0.0000050	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	77.1	<0.050	<0.050	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000015	<0.000010	<0.000010	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00039	<0.00010	<0.00010	----	----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00110	<0.00050	<0.00050	----	----
iron, total	7439-89-6	E420	0.010	mg/L	0.080	<0.010	<0.010	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: DUP	Travel Blank	Field Blank	----	----
					Client sampling date / time: 12-May-2021 12:00	12-May-2021	12-May-2021 12:10	----	----
					VA21A9247-002	VA21A9247-003	VA21A9247-004	--------	--------
					Result	Result	Result	----	----
Total Metals									
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	17.7	<0.0050	<0.0050	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.245	<0.00010	<0.00010	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000886	<0.000050	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00344	<0.00050	<0.00050	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	9.69	<0.050	<0.050	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00130	<0.00020	<0.00020	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000057	<0.000050	<0.000050	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	1.23	<0.10	<0.10	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
sodium, total	17341-25-2	E420	0.050	mg/L	43.0	<0.050	<0.050	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.502	<0.00020	<0.00020	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	5.23	<0.50	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00108	<0.00030	<0.00030	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000401	<0.000010	<0.000010	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
Aggregate Organics									
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	----	<2.0	----	----
chemical oxygen demand [COD]	----	E559	20	mg/L	25	----	----	----	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	----	<0.50	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	DUP	Travel Blank	Field Blank	----	----
					Client sampling date / time	12-May-2021 12:00	12-May-2021	12-May-2021 12:10	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21A9247-002	VA21A9247-003	VA21A9247-004	--------	--------
						Result	Result	Result	----	----
Volatile Organic Compounds [Fuels]										
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	----	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	----	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	----	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	----	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	----	<0.40	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	----	<0.30	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	----	<0.50	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		99.1	----	97.5	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		114	----	85.9	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	----	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	----	<250	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	----	<100	----	----
VPHw	----	EC580A	100	µg/L		<100	----	<100	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		91.1	----	87.8	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		99.9	----	95.3	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21A9247**	Page	: 1 of 14
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 14-May-2021 07:50
PO	: ----	Issue Date	: 25-May-2021 12:39
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] DUP	E550	12-May-2021	----	----	----		14-May-2021	48 hrs	49 hrs	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] Field Blank	E550	12-May-2021	----	----	----		14-May-2021	48 hrs	49 hrs	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT-48h] Wetland 4	E550	12-May-2021	----	----	----		14-May-2021	48 hrs	50 hrs	× EHTL
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	12-May-2021	----	----	----		19-May-2021	28 days	8 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	12-May-2021	----	----	----		19-May-2021	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	12-May-2021	20-May-2021	----	9 days	✓	20-May-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	12-May-2021	20-May-2021	----	9 days	✓	20-May-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	12-May-2021	20-May-2021	----	9 days	✓	20-May-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	12-May-2021	20-May-2021	----	9 days	✓	20-May-2021	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Field Blank	E235.F	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Travel Blank	E235.F	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Wetland 4	E235.F	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO3-L	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	12-May-2021	----	----	----		14-May-2021	3 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	12-May-2021	----	----	----		14-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	12-May-2021	20-May-2021	----	9 days	✓	23-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	12-May-2021	20-May-2021	----	9 days	✓	23-May-2021	28 days	3 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Travel Blank	E366	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	12-May-2021	19-May-2021	14 days	7 days	✓	20-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	12-May-2021	19-May-2021	14 days	7 days	✓	20-May-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	12-May-2021	19-May-2021	14 days	8 days	✓	20-May-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Wetland 4	E581.VH+F1	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E355-L	12-May-2021	20-May-2021	----	9 days	✓	21-May-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	12-May-2021	----	----	----		16-May-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	12-May-2021	----	----	----		16-May-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	12-May-2021	----	----	----		16-May-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	12-May-2021	----	----	----		16-May-2021	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	12-May-2021	----	----	----		16-May-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	12-May-2021	----	----	----		16-May-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	12-May-2021	----	----	----		16-May-2021	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE DUP	E108	12-May-2021	----	----	----		16-May-2021	0.25 hrs	94 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	12-May-2021	----	----	----		16-May-2021	0.25 hrs	95 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	12-May-2021	----	----	----		17-May-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	12-May-2021	----	----	----		17-May-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	12-May-2021	----	----	----		17-May-2021	28 days	6 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	12-May-2021	----	----	----		17-May-2021	28 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	12-May-2021	----	----	----		18-May-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	12-May-2021	----	----	----		18-May-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	12-May-2021	----	----	----		18-May-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Wetland 4	E420	12-May-2021	----	----	----		18-May-2021	180 days	7 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	12-May-2021	20-May-2021	----	8 days	✓	20-May-2021	14 days	1 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	198010	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	202402	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	197974	1	3	33.3	5.0	✓
BTEX by Headspace GC-MS	E611A	201975	1	6	16.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	201138	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	198014	1	16	6.2	5.0	✓
Conductivity in Water	E100	198009	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	198012	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	198013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	198016	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	198017	1	14	7.1	5.0	✓
pH by Meter	E108	198008	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	198018	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	202401	1	4	25.0	5.0	✓
Total Mercury in Water by CVAAS	E508	199525	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	199916	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	202403	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	202404	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	201974	1	6	16.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	198010	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	202402	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	200956	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	197974	1	3	33.3	5.0	✓
BTEX by Headspace GC-MS	E611A	201975	1	6	16.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	201138	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	198014	1	16	6.2	5.0	✓
Conductivity in Water	E100	198009	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	198012	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	198013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	198016	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	198017	1	14	7.1	5.0	✓
pH by Meter	E108	198008	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	198018	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	202401	1	4	25.0	5.0	✓
Total Mercury in Water by CVAAS	E508	199525	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	199916	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	202403	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	202404	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	201974	1	6	16.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	198010	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	202402	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	200956	1	13	7.6	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	197974	1	3	33.3	5.0	✓
BTEX by Headspace GC-MS	E611A	201975	1	6	16.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	201138	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	198014	1	16	6.2	5.0	✓
Conductivity in Water	E100	198009	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	198012	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	198013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	198016	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	198017	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	198018	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	202401	1	4	25.0	5.0	✓
Total Mercury in Water by CVAAS	E508	199525	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	199916	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	202403	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	202404	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	201974	1	6	16.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	202402	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	201975	1	6	16.6	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	201138	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	198014	1	16	6.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	198012	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	198013	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	198016	1	11	9.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	198017	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	198018	1	16	6.2	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	202401	1	4	25.0	5.0	✓
Total Mercury in Water by CVAAS	E508	199525	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	199916	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	202403	1	4	25.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	202404	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	201974	1	6	16.6	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21A9247**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: H. 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	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 14-May-2021 07:50
PO	: ----	Date Analysis Commenced	: 14-May-2021
C-O-C number	: ----	Issue Date	: 25-May-2021 12:39
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Extractions	Organics, 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

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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 198008)											
FJ2100260-004	Anonymous	pH	----	E108	0.10	pH units	8.15	8.14	0.123%	4%	----
Physical Tests (QC Lot: 198009)											
FJ2100260-004	Anonymous	conductivity	----	E100	2.0	µS/cm	278	276	0.722%	10%	----
Physical Tests (QC Lot: 198010)											
FJ2100260-004	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	82.1	84.4	2.76%	20%	----
Anions and Nutrients (QC Lot: 198012)											
FJ2100260-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0020	0.0019	0.00003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 198013)											
FJ2100260-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.075	0.074	0.001	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 198014)											
FJ2100260-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 198016)											
FJ2100260-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.124	0.119	4.30%	20%	----
Anions and Nutrients (QC Lot: 198017)											
FJ2100260-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 198018)											
FJ2100260-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	23.6	23.6	0.184%	20%	----
Anions and Nutrients (QC Lot: 202401)											
VA21A9247-001	Wetland 4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	1.03	1.03	0.0917%	20%	----
Anions and Nutrients (QC Lot: 202402)											
VA21A9247-001	Wetland 4	ammonia, total (as N)	7664-41-7	E298	0.0250	mg/L	0.264	0.265	0.229%	20%	----
Anions and Nutrients (QC Lot: 202403)											
VA21A9247-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.150	mg/L	2.94	2.91	1.07%	20%	----
Organic / Inorganic Carbon (QC Lot: 202404)											
VA21A9247-001	Wetland 4	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	9.25	9.49	2.64%	20%	----
Total Metals (QC Lot: 199525)											
VA21A9209-008	Anonymous	mercury, total	7439-97-6	E508	0.0000250	mg/L	<0.0000250	<0.0000250	0	Diff <2x LOR	----
Total Metals (QC Lot: 199916)											
FJ2100258-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0327	0.0351	7.07%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00031	0.00031	0.000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00062	0.00064	0.00001	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 199916) - continued											
FJ2100258-001	Anonymous	barium, total	7440-39-3	E420	0.00010	mg/L	0.146	0.148	1.73%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.022	0.022	0.0004	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000133	0.0000107	0.0000026	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	91.0	92.0	1.10%	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	0.00021	0.00022	0.000009	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	0.232	0.236	1.54%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000076	0.000070	0.000006	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0343	0.0336	2.00%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	29.9	30.8	2.90%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0294	0.0294	0.000939%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00108	0.00111	2.42%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00139	0.00148	0.00008	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.139	0.133	0.006	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	2.64	2.68	1.36%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00078	0.00085	0.00008	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.00196	0.00194	0.776%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.44	1.46	1.26%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	28.5	28.6	0.111%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.169	0.169	0.0627%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	71.4	72.3	1.16%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00034	<0.00030	0.00004	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00118	0.00116	1.72%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 199916) - continued											
FJ2100258-001	Anonymous	zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 197974)											
VA21A9247-001	Wetland 4	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 201138)											
VA21A9182-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 201975)											
VA21A9247-001	Wetland 4	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 201974)											
VA21A9247-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 198009)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 198010)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 198012)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 198013)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 198014)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 198016)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 198017)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 198018)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 202401)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 202402)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 202403)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 202404)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 199525)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 199916)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 199916) - continued						
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	17341-25-2	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	----
Aggregate Organics (QCLot: 197974)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 201138)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 201975)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 200956)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 201974)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 198008)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 198009)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	105	90.0	110	----
Physical Tests (QCLot: 198010)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	94.0	85.0	115	----
Anions and Nutrients (QCLot: 198012)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	99.7	80.0	120	----
Anions and Nutrients (QCLot: 198013)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 198014)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 198016)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 198017)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 198018)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 202401)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 202402)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.8	85.0	115	----
Anions and Nutrients (QCLot: 202403)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 202404)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	93.2	80.0	120	----
Total Metals (QCLot: 199525)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	94.4	80.0	120	----
Total Metals (QCLot: 199916)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	101	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.2	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 199916) - continued									
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	95.3	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	97.5	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	92.9	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	95.4	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	96.8	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.5	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	98.9	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	92.7	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	97.5	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	107	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	98.9	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	98.4	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	92.3	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	92.4	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.1	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	93.6	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.6	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	105	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	98.1	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.7	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	98.3	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	94.2	80.0	120	----
Aggregate Organics (QCLot: 197974)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 197974) - continued									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	97.7	85.0	115	----
Aggregate Organics (QCLot: 201138)									
chemical oxygen demand [COD]	----	E559	20	mg/L	750 mg/L	102	85.0	115	----
Volatile Organic Compounds (QCLot: 201975)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	98.3	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	104	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	107	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	97.1	70.0	130	----
Hydrocarbons (QCLot: 200956)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	120	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	122	70.0	130	----
Hydrocarbons (QCLot: 201974)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	92.4	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 198012)										
FJ2100260-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0305 mg/L	0.03 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 198013)										
FJ2100260-002	Anonymous	fluoride	16984-48-8	E235.F	0.990 mg/L	1 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 198014)										
FJ2100260-002	Anonymous	chloride	16887-00-6	E235.Cl	97.3 mg/L	100 mg/L	97.3	75.0	125	----
Anions and Nutrients (QCLot: 198016)										
FJ2100260-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.40 mg/L	2.5 mg/L	96.2	75.0	125	----
Anions and Nutrients (QCLot: 198017)										
FJ2100260-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.480 mg/L	0.5 mg/L	96.1	75.0	125	----
Anions and Nutrients (QCLot: 198018)										
FJ2100260-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	96.7 mg/L	100 mg/L	96.7	75.0	125	----
Anions and Nutrients (QCLot: 202401)										
VA21A9247-002	DUP	Kjeldahl nitrogen, total [TKN]	----	E318	4.83 mg/L	5 mg/L	96.7	70.0	130	----
Anions and Nutrients (QCLot: 202402)										
VA21A9247-002	DUP	ammonia, total (as N)	7664-41-7	E298	0.943 mg/L	1 mg/L	94.3	75.0	125	----
Anions and Nutrients (QCLot: 202403)										
VA21A9247-002	DUP	nitrogen, total	7727-37-9	E366	ND mg/L	2 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 202404)										
VA21A9247-002	DUP	carbon, total organic [TOC]	----	E355-L	11.2 mg/L	10 mg/L	112	70.0	130	----
Total Metals (QCLot: 199525)										
VA21A9211-001	Anonymous	mercury, total	7439-97-6	E508	0.000784 mg/L	0.001 mg/L	78.4	70.0	130	----
Total Metals (QCLot: 199916)										
FJ2100258-001	Anonymous	aluminum, total	7429-90-5	E420	0.195 mg/L	0.2 mg/L	97.3	70.0	130	----
		antimony, total	7440-36-0	E420	0.0211 mg/L	0.02 mg/L	106	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00966 mg/L	0.01 mg/L	96.6	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 199916) - continued										
FJ2100258-001	Anonymous	boron, total	7440-42-8	E420	0.097 mg/L	0.1 mg/L	97.1	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00370 mg/L	0.004 mg/L	92.4	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	0.0106 mg/L	0.01 mg/L	106	70.0	130	----
		chromium, total	7440-47-3	E420	0.0398 mg/L	0.04 mg/L	99.6	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0184 mg/L	0.02 mg/L	92.1	70.0	130	----
		copper, total	7440-50-8	E420	0.0179 mg/L	0.02 mg/L	89.6	70.0	130	----
		iron, total	7439-89-6	E420	1.88 mg/L	2 mg/L	94.1	70.0	130	----
		lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		lithium, total	7439-93-2	E420	0.0920 mg/L	0.1 mg/L	92.0	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0215 mg/L	0.02 mg/L	107	70.0	130	----
		nickel, total	7440-02-0	E420	0.0359 mg/L	0.04 mg/L	89.7	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.8 mg/L	10 mg/L	108	70.0	130	----
		potassium, total	7440-09-7	E420	4.08 mg/L	4 mg/L	102	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		selenium, total	7782-49-2	E420	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, total	7440-21-3	E420	9.28 mg/L	10 mg/L	92.8	70.0	130	----
		silver, total	7440-22-4	E420	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		sodium, total	17341-25-2	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	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		thallium, total	7440-28-0	E420	0.00385 mg/L	0.004 mg/L	96.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.5	70.0	130	----
		titanium, total	7440-32-6	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		uranium, total	7440-61-1	E420	0.00392 mg/L	0.004 mg/L	98.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0993 mg/L	0.1 mg/L	99.3	70.0	130	----
		zinc, total	7440-66-6	E420	0.367 mg/L	0.4 mg/L	91.7	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
Aggregate Organics (QCLot: 201138)										
VA21A9182-002	Anonymous	chemical oxygen demand [COD]	----	E559	446 mg/L	500 mg/L	89.2	75.0	125	----
Volatile Organic Compounds (QCLot: 201975)										

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
Volatile Organic Compounds (QCLot: 201975) - continued										
VA21A9366-002	Anonymous	benzene	71-43-2	E611A	82.1 µg/L	100 µg/L	82.1	60.0	140	----
		ethylbenzene	100-41-4	E611A	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	97.6 µg/L	100 µg/L	97.6	60.0	140	----
		styrene	100-42-5	E611A	88.4 µg/L	100 µg/L	88.4	60.0	140	----
		toluene	108-88-3	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	210 µg/L	200 µg/L	105	60.0	140	----
		xylene, o-	95-47-6	E611A	89.2 µg/L	100 µg/L	89.2	60.0	140	----
Hydrocarbons (QCLot: 201974)										
VA21A9366-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5120 µg/L	6310 µg/L	81.2	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page

Environmental Division Vancouver
Work Order Reference
VA21A9247

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Megan Haley

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca; nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca;

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	mhaley@rdks.bc.ca, nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to conf

Regular [R] ☑ Standard TAT if received by 3 pm - b

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day | Same Day, Wee | (Laboratory ope

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected,

Analysis Requ

Indicate Filtered (F), Preserved (P) or Filtered and Pre

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton WMF Treated Leachate at Wetland 4
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)		
AFE/Cost Center:		PO#
Major/Minor Code:		Routing Code:
Requisitioner:		
Location:		

ALS Lab Work Order # (lab use only): 9247

ALS Contact:

Sampler: H. Shinton

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
1	Wetland 4	12-May-21	11:47	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
2	DUP	12-May-21	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
3	Travel Blank	12-May-21	—	Water	R	R	R	R	R				R									2
4	Field Blank	12-May-21	12:10	Water	R	R	R	R	R				R			R		R	R			9

Terrace Shipping
#1 Coolers Ground ☐
#____ Carbouys Air ☑

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.8				4			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: May 13th 2021	Time:	Received by: Chris	Date: 13 May 21	Time: 0950	Received by: JC	Date: MAY 14 2021	Time: 750

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21B1844**	Page	: 1 of 4
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Soil - Composite Sample	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Date Analysis Commenced	: 13-Jun-2021
C-O-C number	: ----	Issue Date	: 21-Jun-2021 14:56
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Cindy Tang	Team Leader - Inorganics	Inorganics, 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
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
%	percent
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
pH units	pH units

<: less than.

>: greater than.

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

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

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

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Composite Soil Sample	----	----	----	----
					Client sampling date / time	10-Jun-2021 11:30	----	----	----	----
					VA21B1844-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests										
% saturation	----	E141	1.0	%		63.6	----	----	----	----
moisture	----	E144	0.25	%		22.2	----	----	----	----
pH (1:2 soil:water)	----	E108	0.10	pH units		6.85	----	----	----	----
Saturated Paste Extractables										
chloride, soluble ion content	16887-00-6	EC239A.Cl	1.0	mg/kg		<12.7	----	----	----	----
chloride, soluble ion content	16887-00-6	E239.Cl	2.0	mg/L		<20.0	----	----	----	----
sodium, soluble ion content	17341-25-2	EC442	1.00	mg/kg		3.82	----	----	----	----
sodium, soluble ion content	17341-25-2	E442	2.0	mg/L		6.0	----	----	----	----
Metals										
aluminum	7429-90-5	E440	50	mg/kg		24400	----	----	----	----
antimony	7440-36-0	E440	0.10	mg/kg		0.66	----	----	----	----
arsenic	7440-38-2	E440	0.10	mg/kg		13.6	----	----	----	----
barium	7440-39-3	E440	0.50	mg/kg		175	----	----	----	----
beryllium	7440-41-7	E440	0.10	mg/kg		0.50	----	----	----	----
bismuth	7440-69-9	E440	0.20	mg/kg		<0.20	----	----	----	----
boron	7440-42-8	E440	5.0	mg/kg		<5.0	----	----	----	----
cadmium	7440-43-9	E440	0.020	mg/kg		0.194	----	----	----	----
calcium	7440-70-2	E440	50	mg/kg		5470	----	----	----	----
chromium	7440-47-3	E440	0.50	mg/kg		26.5	----	----	----	----
cobalt	7440-48-4	E440	0.10	mg/kg		13.5	----	----	----	----
copper	7440-50-8	E440	0.50	mg/kg		30.4	----	----	----	----
iron	7439-89-6	E440	50	mg/kg		36700	----	----	----	----
lead	7439-92-1	E440	0.50	mg/kg		10.3	----	----	----	----
lithium	7439-93-2	E440	2.0	mg/kg		17.1	----	----	----	----
magnesium	7439-95-4	E440	20	mg/kg		7550	----	----	----	----
manganese	7439-96-5	E440	1.0	mg/kg		1120	----	----	----	----
mercury	7439-97-6	E510	0.0500	mg/kg		<0.0500	----	----	----	----
molybdenum	7439-98-7	E440	0.10	mg/kg		0.91	----	----	----	----
nickel	7440-02-0	E440	0.50	mg/kg		30.0	----	----	----	----
phosphorus	7723-14-0	E440	50	mg/kg		909	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Composite Soil Sample	----	----	----	----
					Client sampling date / time	10-Jun-2021 11:30	----	----	----	----
						VA21B1844-001	--------	--------	--------	--------
						Result	----	----	----	----
Metals										
potassium	7440-09-7	E440	100	mg/kg		1220	----	----	----	----
selenium	7782-49-2	E440	0.20	mg/kg		0.24	----	----	----	----
silver	7440-22-4	E440	0.10	mg/kg		0.14	----	----	----	----
sodium	7440-23-5	E440	50	mg/kg		139	----	----	----	----
strontium	7440-24-6	E440	0.50	mg/kg		43.0	----	----	----	----
sulfur	7704-34-9	E440	1000	mg/kg		<1000	----	----	----	----
thallium	7440-28-0	E440	0.050	mg/kg		0.080	----	----	----	----
tin	7440-31-5	E440	2.0	mg/kg		<2.0	----	----	----	----
titanium	7440-32-6	E440	1.0	mg/kg		458	----	----	----	----
tungsten	7440-33-7	E440	0.50	mg/kg		<0.50	----	----	----	----
uranium	7440-61-1	E440	0.050	mg/kg		0.361	----	----	----	----
vanadium	7440-62-2	E440	0.20	mg/kg		62.0	----	----	----	----
zinc	7440-66-6	E440	2.0	mg/kg		92.0	----	----	----	----
zirconium	7440-67-7	E440	1.0	mg/kg		<1.0	----	----	----	----
Leachable Anions & Nutrients										
bromide, leachable	24959-67-9	E235.Br	0.50	mg/kg		<0.50	----	----	----	----
chloride, leachable	16887-00-6	E235.Cl	20.0	mg/kg		<20.0	----	----	----	----
fluoride, leachable	16984-48-8	E237.F	0.50	mg/kg		<0.50	----	----	----	----
nitrate (as N), leachable	14797-55-8	E235.NO3	0.050	mg/kg		0.098	----	----	----	----
nitrite (as N), leachable	14797-65-0	E235.NO2	0.010	mg/kg		<0.010	----	----	----	----
sulfate, leachable	14808-79-8	E235.SO4	10	mg/kg		<10	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21B1844**	Page	: 1 of 8
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Soil - Composite Sample	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Issue Date	: 21-Jun-2021 14:56
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Duplicate outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Duplicate (DUP) RPDs								
Metals	Anonymous	Anonymous	molybdenum	7439-98-7	E440	61.4 % DUP-H	40%	Duplicate RPD does not meet the DQO for this test.
Metals	Anonymous	Anonymous	uranium	7440-61-1	E440	39.9 % DUP-H	30%	Duplicate RPD does not meet the DQO for this test.

Result Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Leachable Anions & Nutrients : Leachable Bromide in Soil/Solid by IC										
LDPE bag Composite Soil Sample	E235.Br	10-Jun-2021	13-Jun-2021	----	4 days	✓	14-Jun-2021	----	1 days	
Leachable Anions & Nutrients : Leachable Chloride in Soil/Solid by IC										
LDPE bag Composite Soil Sample	E235.Cl	10-Jun-2021	13-Jun-2021	----	4 days	✓	14-Jun-2021	----	1 days	
Leachable Anions & Nutrients : Leachable Fluoride by IC (1:5 Soil:Water Extraction)										
LDPE bag Composite Soil Sample	E237.F	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	----	1 days	
Leachable Anions & Nutrients : Leachable Nitrate in Soil/Solid by IC										
LDPE bag Composite Soil Sample	E235.NO3	10-Jun-2021	13-Jun-2021	----	4 days	✓	14-Jun-2021	----	1 days	
Leachable Anions & Nutrients : Leachable Nitrite in Soil/Solid by IC										
LDPE bag Composite Soil Sample	E235.NO2	10-Jun-2021	13-Jun-2021	----	4 days	✓	14-Jun-2021	----	1 days	
Leachable Anions & Nutrients : Leachable Sulfate in Soil/Solid by IC										
LDPE bag Composite Soil Sample	E235.SO4	10-Jun-2021	13-Jun-2021	----	4 days	✓	14-Jun-2021	----	1 days	
Metals : Mercury in Soil/Solid by CVAAS										
LDPE bag Composite Soil Sample	E510	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓

Matrix: **Soil/Solid**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
LDPE bag Composite Soil Sample	E440	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	180 days	1 days	✓
Physical Tests : Moisture Content by Gravimetry										
LDPE bag Composite Soil Sample	E144	10-Jun-2021	----	----	----		13-Jun-2021	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
LDPE bag Composite Soil Sample	E108	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	30 days	1 days	✓
Physical Tests : Saturation Percentage										
LDPE bag Composite Soil Sample	E141	10-Jun-2021	----	----	----		17-Jun-2021	28 days	7 days	✓
Saturated Paste Extractables : Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)										
LDPE bag Composite Soil Sample	E442	10-Jun-2021	----	----	----		17-Jun-2021	365 days	8 days	✓
Saturated Paste Extractables : Chloride by IC (Saturated Paste)										
LDPE bag Composite Soil Sample	E239.Cl	10-Jun-2021	----	----	----		17-Jun-2021	365 days	7 days	✓

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	222502	1	5	20.0	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	222501	1	5	20.0	5.0	✓
Leachable Bromide in Soil/Solid by IC	E235.Br	219995	1	1	100.0	5.0	✓
Leachable Chloride in Soil/Solid by IC	E235.Cl	219996	1	1	100.0	5.0	✓
Leachable Fluoride by IC (1:5 Soil:Water Extraction)	E237.F	222503	1	1	100.0	5.0	✓
Leachable Nitrate in Soil/Solid by IC	E235.NO3	219997	1	1	100.0	5.0	✓
Leachable Nitrite in Soil/Solid by IC	E235.NO2	219998	1	1	100.0	5.0	✓
Leachable Sulfate in Soil/Solid by IC	E235.SO4	219999	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	222493	1	5	20.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	222494	1	5	20.0	5.0	✓
Moisture Content by Gravimetry	E144	220013	1	5	20.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	222497	1	5	20.0	5.0	✓
Saturation Percentage	E141	222498	0	5	0.0	5.0	✗
Laboratory Control Samples (LCS)							
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	222502	2	5	40.0	10.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	222501	2	5	40.0	10.0	✓
Leachable Bromide in Soil/Solid by IC	E235.Br	219995	1	1	100.0	5.0	✓
Leachable Chloride in Soil/Solid by IC	E235.Cl	219996	1	1	100.0	5.0	✓
Leachable Fluoride by IC (1:5 Soil:Water Extraction)	E237.F	222503	1	1	100.0	5.0	✓
Leachable Nitrate in Soil/Solid by IC	E235.NO3	219997	1	1	100.0	5.0	✓
Leachable Nitrite in Soil/Solid by IC	E235.NO2	219998	1	1	100.0	5.0	✓
Leachable Sulfate in Soil/Solid by IC	E235.SO4	219999	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	222493	2	5	40.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	222494	2	5	40.0	10.0	✓
Moisture Content by Gravimetry	E144	220013	1	5	20.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	222497	1	5	20.0	5.0	✓
Saturation Percentage	E141	222498	2	5	40.0	10.0	✓
Method Blanks (MB)							
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442	222502	1	5	20.0	5.0	✓
Chloride by IC (Saturated Paste)	E239.Cl	222501	1	5	20.0	5.0	✓
Leachable Bromide in Soil/Solid by IC	E235.Br	219995	1	1	100.0	5.0	✓
Leachable Chloride in Soil/Solid by IC	E235.Cl	219996	1	1	100.0	5.0	✓
Leachable Fluoride by IC (1:5 Soil:Water Extraction)	E237.F	222503	1	1	100.0	5.0	✓
Leachable Nitrate in Soil/Solid by IC	E235.NO3	219997	1	1	100.0	5.0	✓
Leachable Nitrite in Soil/Solid by IC	E235.NO2	219998	1	1	100.0	5.0	✓
Leachable Sulfate in Soil/Solid by IC	E235.SO4	219999	1	1	100.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	222493	1	5	20.0	5.0	✓

Matrix: **Soil/Solid**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Metals in Soil/Solid by CRC ICPMS	E440	222494	1	5	20.0	5.0	✓
Moisture Content by Gravimetry	E144	220013	1	5	20.0	5.0	✓
Saturation Percentage	E141	222498	1	5	20.0	5.0	✓
Matrix Spikes (MS)							
Leachable Bromide in Soil/Solid by IC	E235.Br	219995	0	1	0.0	5.0	✗
Leachable Chloride in Soil/Solid by IC	E235.Cl	219996	0	1	0.0	5.0	✗
Leachable Fluoride by IC (1:5 Soil:Water Extraction)	E237.F	222503	0	1	0.0	5.0	✗
Leachable Nitrate in Soil/Solid by IC	E235.NO3	219997	0	1	0.0	5.0	✗
Leachable Nitrite in Soil/Solid by IC	E235.NO2	219998	0	1	0.0	5.0	✗
Leachable Sulfate in Soil/Solid by IC	E235.SO4	219999	0	1	0.0	5.0	✗

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Vancouver - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Saturation Percentage	E141 Vancouver - Environmental	Soil/Solid	CSSS Ch. 18 (mod)/AER D50	Saturation Percentage (SP) is determined as the total volume of water present in a saturated paste (in mL) divided by the dry weight of the sample (in grams), expressed as a percentage.
Moisture Content by Gravimetry	E144 Vancouver - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Leachable Bromide in Soil/Solid by IC	E235.Br Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Leachable Chloride in Soil/Solid by IC	E235.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Leachable Nitrite in Soil/Solid by IC	E235.NO2 Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Leachable Nitrate in Soil/Solid by IC	E235.NO3 Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Leachable Sulfate in Soil/Solid by IC	E235.SO4 Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.
Leachable Fluoride by IC (1:5 Soil:Water Extraction)	E237.F Vancouver - Environmental	Soil/Solid	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection using a soil sample that has been added in a defined ratio of soil to deionized water, then shaken well and allowed to settle. Anions are measured in the fluid that is observed in the upper layer.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Chloride by IC (Saturated Paste)	E239.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Metals in Soil/Solid by CRC ICPMS	E440 Vancouver - Environmental	Soil/Solid	EPA 6020B (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available. Silicate minerals are not solubilized. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. Analysis is by Collision/Reaction Cell ICPMS.
Ca, K, Mg, and Na by CRC ICPMS (Saturated Paste, mg/L)	E442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium and Sodium by Collision/Reaction Cell ICPMS as per "Soil Sampling Methods of Analysis" By M Carter.
Mercury in Soil/Solid by CVAAS	E510 Vancouver - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl, followed by CVAAS analysis.
Chloride by IC (Saturated Paste) (mg/kg)	EC239A.Cl Vancouver - Environmental	Soil/Solid	CSSS Ch. 15 (mod)/EPA 300.1 (mod)	Inorganic anions are analyzed by obtaining a soil extract produced by the saturated paste extraction procedure which is then analyzed by Ion Chromatography with conductivity and/or UV detection.
Ca, K, Mg, Na by ICPMS (Saturated Paste, mg/kg)	EC442 Vancouver - Environmental	Soil/Solid	CSSS CH15/EPA 6020B (mod)	A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPMS.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Vancouver - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Leach 1:5 Soil:Water for Anions	EP237 Vancouver - Environmental	Soil/Solid	EPA 300.1 (mod)	This analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time.
Digestion for Metals and Mercury	EP440 Vancouver - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO_3 and HCl. This method is intended to liberate metals that may be environmentally available.
Leach for Metals and Anions	EP441 Vancouver - Environmental	Soil/Solid	In-House	This analysis is carried out using a leaching procedure which involves the gentle tumbling of the sample in a specified leaching solution (typically deionized water) for a specific length of time.

QUALITY CONTROL REPORT

Work Order	: **VA21B1844**	Page	: 1 of 10
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Soil - Composite Sample	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Date Analysis Commenced	: 13-Jun-2021
C-O-C number	: ----	Issue Date	: 21-Jun-2021 14:56
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Cindy Tang	Team Leader - Inorganics	Inorganics, 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
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 220013)											
VA21B1669-001	Anonymous	moisture	----	E144	0.25	%	0.31	0.29	0.02	Diff <2x LOR	----
Physical Tests (QC Lot: 222497)											
VA21B1839-001	Anonymous	pH (1:2 soil:water)	----	E108	0.10	pH units	7.80	7.77	0.4%	5%	----
Saturated Paste Extractables (QC Lot: 222501)											
VA21B1839-005	Anonymous	chloride, soluble ion content	16887-00-6	E239.Cl	20.0	mg/L	140	122	17.8	Diff <2x LOR	----
Saturated Paste Extractables (QC Lot: 222502)											
VA21B1839-005	Anonymous	sodium, soluble ion content	17341-25-2	E442	2.0	mg/L	93.6	83.2	11.8%	30%	----
Metals (QC Lot: 222493)											
VA21B1839-001	Anonymous	mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 222494)											
VA21B1839-001	Anonymous	aluminum	7429-90-5	E440	50	mg/kg	20600	21100	2.44%	40%	----
		antimony	7440-36-0	E440	0.10	mg/kg	0.14	0.15	0.003	Diff <2x LOR	----
		arsenic	7440-38-2	E440	0.10	mg/kg	4.38	4.29	2.19%	30%	----
		barium	7440-39-3	E440	0.50	mg/kg	103	101	2.14%	40%	----
		beryllium	7440-41-7	E440	0.10	mg/kg	0.31	0.32	0.01	Diff <2x LOR	----
		bismuth	7440-69-9	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		boron	7440-42-8	E440	5.0	mg/kg	<5.0	<5.0	0	Diff <2x LOR	----
		cadmium	7440-43-9	E440	0.020	mg/kg	0.056	0.055	0.0009	Diff <2x LOR	----
		calcium	7440-70-2	E440	50	mg/kg	5740	5320	7.51%	30%	----
		chromium	7440-47-3	E440	0.50	mg/kg	31.8	30.6	3.53%	30%	----
		cobalt	7440-48-4	E440	0.10	mg/kg	9.26	9.28	0.212%	30%	----
		copper	7440-50-8	E440	0.50	mg/kg	18.5	16.6	11.0%	30%	----
		iron	7439-89-6	E440	50	mg/kg	23900	23500	1.67%	30%	----
		lead	7439-92-1	E440	0.50	mg/kg	4.25	4.14	2.51%	40%	----
		lithium	7439-93-2	E440	2.0	mg/kg	10.7	10.6	0.1	Diff <2x LOR	----
		magnesium	7439-95-4	E440	20	mg/kg	6360	6170	2.97%	30%	----
		manganese	7439-96-5	E440	1.0	mg/kg	510	545	6.53%	30%	----
		molybdenum	7439-98-7	E440	0.10	mg/kg	0.88	0.47	61.4%	40%	DUP-H
		nickel	7440-02-0	E440	0.50	mg/kg	24.9	25.0	0.502%	30%	----
		phosphorus	7723-14-0	E440	50	mg/kg	406	434	6.72%	30%	----
		potassium	7440-09-7	E440	100	mg/kg	860	890	2.85%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 222494) - continued											
VA21B1839-001	Anonymous	selenium	7782-49-2	E440	0.20	mg/kg	<0.20	<0.20	0	Diff <2x LOR	----
		silver	7440-22-4	E440	0.10	mg/kg	<0.10	<0.10	0	Diff <2x LOR	----
		sodium	7440-23-5	E440	50	mg/kg	388	394	1.34%	40%	----
		strontium	7440-24-6	E440	0.50	mg/kg	37.1	37.9	2.16%	40%	----
		sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		thallium	7440-28-0	E440	0.050	mg/kg	0.065	0.067	0.002	Diff <2x LOR	----
		tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		titanium	7440-32-6	E440	1.0	mg/kg	1170	1090	6.78%	40%	----
		tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		uranium	7440-61-1	E440	0.050	mg/kg	0.300	0.449	39.9%	30%	DUP-H
		vanadium	7440-62-2	E440	0.20	mg/kg	68.0	66.7	1.82%	30%	----
		zinc	7440-66-6	E440	2.0	mg/kg	52.1	52.1	0.0482%	30%	----
		zirconium	7440-67-7	E440	1.0	mg/kg	2.0	1.9	0.2	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 219995)											
VA21B1844-001	Composite Soil Sample	bromide, leachable	24959-67-9	E235.Br	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 219996)											
VA21B1844-001	Composite Soil Sample	chloride, leachable	16887-00-6	E235.Cl	20.0	mg/kg	<20.0	<20.0	0	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 219997)											
VA21B1844-001	Composite Soil Sample	nitrate (as N), leachable	14797-55-8	E235.NO3	0.050	mg/kg	0.098	0.176	0.078	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 219998)											
VA21B1844-001	Composite Soil Sample	nitrite (as N), leachable	14797-65-0	E235.NO2	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 219999)											
VA21B1844-001	Composite Soil Sample	sulfate, leachable	14808-79-8	E235.SO4	10	mg/kg	<10	<10	0	Diff <2x LOR	----
Leachable Anions & Nutrients (QC Lot: 222503)											
VA21B1844-001	Composite Soil Sample	fluoride, leachable	16984-48-8	E237.F	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----

Qualifiers

Qualifier	*Description*
DUP-H	*Duplicate results outside ALS DQO, due to sample heterogeneity.*

Method Blank (MB) Report

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

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 220013)						
moisture	----	E144	0.25	%	<0.25	----
Saturated Paste Extractables (QCLot: 222498)						
% saturation	----	E141	1	%	50.0	----
Saturated Paste Extractables (QCLot: 222501)						
chloride, soluble ion content	16887-00-6	E239.Cl	2	mg/L	<2.0	----
Saturated Paste Extractables (QCLot: 222502)						
sodium, soluble ion content	17341-25-2	E442	2	mg/L	<2.0	----
Metals (QCLot: 222493)						
mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 222494)						
aluminum	7429-90-5	E440	50	mg/kg	<50	----
antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
boron	7440-42-8	E440	5	mg/kg	<5.0	----
cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
calcium	7440-70-2	E440	50	mg/kg	<50	----
chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
iron	7439-89-6	E440	50	mg/kg	<50	----
lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
lithium	7439-93-2	E440	2	mg/kg	<2.0	----
magnesium	7439-95-4	E440	20	mg/kg	<20	----
manganese	7439-96-5	E440	1	mg/kg	<1.0	----
molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
phosphorus	7723-14-0	E440	50	mg/kg	<50	----
potassium	7440-09-7	E440	100	mg/kg	<100	----
selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
silver	7440-22-4	E440	0.1	mg/kg	<0.10	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 222494) - continued						
sodium	7440-23-5	E440	50	mg/kg	<50	----
strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
tin	7440-31-5	E440	2	mg/kg	<2.0	----
titanium	7440-32-6	E440	1	mg/kg	<1.0	----
tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
zinc	7440-66-6	E440	2	mg/kg	<2.0	----
zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Leachable Anions & Nutrients (QCLot: 219995)						
bromide, leachable	24959-67-9	E235.Br	0.5	mg/kg	<0.50	----
Leachable Anions & Nutrients (QCLot: 219996)						
chloride, leachable	16887-00-6	E235.Cl	5	mg/kg	<5.0	----
Leachable Anions & Nutrients (QCLot: 219997)						
nitrate (as N), leachable	14797-55-8	E235.NO3	0.05	mg/kg	<0.050	----
Leachable Anions & Nutrients (QCLot: 219998)						
nitrite (as N), leachable	14797-65-0	E235.NO2	0.01	mg/kg	<0.010	----
Leachable Anions & Nutrients (QCLot: 219999)						
sulfate, leachable	14808-79-8	E235.SO4	10	mg/kg	<10	----
Leachable Anions & Nutrients (QCLot: 222503)						
fluoride, leachable	16984-48-8	E237.F	0.5	mg/kg	<0.50	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 220013)									
moisture	----	E144	0.25	%	50 %	101	90.0	110	----
Physical Tests (QCLot: 222497)									
pH (1:2 soil:water)	----	E108	----	pH units	6 pH units	100	95.0	105	----
Saturated Paste Extractables (QCLot: 222498)									
% saturation	----	E141	1	%	100 %	101	80.0	120	----
Saturated Paste Extractables (QCLot: 222501)									
chloride, soluble ion content	16887-00-6	E239.Cl	2	mg/L	100 mg/L	101	80.0	120	----
Saturated Paste Extractables (QCLot: 222502)									
sodium, soluble ion content	17341-25-2	E442	2	mg/L	50 mg/L	105	80.0	120	----
Metals (QCLot: 222493)									
mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	108	80.0	120	----
Metals (QCLot: 222494)									
aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	109	80.0	120	----
antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	114	80.0	120	----
arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	110	80.0	120	----
barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	106	80.0	120	----
beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	103	80.0	120	----
bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	103	80.0	120	----
boron	7440-42-8	E440	5	mg/kg	100 mg/kg	98.9	80.0	120	----
cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	107	80.0	120	----
calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	104	80.0	120	----
chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	108	80.0	120	----
cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	108	80.0	120	----
copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
iron	7439-89-6	E440	50	mg/kg	100 mg/kg	103	80.0	120	----
lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	95.3	80.0	120	----
magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	112	80.0	120	----
manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	106	80.0	120	----
molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	113	80.0	120	----
nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	106	80.0	120	----
phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	116	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 222494) - continued									
potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	108	80.0	120	----
selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	108	80.0	120	----
sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	107	80.0	120	----
strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	115	80.0	120	----
sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	103	80.0	120	----
thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	99.0	80.0	120	----
tin	7440-31-5	E440	2	mg/kg	50 mg/kg	111	80.0	120	----
titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	104	80.0	120	----
tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	99.3	80.0	120	----
uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	94.9	80.0	120	----
vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	109	80.0	120	----
zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	116	80.0	120	----
zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	109	80.0	120	----
Leachable Anions & Nutrients (QCLot: 219995)									
bromide, leachable	24959-67-9	E235.Br	0.5	mg/kg	2.5 mg/kg	93.9	70.0	130	----
Leachable Anions & Nutrients (QCLot: 219996)									
chloride, leachable	16887-00-6	E235.Cl	5	mg/kg	500 mg/kg	96.5	70.0	130	----
Leachable Anions & Nutrients (QCLot: 219997)									
nitrate (as N), leachable	14797-55-8	E235.NO3	0.05	mg/kg	12.5 mg/kg	96.6	70.0	130	----
Leachable Anions & Nutrients (QCLot: 219998)									
nitrite (as N), leachable	14797-65-0	E235.NO2	0.01	mg/kg	2.5 mg/kg	95.0	70.0	130	----
Leachable Anions & Nutrients (QCLot: 219999)									
sulfate, leachable	14808-79-8	E235.SO4	10	mg/kg	500 mg/kg	99.3	70.0	130	----
Leachable Anions & Nutrients (QCLot: 222503)									
fluoride, leachable	16984-48-8	E237.F	0.5	mg/kg	2.5 mg/kg	96.1	70.0	130	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Saturated Paste Extractables (QCLot: 222498)									
QC-222498-003	RM	% saturation	----	E141	50.2 %	99.7	70.0	130	----
Saturated Paste Extractables (QCLot: 222501)									
QC-222501-003	RM	chloride, soluble ion content	16887-00-6	E239.Cl	994 mg/L	96.8	70.0	130	----
Saturated Paste Extractables (QCLot: 222502)									
QC-222502-003	RM	sodium, soluble ion content	17341-25-2	E442	610 mg/L	92.9	70.0	130	----
Metals (QCLot: 222493)									
QC-222493-003	SCP SS-2	mercury	7439-97-6	E510	0.059 mg/kg	101	70.0	130	----
Metals (QCLot: 222494)									
QC-222494-003	SCP SS-2	aluminum	7429-90-5	E440	9817 mg/kg	107	70.0	130	----
QC-222494-003	SCP SS-2	antimony	7440-36-0	E440	3.99 mg/kg	98.6	70.0	130	----
QC-222494-003	SCP SS-2	arsenic	7440-38-2	E440	3.73 mg/kg	111	70.0	130	----
QC-222494-003	SCP SS-2	barium	7440-39-3	E440	105 mg/kg	98.7	70.0	130	----
QC-222494-003	SCP SS-2	beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
QC-222494-003	SCP SS-2	boron	7440-42-8	E440	8.5 mg/kg	111	40.0	160	----
QC-222494-003	SCP SS-2	cadmium	7440-43-9	E440	0.91 mg/kg	112	70.0	130	----
QC-222494-003	SCP SS-2	calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
QC-222494-003	SCP SS-2	chromium	7440-47-3	E440	101 mg/kg	110	70.0	130	----
QC-222494-003	SCP SS-2	cobalt	7440-48-4	E440	6.9 mg/kg	104	70.0	130	----
QC-222494-003	SCP SS-2	copper	7440-50-8	E440	123 mg/kg	103	70.0	130	----
QC-222494-003	SCP SS-2	iron	7439-89-6	E440	23558 mg/kg	102	70.0	130	----
QC-222494-003	SCP SS-2	lead	7439-92-1	E440	267 mg/kg	98.5	70.0	130	----
QC-222494-003	SCP SS-2	lithium	7439-93-2	E440	9.5 mg/kg	99.4	70.0	130	----
QC-222494-003	SCP SS-2	magnesium	7439-95-4	E440	5509 mg/kg	103	70.0	130	----
QC-222494-003	SCP SS-2	manganese	7439-96-5	E440	269 mg/kg	108	70.0	130	----
QC-222494-003	SCP SS-2	molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
QC-222494-003	SCP SS-2	nickel	7440-02-0	E440	26.7 mg/kg	102	70.0	130	----
QC-222494-003	SCP SS-2	phosphorus	7723-14-0	E440	752 mg/kg	113	70.0	130	----
QC-222494-003	SCP SS-2	potassium	7440-09-7	E440	1587 mg/kg	110	70.0	130	----
QC-222494-003	SCP SS-2	sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----

Sub-Matrix: **Soil/Solid**

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Metals (QCLot: 222494) - continued									
QC-222494-003	SCP SS-2	strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----
QC-222494-003	SCP SS-2	thallium	7440-28-0	E440	0.0786 mg/kg	91.1	40.0	160	----
QC-222494-003	SCP SS-2	tin	7440-31-5	E440	10.6 mg/kg	106	70.0	130	----
QC-222494-003	SCP SS-2	titanium	7440-32-6	E440	839 mg/kg	108	70.0	130	----
QC-222494-003	SCP SS-2	uranium	7440-61-1	E440	0.52 mg/kg	93.0	70.0	130	----
QC-222494-003	SCP SS-2	vanadium	7440-62-2	E440	32.7 mg/kg	106	70.0	130	----
QC-222494-003	SCP SS-2	zinc	7440-66-6	E440	297 mg/kg	109	70.0	130	----
QC-222494-003	SCP SS-2	zirconium	7440-67-7	E440	5.73 mg/kg	103	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton Soil - Composite Sample
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Amber Springer Sampler: H.Shinton

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals	salinity	nutrients	cations	ions	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Composite soil sample	10-Jun-21	11:30	Soil	R	R	R	R	R			

Environmental Division Vancouver

Work Order Reference

VA21B1844

Telephone : +1 604 253 4188

Terrace Shipping

1 Coolers Ground ☐

___ Carbouys Air ☑

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.8				J			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: June 11 2021	Time:	Received by: Chris	Date: 11 June 21	Time: 0925	Received by:	Date: JUN 11	Time: 8101

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21B1843**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Date Analysis Commenced	: 13-Jun-2021
C-O-C number	: ----	Issue Date	: 23-Jun-2021 16:25
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, 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*
µg/L	micrograms per litre
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*
HTD	*Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time	10-Jun-2021 10:15	10-Jun-2021 12:00	[10-Jun-2021]	10-Jun-2021 10:30	----
						VA21B1843-001	VA21B1843-002	VA21B1843-003	VA21B1843-004	--------
						Result	Result	Result	Result	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		292	294	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm		661	659	----	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		255	261	<0.60	<0.60	----
pH	----	E108	0.10	pH units		8.25	8.25	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0506	0.0515	<0.0050	<0.0050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		50.6	50.5	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.098	0.098	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.935	0.968	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.740 HTD	0.706 HTD	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0198	0.0210	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L		1.74	1.64	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		6.76	6.76	<0.30	<0.30	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		10.0	9.72	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0330	0.0302	<0.0030	<0.0030	----
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00019	0.00019	<0.00010	<0.00010	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00090	0.00092	<0.00010	<0.00010	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0463	0.0476	<0.00010	<0.00010	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
boron, total	7440-42-8	E420	0.010	mg/L		0.340	0.362	<0.010	<0.010	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000096	0.0000082	<0.0000050	<0.0000050	----
calcium, total	7440-70-2	E420	0.050	mg/L		74.1	76.2	<0.050	<0.050	----
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000010	0.000011	<0.000010	<0.000010	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00029	0.00030	<0.00010	<0.00010	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.00130	0.00104	<0.00050	<0.00050	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time	10-Jun-2021 10:15	10-Jun-2021 12:00	[10-Jun-2021]	10-Jun-2021 10:30	----
Analyte	CAS Number	Method	LOR	Unit		VA21B1843-001	VA21B1843-002	VA21B1843-003	VA21B1843-004	--------
						Result	Result	Result	Result	----
Total Metals										
iron, total	7439-89-6	E420	0.010	mg/L		0.068	0.064	<0.010	<0.010	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		17.0	17.2	<0.0050	<0.0050	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.134	0.135	<0.00010	<0.00010	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		0.0000051	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000916	0.000950	<0.000050	<0.000050	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00346	0.00351	<0.00050	<0.00050	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E420	0.050	mg/L		8.30	8.40	<0.050	<0.050	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00103	0.00106	<0.00020	<0.00020	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000056	0.000054	<0.000050	<0.000050	----
silicon, total	7440-21-3	E420	0.10	mg/L		1.21	1.24	<0.10	<0.10	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
sodium, total	17341-25-2	E420	0.050	mg/L		45.6	46.6	<0.050	<0.050	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.490	0.520	<0.00020	<0.00020	----
sulfur, total	7704-34-9	E420	0.50	mg/L		2.99	3.09	<0.50	<0.50	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00057	0.00054	<0.00030	<0.00030	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000386	0.000402	<0.000010	<0.000010	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	<2.0	----	<2.0	----
chemical oxygen demand [COD]	----	E559	20	mg/L		30	32	----	----	----
Volatile Organic Compounds [Fuels]										

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
Client sampling date / time					10-Jun-2021 10:15	10-Jun-2021 12:00	[10-Jun-2021]	10-Jun-2021 10:30	----
					VA21B1843-001	**VA21B1843-002**	**VA21B1843-003**	**VA21B1843-004**	--------
					Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	----	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	----	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	96.3	94.4	----	91.7	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	129	125	----	125	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	----	<100	----
VPHw	----	EC580A	100	µg/L	<100	<100	----	<100	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	89.2	89.3	----	82.9	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	84.2	81.2	----	110	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21B1843**	Page	: 1 of 14
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Issue Date	: 23-Jun-2021 16:25
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	10-Jun-2021	----	----	----		13-Jun-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	10-Jun-2021	----	----	----		13-Jun-2021	3 days	4 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	10-Jun-2021	----	----	----		13-Jun-2021	3 days	4 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	10-Jun-2021	----	----	----		17-Jun-2021	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	10-Jun-2021	----	----	----		17-Jun-2021	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	10-Jun-2021	----	----	----		13-Jun-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	10-Jun-2021	----	----	----		13-Jun-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	10-Jun-2021	----	----	----		13-Jun-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Wetland 4	E378-U	10-Jun-2021	----	----	----		13-Jun-2021	3 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE DUP	E235.F	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Wetland 4	E235.F	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	10-Jun-2021	----	----	----		13-Jun-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO3-L	10-Jun-2021	----	----	----		13-Jun-2021	3 days	4 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	10-Jun-2021	----	----	----		13-Jun-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO2-L	10-Jun-2021	----	----	----		13-Jun-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE DUP	E235.SO4	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	10-Jun-2021	----	----	----		13-Jun-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Field Blank	E235.SO4	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Wetland 4	E235.SO4	10-Jun-2021	----	----	----		13-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) DUP	E318	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E318	10-Jun-2021	18-Jun-2021	----	8 days	✓	18-Jun-2021	28 days	1 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) DUP	E366	10-Jun-2021	18-Jun-2021	----	8 days	✓	21-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E366	10-Jun-2021	18-Jun-2021	----	8 days	✓	21-Jun-2021	28 days	4 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid) Travel Blank	E366	10-Jun-2021	18-Jun-2021	----	8 days	✓	21-Jun-2021	28 days	4 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	10-Jun-2021	18-Jun-2021	----	8 days	✓	21-Jun-2021	28 days	4 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	10-Jun-2021	16-Jun-2021	14 days	6 days	✓	16-Jun-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	10-Jun-2021	16-Jun-2021	14 days	6 days	✓	16-Jun-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	10-Jun-2021	16-Jun-2021	14 days	6 days	✓	16-Jun-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Wetland 4	E581.VH+F1	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	10-Jun-2021	18-Jun-2021	----	8 days	✓	20-Jun-2021	28 days	3 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E355-L	10-Jun-2021	18-Jun-2021	----	8 days	✓	20-Jun-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	10-Jun-2021	----	----	----		14-Jun-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	10-Jun-2021	----	----	----		14-Jun-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	10-Jun-2021	----	----	----		14-Jun-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	10-Jun-2021	----	----	----		14-Jun-2021	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	10-Jun-2021	----	----	----		14-Jun-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	10-Jun-2021	----	----	----		14-Jun-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	10-Jun-2021	----	----	----		14-Jun-2021	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE DUP	E108	10-Jun-2021	----	----	----		14-Jun-2021	0.25 hrs	90 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	10-Jun-2021	----	----	----		14-Jun-2021	0.25 hrs	91 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	10-Jun-2021	----	----	----		17-Jun-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	10-Jun-2021	----	----	----		17-Jun-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	10-Jun-2021	----	----	----		17-Jun-2021	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	10-Jun-2021	----	----	----		17-Jun-2021	28 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	10-Jun-2021	----	----	----		17-Jun-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	10-Jun-2021	----	----	----		17-Jun-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	10-Jun-2021	----	----	----		17-Jun-2021	180 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Wetland 4	E420	10-Jun-2021	----	----	----		17-Jun-2021	180 days	7 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	10-Jun-2021	16-Jun-2021	----	7 days	✓	16-Jun-2021	14 days	1 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	219913	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	224185	1	11	9.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	219891	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	222728	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	223340	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	219906	1	15	6.6	5.0	✓
Conductivity in Water	E100	219912	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	219916	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	219905	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	219908	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	219909	1	13	7.6	5.0	✓
pH by Meter	E108	219911	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	219910	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	224183	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	223995	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	222438	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	224186	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	224184	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	222727	1	10	10.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	219913	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	224185	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	221986	1	7	14.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	219891	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	222728	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	223340	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	219906	1	15	6.6	5.0	✓
Conductivity in Water	E100	219912	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	219916	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	219905	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	219908	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	219909	1	13	7.6	5.0	✓
pH by Meter	E108	219911	1	8	12.5	5.0	✓
Sulfate in Water by IC	E235.SO4	219910	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	224183	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	223995	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	222438	1	19	5.2	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	224186	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	224184	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	222727	1	10	10.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	219913	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	224185	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	221986	1	7	14.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	219891	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	222728	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	223340	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	219906	1	15	6.6	5.0	✓
Conductivity in Water	E100	219912	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	219916	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	219905	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	219908	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	219909	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	219910	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	224183	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	223995	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	222438	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	224186	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	224184	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	222727	1	10	10.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	224185	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	222728	1	10	10.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	223340	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	219906	1	15	6.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	219916	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	219905	1	15	6.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	219908	1	14	7.1	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	219909	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	219910	1	15	6.6	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	224183	1	2	50.0	5.0	✓
Total Mercury in Water by CVAAS	E508	223995	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	222438	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	224186	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	224184	1	5	20.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	222727	1	10	10.0	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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21B1843**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 11-Jun-2021 20:15
PO	: ----	Date Analysis Commenced	: 13-Jun-2021
C-O-C number	: ----	Issue Date	: 23-Jun-2021 16:25
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 219911)											
KS2101836-001	Anonymous	pH	----	E108	0.10	pH units	7.69	7.69	0.00%	4%	----
Physical Tests (QC Lot: 219912)											
KS2101836-001	Anonymous	conductivity	----	E100	2.0	µS/cm	94.2	94.6	0.424%	10%	----
Physical Tests (QC Lot: 219913)											
KS2101836-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	40.4	40.5	0.247%	20%	----
Anions and Nutrients (QC Lot: 219905)											
FJ2100385-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.146	0.143	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 219906)											
FJ2100385-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.41	1.40	0.01	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 219908)											
FJ2100385-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.138	0.138	0.0130%	20%	----
Anions and Nutrients (QC Lot: 219909)											
FJ2100385-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0098	0.0095	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 219910)											
FJ2100385-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	35.4	35.5	0.516%	20%	----
Anions and Nutrients (QC Lot: 219916)											
FJ2100385-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0019	0.0013	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 224183)											
VA21B1843-001	Wetland 4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.935	0.970	3.65%	20%	----
Anions and Nutrients (QC Lot: 224185)											
VA21B1843-001	Wetland 4	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0506	0.0498	1.55%	20%	----
Anions and Nutrients (QC Lot: 224186)											
VA21B1843-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.150	mg/L	1.74	1.65	5.32%	20%	----
Organic / Inorganic Carbon (QC Lot: 224184)											
VA21B1843-001	Wetland 4	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	10.0	9.78	2.38%	20%	----
Total Metals (QC Lot: 222438)											
VA21B1842-007	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0136	0.0139	0.0003	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.00396	0.00388	2.19%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 222438) - continued											
VA21B1842-007	Anonymous	bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000126	0.000129	0.000003	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000212	0.0000198	0.0000015	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	5.00	5.04	0.734%	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	0.328	0.320	2.51%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.052	0.052	0.0009	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.0227	0.0230	1.48%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.11	1.10	1.09%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00345	0.00346	0.108%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	0.000052	0.000002	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00386	0.00375	0.00011	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	0.129	0.131	0.002	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00021	0.00022	0.00001	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	2.12	2.04	3.73%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	0.000011	0.000001	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	3.25	3.28	1.04%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0154	0.0150	2.26%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00845	0.00844	0.0157%	20%	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.141	0.139	1.70%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 223995)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 223995) - continued											
VA21B1814-003	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 219891)											
VA21B1814-017	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 223340)											
VA21B1814-017	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 222728)											
VA21B1843-001	Wetland 4	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 222727)											
VA21B1843-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 219912)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 219913)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 219905)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 219906)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 219908)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 219909)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 219910)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 219916)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 224183)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 224185)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 224186)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 224184)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 222438)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 222438) - continued						
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 223995)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 219891)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 223340)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 222728)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 221986)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 222727)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 219911)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 219912)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.6	90.0	110	----
Physical Tests (QCLot: 219913)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	99.1	85.0	115	----
Anions and Nutrients (QCLot: 219905)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 219906)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 219908)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 219909)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 219910)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 219916)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	103	80.0	120	----
Anions and Nutrients (QCLot: 224183)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.6	75.0	125	----
Anions and Nutrients (QCLot: 224185)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 224186)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.9	75.0	125	----
Organic / Inorganic Carbon (QCLot: 224184)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Total Metals (QCLot: 222438)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	98.0	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	97.3	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	94.3	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 222438) - continued									
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	99.5	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	86.3	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	97.1	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.1	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	99.2	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.9	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.4	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.7	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	100	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	91.1	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	94.1	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.8	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	96.5	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	96.8	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.4	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	96.8	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	98.6	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	83.9	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	92.7	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.8	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.6	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	100	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	97.6	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	92.6	80.0	120	----
Total Metals (QCLot: 223995)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.7	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 219891)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	101	85.0	115	----
Aggregate Organics (QCLot: 223340)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	109	85.0	115	----
Volatile Organic Compounds (QCLot: 222728)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	124	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	115	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	119	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	116	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	114	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	120	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	99.6	70.0	130	----
Hydrocarbons (QCLot: 221986)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	107	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	103	70.0	130	----
Hydrocarbons (QCLot: 222727)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	102	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 219905)										
VA21B1840-009	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 219906)										
VA21B1840-009	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 219908)										
VA21B1840-009	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.55 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 219909)										
VA21B1840-009	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 219910)										
VA21B1840-009	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 219916)										
VA21B1843-001	Wetland 4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0316 mg/L	0.03 mg/L	106	70.0	130	----
Anions and Nutrients (QCLot: 224183)										
VA21B1843-002	DUP	Kjeldahl nitrogen, total [TKN]	----	E318	2.48 mg/L	2.5 mg/L	99.4	70.0	130	----
Anions and Nutrients (QCLot: 224185)										
VA21B1843-002	DUP	ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 224186)										
VA21B1843-002	DUP	nitrogen, total	7727-37-9	E366	1.92 mg/L	2 mg/L	96.3	70.0	130	----
Organic / Inorganic Carbon (QCLot: 224184)										
VA21B1843-002	DUP	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 222438)										
VA21B1842-007	Anonymous	aluminum, total	7429-90-5	E420	0.189 mg/L	0.2 mg/L	94.7	70.0	130	----
		antimony, total	7440-36-0	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		barium, total	7440-39-3	E420	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		boron, total	7440-42-8	E420	0.091 mg/L	0.1 mg/L	90.8	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 222438) - continued										
VA21B1842-007	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.00968 mg/L	0.01 mg/L	96.8	70.0	130	----
		chromium, total	7440-47-3	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		iron, total	7439-89-6	E420	1.93 mg/L	2 mg/L	96.4	70.0	130	----
		lead, total	7439-92-1	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		lithium, total	7439-93-2	E420	0.0913 mg/L	0.1 mg/L	91.3	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0196 mg/L	0.02 mg/L	98.2	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	9.46 mg/L	10 mg/L	94.6	70.0	130	----
		potassium, total	7440-09-7	E420	3.80 mg/L	4 mg/L	94.9	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		selenium, total	7782-49-2	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		silicon, total	7440-21-3	E420	9.47 mg/L	10 mg/L	94.7	70.0	130	----
		silver, total	7440-22-4	E420	0.00398 mg/L	0.004 mg/L	99.6	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		sulfur, total	7704-34-9	E420	19.6 mg/L	20 mg/L	97.8	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		thorium, total	7440-29-1	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		titanium, total	7440-32-6	E420	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		uranium, total	7440-61-1	E420	0.00394 mg/L	0.004 mg/L	98.6	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0978 mg/L	0.1 mg/L	97.8	70.0	130	----
		zinc, total	7440-66-6	E420	0.378 mg/L	0.4 mg/L	94.5	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
Total Metals (QCLot: 223995)										
VA21B1814-004	Anonymous	mercury, total	7439-97-6	E508	0.0000957 mg/L	0.0001 mg/L	95.7	70.0	130	----
Aggregate Organics (QCLot: 223340)										
VA21B1822-001	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	1000 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 222728)										

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
Volatile Organic Compounds (QCLot: 222728) - continued										
VA21B1843-002	DUP	benzene	71-43-2	E611A	100 µg/L	100 µg/L	100	60.0	140	----
		ethylbenzene	100-41-4	E611A	96.6 µg/L	100 µg/L	96.6	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	103 µg/L	100 µg/L	103	60.0	140	----
		styrene	100-42-5	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		toluene	108-88-3	E611A	94.5 µg/L	100 µg/L	94.5	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	204 µg/L	200 µg/L	102	60.0	140	----
		xylene, o-	95-47-6	E611A	84.5 µg/L	100 µg/L	84.5	60.0	140	----
Hydrocarbons (QCLot: 222727)										
VA21B1843-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	4530 µg/L	6310 µg/L	71.8	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	mglover@rdks.bc.ca;

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Hazelton WMF Treated Leachate at Wetland 4
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days):
- 4 day [P4-20%] ☐
- 3 day [P3-25%] ☐
- 2 day [P2-50%] ☐

EMERGENCY:
- 1 Business day [E1 - 100%] ☐
- Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
	Wetland 4	10-JUN-21	10:15	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	10-JUN-21	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank			Water	R	R	R	R	R				R			R						2
	Field Blank	10-JUN-21	10:30	Water	R	R	R	R	R				R			R		R	R			9

Environmental Division
Vancouver
Work Order Reference
VA21B1843

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.8				5			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: June 11. 2021	Time:	Received by: Chris	Date: 11 June 21	Time: 0925	Received by:	Date: JUN 11 2021	Time: 8:55

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21B5003**	Page	: 1 of 2
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 05-Aug-2021
C-O-C number	: ----	Issue Date	: 13-Aug-2021 10:50
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Erin Gatdula	Account Manager Assistant	External Subcontracting, 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

<: less than.

>: greater than.

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

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

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

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					*Client sample ID*	**Wetland 4 Outlet**	----	----	----	----
					Client sampling date / time	20-Jul-2021 13:44	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA21B5003-001**	--------	--------	--------	--------
						Result	----	----	----	----
Bioassays										
Daphnia magna LC50	----	DAP-LC50-48	-	-		See attached	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21B5003**	Page	: 1 of 4
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Issue Date	: 13-Aug-2021 10:50
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bioassays : Survival/LC50 Daphnia Magna 48 hours										
HDPE LC50										
Wetland 4 Outlet	DAP-LC50-48	20-Jul-2021	----	----	----		05-Aug-2021	----	16 days	EHT

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

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

Quality Control Parameter Frequency Compliance

- **No Quality Control data available for this section.**

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
Survival/LC50 Daphnia Magna 48 hours	DAP-LC50-48 Nautilus Environmental (Burnaby) - 8664 Commerce Court Burnaby British Columbia Canada V5A 4N7	Water	EPS1/RM/14	See attached report.

QUALITY CONTROL REPORT

Work Order	: **VA21B5003**	Page	: 1 of 2
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 05-Aug-2021
C-O-C number	: ----	Issue Date	: 13-Aug-2021 10:50
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Erin Gatdula	Account Manager Assistant	External Subcontracting, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Acute Toxicity Test Results

Sample VA21B5003-001 (Wetland 4 Outlet),
collected July 20, 2021

Final Report

August 5, 2021

Submitted to: **ALS Environmental**
Burnaby, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

SAMPLE INFORMATION

Sample ID	Dates			Receipt temperature
	Collected	Received	*Daphnia magna* test initiation	
VA21B5003-001 (Wetland 4 Outlet)	20-Jul-21 at 1344h	22-Jul-21 at 0840h	22-Jul-21 at 1205h	8.3°C

TESTS

- *Daphnia magna* 48-h LC50 test

RESULTS

Toxicity test results

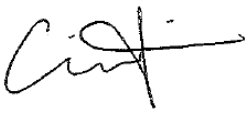
Sample ID	LC50 (% v/v) [95% CL]
VA21B5003-001 (Wetland 4 Outlet)	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	*Daphnia magna*
Reference toxicant LC50 (95% CL)	6.8 (5.7 – 8.1) g/L NaCl[1]
Reference toxicant historical mean (2 SD range)	5.4 (3.9 – 7.6) g/L NaCl
Reference toxicant CV	17%
Organism health history	Acceptable
Protocol deviations	Yes (see below)
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date: July 14, 2021, LC = Lethal Concentration, SD = Standard Deviation, CL = Confidence Limits, CV = Coefficient of Variation



Report By:
Connie Siu, M.Sc.
Laboratory Biologist

Reviewed By:
Andy Diewald, B.Sc.
Senior Analyst

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	*Daphnia magna*
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.9.4
Test endpoint	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Daphnia magna Summary Sheet

Client: ALS Environmental
Work Order No.: 211430

Start Date/Time: July 21/2021 @ 1205 h
Test Species: *Daphnia magna*
Set up by: MDO / CCBS
CJS

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤2 daphnids exibit immobility and/or mortality in any single control replicate.

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Sample Information:

Sample ID: VA21B5003-001 (Wetland 4 Outlet)
Sample Date: July 20/2021
Date Received: July 22/2021
Sample Volume: 2x 1L

Test Organism Information:

Broodstock No.: 063021A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmDC76
Stock Solution ID: 21NaCl
Date Initiated: July 14/2021
48-h LC50 (95% CL): 6.8 (5.7-8.1) g/LNaCL

Reference Toxicant Mean and Historical Range: 5.4 (3.9-7.6) g/L NaCL
Reference Toxicant CV (%): 17

Test Results: The 48 hr LC50 is estimated to be 7100 % (v/v).

Reviewed by: A
Date reviewed: Aug 3/21

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client: ALS Environmental
Sample ID: ~~Wetland 4 @ Weir (outlet)~~ VA21B5003-001 (Wetland 4 outlet)
Work Order No.: 211430
CER #: 5

Start Date/Time: July 22/21 @ 1205 h
Test Organism: *D.magna*
Organisms/volume: 10/200mL
Set up by: MDO/CCS

Thermometer: CER#5 pH meter/probe: 6/6 DO meter/probe: 6/6 Cond./Salinity meter/probe: 6/6

Concentration % (v/v)	Rep	Number of Live Organisms 24	Number of Live Organisms 48	No. Immobilized 48	Temperature (°C) 0	Temperature (°C) 24	Temperature (°C) 48	Dissolved oxygen (mg/L) 0	Dissolved oxygen (mg/L) 24	Dissolved oxygen (mg/L) 48	pH 0	pH 24	pH 48	Conductivity (µS/cm) 0	Conductivity (µS/cm) 48
Control	A	10	10	0	19.5	19.5	19.5	8.9	8.4	8.5	8.0	8.0	7.8	359	365
	B														
	C														
	D														
6.25	A	10	10	0	19.5	19.5	19.5	~~7~~8.9	8.5	8.6	7.9	8.0	7.8	379	381
	B														
	C														
	D														
12.5	A	10	9	0	19.5	19.5	19.5	8.9	8.5	8.6	7.9	8.1	7.9	398	401
	B														
	C														
	D														
25	A	10	10	0	19.5	19.5	19.5	8.8	8.5	8.7	8.0	8.2	8.0	437	439
	B														
	C														
	D														
50	A	10	10	0	20.0	19.5	19.5	8.8	8.6	8.8	8.1	8.3	8.1	511	513
	B														
	C														
	D														
100	A	10	10	0	20.5	19.0	19.5	8.8	8.6	8.9	8.1	8.4	8.3	670	661
	B														
	C														
	D														
Technician Initials		CCS	MDO	MDO	MDO/CCS	CCS	MDO	MDO/CCS	CCS	MDO	MDO/CCS	CCS	MDO	MDO/CCS	MDO

Concentration	Hardness* (mg/L as CaCo3)	Alkalinity* (mg/L as CaCo3)
Control (MHW)	94	88
Highest conc.	226	270
Hardness adjusted	—	

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	9.2 NO 8.8		
pH	8.1		
Cond (µS/cm)	670		
Salinity (ppt)	0.3		

Sample Description: Slightly yellow, clear, grassy odour, with some particulates

Comments:

Mortality: Heartbeat checked under microscope: yes

Batch#: 063021A 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: Date reviewed: Aug 3/21

APPENDIX C – Chain-of-custody form

Chain of Custody

Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

19996

Destination Lab:	**Nautilus Environmental (Burnaby)**
Address:	8664 Commerce Court Burnaby BC Canada V5A 4N7
Client:	[redacted]
Work Order Number:	**VA21B5003**
Original Receipt Date/Time	Instructions Received
21/07/2021 21:00	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: alsev.datasublet@alsglobal.com Invoice: alsev.datasublet@alsglobal.com Electronic Data: alsev.datasublet@alsglobal.com

Attention: Amber Springer

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
VA21B5003-001	Wetland 4 Outlet	Water	HDPE LC50	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	13-08-2021	20/07/2021 13:44	
VA21B5003-001	Wetland 4 Outlet	Water	HDPE LC50			13-08-2021	20/07/2021 13:44	

TH
July 22/21 @ 8:40
2×1L
211430
8.3°C

END OF REPORT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

COC Number: 17 -

Page of

Affix ALS barcode label here
(lab use only)

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	eblaney@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4-20%] ☐		1 Business day [E1 - 100%] ☐
	3 day [P3-25%] ☐		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	2 day [P2-50%] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	Hazelton EQ LC50	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Amber Springer	Sampler: H.Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Acute toxicity LC50 Daphnia magna	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Wetland 4 Outlet	20-Jul-21	13:44	Effluent	R			

Environmental Division
Vancouver
Work Order Reference
VA21B5003

Telephone : +1 604 253 4188

Terrace Shipping
1 Coolers Ground ☐
___ Carbouys Air ☑

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☑ Ice Cubes ☐	Custody seal intact	Yes ☐	No	☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
4.4	4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: July 21st 2021	Time:	Received by: Chris	Date: 21 July 21	Time: 1210	Received by:	Date: JUL 21 2021	Time: 4

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEP 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21B5001**	Page	: 1 of 6
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 22-Jul-2021
C-O-C number	: ----	Issue Date	: 30-Jul-2021 09:20
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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*
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).*
DTMF	*Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-05	SW-09	----	----	----
					Client sampling date / time	20-Jul-2021 13:03	16-Jul-2021 14:00	----	----	----
						VA21B5001-001	VA21B5001-002	--------	--------	--------
						Result	Result	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		24.3	275	----	----	----
conductivity	----	E100	2.0	µS/cm		181	669	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		43.1	236	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		47.0	254	----	----	----
pH	----	E108	0.10	pH units		6.93	8.16	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0094	0.0142	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		38.1	57.8	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.038	<0.100 DLDS	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.918	0.822	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	0.274	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	<0.0050 DLDS	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	2.62	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		25.4	15.7	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0858	0.0588	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	0.00014	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00089	0.00110	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0184	0.0423	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.454	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000160	0.0000326	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		14.4	74.5	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00025	0.00017	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		<0.00050	0.00084	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L		0.613	0.047	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		0.000074	<0.000050	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-05	SW-09	----	----	----
					Client sampling date / time	20-Jul-2021 13:03	16-Jul-2021 14:00	----	----	----
						VA21B5001-001	VA21B5001-002	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		2.69	16.6	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0584	0.0183	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		<0.000050	0.00100	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00075	0.00326	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	0.065	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		0.136	7.77	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		<0.00020	0.00131	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		<0.000050	0.000070	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		0.58	4.56	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
sodium, total	17341-25-2	E420	0.050	mg/L		18.0	44.7	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0955	0.467	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	1.40	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00120 DLM	0.00071	----	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		<0.000010	0.000555	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0069	<0.0030	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0574	0.0181	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	0.00014	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00080	0.00109	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0156	0.0432	----	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	----	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-05	SW-09	----	----	----
					Client sampling date / time	20-Jul-2021 13:03	16-Jul-2021 14:00	----	----	----
						VA21B5001-001	VA21B5001-002	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	0.408	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000115	0.0000452 DTMF	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		13.3	68.2	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	<0.000010	----	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	<0.00050	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00018	0.00015	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00038	0.00078	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.440	0.016	----	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.000054	<0.000050	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		2.41	16.1	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0368	0.00348	----	----	----
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	0.00100	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00066	0.00329	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	0.065	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		0.099	8.08	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		<0.00020	0.00149	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000063	0.000095	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		0.473	4.64	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	----	----	----
sodium, dissolved	17341-25-2	E421	0.050	mg/L		16.7	46.0	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.102	0.496	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	1.53	----	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	----	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	----	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	----	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	----	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00044	<0.00030	----	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	----	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		<0.000010	0.000554	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-05	SW-09	----	----	----
					Client sampling date / time	20-Jul-2021 13:03	16-Jul-2021 14:00	----	----	----
						VA21B5001-001	VA21B5001-002	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0032	<0.0010	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	<0.00020	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	Field	----	----	----
dissolved metals filtration location	----	EP421	-	-		Field	Field	----	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		80	50	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		84.9	82.8	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		106	113	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	----	----	----
VPHw	----	EC580A	100	µg/L		<100	<100	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		97.0	82.4	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		107	91.4	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21B5001**	Page	: 1 of 11
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Issue Date	: 30-Jul-2021 09:20
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-09	E559	16-Jul-2021	----	----	----		27-Jul-2021	28 days	11 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-05	E559	20-Jul-2021	----	----	----		27-Jul-2021	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-09	E298	16-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-05	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-05	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-09	E235.Cl	16-Jul-2021	----	----	----		22-Jul-2021	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-05	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE SW-09	E235.F	16-Jul-2021	----	----	----		22-Jul-2021	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-05	E235.NO3-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-09	E235.NO3-L	16-Jul-2021	----	----	----		22-Jul-2021	3 days	6 days	× EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-05	E235.NO2-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-09	E235.NO2-L	16-Jul-2021	----	----	----		22-Jul-2021	3 days	6 days	× EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-05	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SW-09	E235.SO4	16-Jul-2021	----	----	----		22-Jul-2021	28 days	6 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SW-09	E318	16-Jul-2021	27-Jul-2021	----	----		29-Jul-2021	28 days	12 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SW-05	E318	20-Jul-2021	27-Jul-2021	----	----		29-Jul-2021	28 days	8 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-05	E509	20-Jul-2021	25-Jul-2021	----	----		25-Jul-2021	28 days	5 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-09	E509	16-Jul-2021	25-Jul-2021	----	----		25-Jul-2021	28 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
SW-09	E421	16-Jul-2021	26-Jul-2021	----	----		26-Jul-2021	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
SW-05	E421	20-Jul-2021	26-Jul-2021	----	----		26-Jul-2021	180 days	6 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-09	E601A	16-Jul-2021	29-Jul-2021	14 days	13 days	✓	29-Jul-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-05	E601A	20-Jul-2021	29-Jul-2021	14 days	9 days	✓	29-Jul-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SW-05	E581.VH+F1	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SW-09	E581.VH+F1	16-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SW-09	E355-L	16-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-05	E355-L	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-05	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-09	E290	16-Jul-2021	----	----	----		22-Jul-2021	14 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-05	E100	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-09	E100	16-Jul-2021	----	----	----		22-Jul-2021	28 days	6 days	✓
Physical Tests : pH by Meter										
HDPE SW-09	E108	16-Jul-2021	----	----	----		22-Jul-2021	0.25 hrs	141 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-05	E108	20-Jul-2021	----	----	----		22-Jul-2021	0.25 hrs	46 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-05	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-09	E508	16-Jul-2021	----	----	----		25-Jul-2021	28 days	9 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
SW-09	E420	16-Jul-2021	----	----	----		28-Jul-2021	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
SW-05	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	8 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-05	E611A	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-09	E611A	16-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	7 days	✓

Legend & Qualifier Definitions

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

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	251524	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	251778	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
pH by Meter	E108	249055	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253286	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	254202	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	251524	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	251778	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
pH by Meter	E108	249055	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253286	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	254202	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	251524	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	251778	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253286	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	251524	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	251778	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253286	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21B5001**	Page	: 1 of 18
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 22-Jul-2021
C-O-C number	: ----	Issue Date	: 30-Jul-2021 09:20
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Ruby Pham	Lab Assistant	Metals, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 249055)											
VA21B5000-001	Anonymous	pH	----	E108	0.10	pH units	8.37	8.36	0.120%	4%	----
Physical Tests (QC Lot: 249056)											
VA21B5000-001	Anonymous	conductivity	----	E100	2.0	µS/cm	670	670	0.00%	10%	----
Physical Tests (QC Lot: 249057)											
VA21B5000-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	272	271	0.221%	20%	----
Anions and Nutrients (QC Lot: 249091)											
VA21B5000-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	1.62	1.63	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249092)											
VA21B5000-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0372	0.0351	0.0020	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249093)											
VA21B5000-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249094)											
VA21B5000-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.103	0.102	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249095)											
VA21B5000-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	61.6	61.8	0.274%	20%	----
Anions and Nutrients (QC Lot: 253168)											
VA21B4971-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0537	0.0541	0.744%	20%	----
Anions and Nutrients (QC Lot: 253169)											
VA21B4999-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.34	2.33	0.198%	20%	----
Organic / Inorganic Carbon (QC Lot: 253165)											
VA21B4971-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	5.62	5.58	0.767%	20%	----
Total Metals (QC Lot: 251604)											
VA21B4971-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 253286)											
VA21B5001-001	SW-05	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0858	0.0856	0.255%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00089	0.00090	0.000007	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0184	0.0184	0.143%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Total Metals (QC Lot: 253286) - continued											
VA21B5001-001	SW-05	cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000160	0.0000164	0.0000005	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	14.4	14.4	0.496%	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	0.00025	0.00026	0.00001	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	0.613	0.612	0.125%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000074	0.000074	0.0000003	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	2.69	2.61	3.22%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0584	0.0574	1.79%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00075	0.00073	0.00002	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	0.136	0.134	0.002	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	0.58	0.60	0.02	Diff <2x LOR	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	18.0	17.6	2.44%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0955	0.0998	4.37%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	0.00024	0.00004	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00120	mg/L	<0.00120	0.00078	0.00042	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0069	0.0063	0.0006	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 251524)											
FJ2100577-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 251778)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 251778) - continued											
VA21B4901-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0309	0.0333	7.37%	20%	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.0208	0.0205	1.26%	20%	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00082	0.00080	0.00001	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0313	0.0317	1.32%	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	0.045	0.045	0.00005	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000100	mg/L	<0.0000100	<0.0000100	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	76.2	78.6	3.12%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	0.000089	0.000085	0.000003	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00055	0.00055	0.000004	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00023	0.00025	0.00002	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00029	0.00032	0.00004	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0125	0.0124	0.638%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.100	mg/L	24.2	25.5	5.22%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0592	0.0605	2.27%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00532	0.00523	1.57%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.064	0.080	0.016	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.100	mg/L	9.98	9.94	0.454%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00522	0.00492	5.97%	20%	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.0117	0.0112	4.46%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.80	2.74	2.37%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	57.7	58.5	1.50%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	2.10	2.10	0.281%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	80.1	79.2	1.11%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	0.00023	<0.00020	0.00003	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000029	0.000027	0.000002	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	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 251778) - continued											
VA21B4901-001	Anonymous	uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000963	0.00100	3.84%	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	0.0022	0.0022	0.00002	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 252456)											
VA21B4863-001	Anonymous	chemical oxygen demand [COD]	----	E559	80	mg/L	4470	4560	1.87%	20%	----
Volatile Organic Compounds (QC Lot: 250705)											
VA21B5000-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 250706)											
VA21B5000-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 249056)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 249057)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 249091)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 249092)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 249093)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 249094)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 249095)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 253168)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 253169)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 253165)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 251604)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 253286)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 253286) - continued						
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 251524)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 251778)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 251778) - continued						
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Aggregate Organics (QCLot: 252456)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 250705)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 250706)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 254202)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 249055)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 249056)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 249057)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.9	85.0	115	----
Anions and Nutrients (QCLot: 249091)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 249092)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 249093)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 249094)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 249095)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 253168)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 253169)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 253165)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Total Metals (QCLot: 251604)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
Total Metals (QCLot: 253286)									
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	101	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	99.9	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	90.6	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	104	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	94.8	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 253286) - continued									
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	96.9	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	101	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.5	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.3	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.5	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	93.4	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	92.3	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.4	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.3	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.7	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	98.6	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	101	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	97.2	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	101	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	99.7	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	90.5	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	93.3	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	97.2	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	93.1	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	96.2	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	95.7	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.2	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	94.9	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Dissolved Metals (QCLot: 251778)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.0	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	108	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	93.5	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 251778) - continued									
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.5	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	95.8	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.4	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.0	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100.0	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.5	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.9	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.9	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	93.6	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.4	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	106	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.1	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	98.5	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	101	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	94.5	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	98.5	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	90.6	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	106	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	94.4	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.8	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	86.9	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	110	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.7	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.3	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
Aggregate Organics (QCLot: 252456)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Aggregate Organics (QCLot: 252456) - continued									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	103	85.0	115	----
Volatile Organic Compounds (QCLot: 250705)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	91.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	78.8	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	96.3	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	77.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	82.7	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	77.5	70.0	130	----
Hydrocarbons (QCLot: 250706)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	85.3	70.0	130	----
Hydrocarbons (QCLot: 254202)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	100	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	99.7	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 249091)										
VA21B5000-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	548 mg/L	500 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 249092)										
VA21B5000-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	13.8 mg/L	12.5 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 249093)										
VA21B5000-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.69 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 249094)										
VA21B5000-002	Anonymous	fluoride	16984-48-8	E235.F	5.60 mg/L	5 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 249095)										
VA21B5000-002	Anonymous	chloride	16887-00-6	E235.Cl	549 mg/L	500 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 253168)										
VA21B4971-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.111 mg/L	0.1 mg/L	111	75.0	125	----
Anions and Nutrients (QCLot: 253169)										
VA21B4999-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.66 mg/L	2.5 mg/L	106	70.0	130	----
Organic / Inorganic Carbon (QCLot: 253165)										
VA21B4971-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.19 mg/L	5 mg/L	104	70.0	130	----
Total Metals (QCLot: 251604)										
VA21B4971-007	Anonymous	mercury, total	7439-97-6	E508	0.0000963 mg/L	0.0001 mg/L	96.3	70.0	130	----
Total Metals (QCLot: 253286)										
VA21B5001-002	SW-09	aluminum, total	7429-90-5	E420	0.196 mg/L	0.2 mg/L	98.3	70.0	130	----
		antimony, total	7440-36-0	E420	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0199 mg/L	0.02 mg/L	99.7	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00909 mg/L	0.01 mg/L	90.9	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, total	7440-47-3	E420	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 253286) - continued										
VA21B5001-002	SW-09	cobalt, total	7440-48-4	E420	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		copper, total	7440-50-8	E420	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		iron, total	7439-89-6	E420	1.86 mg/L	2 mg/L	93.1	70.0	130	----
		lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		nickel, total	7440-02-0	E420	0.0362 mg/L	0.04 mg/L	90.4	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.3 mg/L	10 mg/L	103	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		selenium, total	7782-49-2	E420	0.0411 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, total	7440-21-3	E420	8.96 mg/L	10 mg/L	89.6	70.0	130	----
		silver, total	7440-22-4	E420	0.00382 mg/L	0.004 mg/L	95.6	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	20.9 mg/L	20 mg/L	104	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		thallium, total	7440-28-0	E420	0.00357 mg/L	0.004 mg/L	89.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		tin, total	7440-31-5	E420	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		titanium, total	7440-32-6	E420	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		uranium, total	7440-61-1	E420	0.00384 mg/L	0.004 mg/L	96.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		zinc, total	7440-66-6	E420	0.382 mg/L	0.4 mg/L	95.6	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
Dissolved Metals (QCLot: 251524)										
FJ2100577-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 251778)										
VA21B4906-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.186 mg/L	0.2 mg/L	92.8	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0394 mg/L	0.04 mg/L	98.5	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 251778) - continued										
VA21B4906-001	Anonymous	bismuth, dissolved	7440-69-9	E421	0.00789 mg/L	0.01 mg/L	78.9	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	0.00393 mg/L	0.004 mg/L	98.2	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0375 mg/L	0.04 mg/L	93.8	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	90.3	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.86 mg/L	2 mg/L	92.9	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0354 mg/L	0.04 mg/L	88.5	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	11.0 mg/L	10 mg/L	110	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.83 mg/L	4 mg/L	95.7	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	0.0443 mg/L	0.04 mg/L	111	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.86 mg/L	10 mg/L	88.6	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00311 mg/L	0.004 mg/L	77.7	70.0	130	----
		sodium, dissolved	17341-25-2	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	19.3 mg/L	20 mg/L	96.5	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0426 mg/L	0.04 mg/L	106	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00372 mg/L	0.004 mg/L	93.0	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0213 mg/L	0.02 mg/L	106	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0196 mg/L	0.02 mg/L	98.3	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0970 mg/L	0.1 mg/L	97.0	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.367 mg/L	0.4 mg/L	91.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0446 mg/L	0.04 mg/L	112	70.0	130	----
Aggregate Organics (QCLot: 252456)										
VA21B4999-001	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 250705)										
VA21B5000-002	Anonymous	benzene	71-43-2	E611A	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	78.4 µg/L	100 µg/L	78.4	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		styrene	100-42-5	E611A	78.6 µg/L	100 µg/L	78.6	60.0	140	----
		toluene	108-88-3	E611A	87.8 µg/L	100 µg/L	87.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	164 µg/L	200 µg/L	81.8	60.0	140	----
		xylene, o-	95-47-6	E611A	78.1 µg/L	100 µg/L	78.1	60.0	140	----
Hydrocarbons (QCLot: 250706)										
VA21B5000-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	4680 µg/L	6310 µg/L	74.2	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	eblaney@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca, nveikle@rdks.bc.ca
Email 2	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals (P)	Dissolved Metals (F/P)	Alkalinity	Chloride	Fluoride, sulphate, hardness	Ammonia (P)	Nitrate	Nitrite	Total Kjeldahl Nitrogen (P)	TOC (P)	pH	COD (P)	Conductivity	EPH (P)	BTEX / VPH (P)	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	SW-05	20-Jul-21	13:03	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-09	16-Jul-21	14:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10

Environmental Division
Vancouver
Work Order Reference
VA21B5001

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

ED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.4				4			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: July 21st 2021	Time:	Received by: Chris	Date: 21 July 21	Time: 1210	Received by:	Date: JUL 21 2021	Time: 9

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21B5000**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 22-Jul-2021
C-O-C number	: ----	Issue Date	: 30-Jul-2021 09:24
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
µg/L	micrograms per litre
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*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Treated Leachate Post Sand Filter Pre Pump
					Client sampling date / time	20-Jul-2021 13:53	20-Jul-2021 12:00	20-Jul-2021	20-Jul-2021 13:23	20-Jul-2021 14:22
						VA21B5000-001	VA21B5000-002	VA21B5000-003	VA21B5000-004	VA21B5000-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		272	273	1.1	1.3	286
conductivity	----	E100	2.0	µS/cm		670	667	----	<2.0	733
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		230	229	<0.60	<0.60	230
pH	----	E108	0.10	pH units		8.37	8.36	----	----	7.72
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0252	0.0277	<0.0050	<0.0050	2.40
chloride	16887-00-6	E235.Cl	0.50	mg/L		61.6	61.9	<0.50	<0.50	68.0
fluoride	16984-48-8	E235.F	0.020	mg/L		0.103	0.101	<0.020	<0.020	0.120
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.953	0.973	----	----	3.44
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.0372	0.0352	----	----	0.0408
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0050 DLDS	<0.0050 DLDS	----	----	0.0068
nitrogen, total	7727-37-9	E366	0.030	mg/L		0.886	0.881	<0.030	<0.030	3.00
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	0.0072
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		1.62	1.62	<0.30	<0.30	4.18
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		11.7	12.4	----	----	13.6
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.125	0.110	<0.0030	<0.0030	0.0733
antimony, total	7440-36-0	E420	0.00010	mg/L		0.00024	0.00024	<0.00010	<0.00010	0.00024
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00195	0.00220	<0.00010	<0.00010	0.00555
barium, total	7440-39-3	E420	0.00010	mg/L		0.0266	0.0296	<0.00010	<0.00010	0.0818
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		0.427	0.441	<0.010	<0.010	0.466
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000144	0.0000100	<0.0000050	<0.0000050	0.0000503
calcium, total	7440-70-2	E420	0.050	mg/L		63.2	63.2	<0.050	<0.050	67.6
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000016	0.000020	<0.000010	<0.000010	0.000028
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00034	0.00036	<0.00010	<0.00010	0.00088

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Treated Leachate Post Sand Filter Pre Pump
					Client sampling date / time	20-Jul-2021 13:53	20-Jul-2021 12:00	20-Jul-2021	20-Jul-2021 13:23	20-Jul-2021 14:22
						VA21B5000-001	VA21B5000-002	VA21B5000-003	VA21B5000-004	VA21B5000-005
						Result	Result	Result	Result	Result
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L		0.00142	0.00153	<0.00050	<0.00050	0.00082
iron, total	7439-89-6	E420	0.010	mg/L		0.167	0.216	<0.010	<0.010	0.165
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	0.000065	<0.000050	<0.000050	0.000061
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		17.5	17.4	<0.0050	<0.0050	15.0
manganese, total	7439-96-5	E420	0.00010	mg/L		0.261	0.272	<0.00010	<0.00010	2.88
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.00183	0.00185	<0.000050	<0.000050	0.00247
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00440	0.00446	<0.00050	<0.00050	0.00496
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L		8.00	8.05	<0.050	<0.050	10.0
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00093	0.00096	<0.00020	<0.00020	0.00073
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000101	0.000089	<0.000050	<0.000050	0.000088
silicon, total	7440-21-3	E420	0.10	mg/L		3.86	4.11	<0.10	<0.10	3.60
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, total	17341-25-2	E420	0.050	mg/L		55.7	56.0	<0.050	<0.050	60.8
strontium, total	7440-24-6	E420	0.00020	mg/L		0.462	0.464	<0.00020	<0.00020	0.408
sulfur, total	7704-34-9	E420	0.50	mg/L		1.01	0.98	<0.50	<0.50	2.06
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	0.000019
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00332	0.00447	<0.00030	<0.00030	<0.00270 DLM
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000442	0.000457	<0.000010	<0.000010	0.000622
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00052	0.00063	<0.00050	<0.00050	0.00054
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	0.0039
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		2.4	2.5	----	<2.0	3.3

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	Treated Leachate Post Sand Filter Pre Pump
					Client sampling date / time	20-Jul-2021 13:53	20-Jul-2021 12:00	20-Jul-2021	20-Jul-2021 13:23	20-Jul-2021 14:22
						VA21B5000-001	VA21B5000-002	VA21B5000-003	VA21B5000-004	VA21B5000-005
						Result	Result	Result	Result	Result
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		41	39	----	----	46
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	----	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	----	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	<0.50
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		101	80.0	----	84.2	84.1
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		115	108	----	115	115
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	----	<250	<250
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	----	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	----	<100	<100
VPHw	----	EC580A	100	µg/L		<100	<100	----	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		90.3	93.8	----	86.1	92.5
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		111	111	----	114	105

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21B5000**	Page	: 1 of 16
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Issue Date	: 30-Jul-2021 09:24
C-O-C number	: ----		
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	20-Jul-2021	----	----	----		23-Jul-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	20-Jul-2021	----	----	----		23-Jul-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Treated Leachate Post Sand Filter Pre Pump	E550	20-Jul-2021	----	----	----		23-Jul-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	20-Jul-2021	----	----	----		23-Jul-2021	3 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	20-Jul-2021	----	----	----		27-Jul-2021	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Treated Leachate Post Sand Filter Pre Pump	E559	20-Jul-2021	----	----	----		27-Jul-2021	28 days	7 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	20-Jul-2021	----	----	----		27-Jul-2021	28 days	7 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Treated Leachate Post Sand Filter Pre Pump	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Wetland 4	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Travel Blank	E298	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	9 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE DUP	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Field Blank	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Treated Leachate Post Sand Filter Pre Pump	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Wetland 4	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	20-Jul-2021	----	----	----		22-Jul-2021	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Treated Leachate Post Sand Filter Pre Pump	E378-U	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	20-Jul-2021	----	----	----		22-Jul-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Field Blank	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Treated Leachate Post Sand Filter Pre Pump	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Wetland 4	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Travel Blank	E235.F	20-Jul-2021	----	----	----		22-Jul-2021	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Treated Leachate Post Sand Filter Pre Pump	E235.NO3-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO3-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Treated Leachate Post Sand Filter Pre Pump	E235.NO2-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	20-Jul-2021	----	----	----		22-Jul-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Treated Leachate Post Sand Filter Pre Pump	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	20-Jul-2021	----	----	----		22-Jul-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	20-Jul-2021	27-Jul-2021	----	----		29-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Treated Leachate Post Sand Filter Pre Pump	E318	20-Jul-2021	27-Jul-2021	----	----		29-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	20-Jul-2021	27-Jul-2021	----	----		29-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Treated Leachate Post Sand Filter Pre Pump	E366	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	8 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Travel Blank	E366	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	9 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	20-Jul-2021	27-Jul-2021	14 days	7 days	✓	28-Jul-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Treated Leachate Post Sand Filter Pre Pump	E601A	20-Jul-2021	27-Jul-2021	14 days	7 days	✓	28-Jul-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	20-Jul-2021	29-Jul-2021	14 days	9 days	✓	29-Jul-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	20-Jul-2021	29-Jul-2021	14 days	9 days	✓	29-Jul-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Treated Leachate Post Sand Filter Pre Pump	E581.VH+F1	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Wetland 4	E581.VH+F1	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP	E581.VH+F1	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	4 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP	E355-L	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Treated Leachate Post Sand Filter Pre Pump	E355-L	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	7 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E355-L	20-Jul-2021	27-Jul-2021	----	----		28-Jul-2021	28 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Treated Leachate Post Sand Filter Pre Pump	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	20-Jul-2021	----	----	----		22-Jul-2021	14 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Treated Leachate Post Sand Filter Pre Pump	E100	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	20-Jul-2021	----	----	----		22-Jul-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE Treated Leachate Post Sand Filter Pre Pump	E108	20-Jul-2021	----	----	----		22-Jul-2021	0.25 hrs	45 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	20-Jul-2021	----	----	----		22-Jul-2021	0.25 hrs	45 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	20-Jul-2021	----	----	----		22-Jul-2021	0.25 hrs	47 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	5 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Field Blank	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Treated Leachate Post Sand Filter Pre Pump	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Wetland 4	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	5 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Travel Blank	E508	20-Jul-2021	----	----	----		25-Jul-2021	28 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
DUP	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Treated Leachate Post Sand Filter Pre Pump	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Wetland 4	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	8 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	20-Jul-2021	----	----	----		28-Jul-2021	180 days	9 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Treated Leachate Post Sand Filter Pre Pump	E611A	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	3 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
DUP	E611A	20-Jul-2021	24-Jul-2021	----	----		24-Jul-2021	14 days	4 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	250130	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	249058	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
pH by Meter	E108	249055	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253164	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	253166	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	252384	2	19	10.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	250130	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	249058	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
pH by Meter	E108	249055	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253164	1	19	5.2	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	253166	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	249057	1	15	6.6	5.0	✓
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	252384	2	19	10.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	250130	1	13	7.6	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Conductivity in Water	E100	249056	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	249058	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253164	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	253166	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	1	15	6.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	253168	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	250705	1	16	6.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	252456	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	249095	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	249058	1	5	20.0	5.0	✓
Fluoride in Water by IC	E235.F	249094	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	249092	1	12	8.3	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	249093	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	249091	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	253169	1	8	12.5	5.0	✓
Total Mercury in Water by CVAAS	E508	251604	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	253164	1	19	5.2	5.0	✓
Total Nitrogen by Colourimetry	E366	253166	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	253165	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	250706	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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21B5000**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 21-Jul-2021 21:00
PO	: ----	Date Analysis Commenced	: 22-Jul-2021
C-O-C number	: ----	Issue Date	: 30-Jul-2021 09:24
Sampler	: HS		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Courtney Cox	Analsyt	Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 249055)											
VA21B5000-001	Wetland 4	pH	----	E108	0.10	pH units	8.37	8.36	0.120%	4%	----
Physical Tests (QC Lot: 249056)											
VA21B5000-001	Wetland 4	conductivity	----	E100	2.0	µS/cm	670	670	0.00%	10%	----
Physical Tests (QC Lot: 249057)											
VA21B5000-001	Wetland 4	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	272	271	0.221%	20%	----
Anions and Nutrients (QC Lot: 249058)											
VA21B5000-001	Wetland 4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249091)											
VA21B5000-001	Wetland 4	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	1.62	1.63	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249092)											
VA21B5000-001	Wetland 4	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0372	0.0351	0.0020	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249093)											
VA21B5000-001	Wetland 4	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249094)											
VA21B5000-001	Wetland 4	fluoride	16984-48-8	E235.F	0.100	mg/L	0.103	0.102	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 249095)											
VA21B5000-001	Wetland 4	chloride	16887-00-6	E235.Cl	2.50	mg/L	61.6	61.8	0.274%	20%	----
Anions and Nutrients (QC Lot: 253166)											
VA21B4971-001	Anonymous	nitrogen, total	7727-37-9	E366	1.50	mg/L	29.8	30.0	0.912%	20%	----
Anions and Nutrients (QC Lot: 253168)											
VA21B4971-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0537	0.0541	0.744%	20%	----
Anions and Nutrients (QC Lot: 253169)											
VA21B4999-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	2.34	2.33	0.198%	20%	----
Organic / Inorganic Carbon (QC Lot: 253165)											
VA21B4971-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	5.62	5.58	0.767%	20%	----
Total Metals (QC Lot: 251604)											
VA21B4971-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 253164)											
VA21B5000-001	Wetland 4	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.125	0.119	5.40%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00024	0.00024	0.000004	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00195	0.00187	4.23%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 253164) - continued											
VA21B5000-001	Wetland 4	barium, total	7440-39-3	E420	0.00010	mg/L	0.0266	0.0269	1.24%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.427	0.452	5.73%	20%	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000144	0.0000127	0.0000016	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	63.2	63.2	0.0254%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000016	0.000015	0.000001	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	0.00034	0.00035	0.00001	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00142	0.00142	0.000003	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.167	0.173	3.51%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	17.5	17.8	1.54%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.261	0.264	0.912%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00183	0.00187	2.13%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00440	0.00442	0.00003	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	8.00	8.04	0.450%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00093	0.00098	0.00004	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000101	0.000117	0.000017	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	3.86	3.91	1.20%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	55.7	56.4	1.31%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.462	0.463	0.220%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	1.01	1.02	0.006	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00332	0.00375	12.3%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000442	0.000442	0.148%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00052	<0.00050	0.00002	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 253164) - continued											
VA21B5000-001	Wetland 4	zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 250130)											
VA21B4860-003	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 252456)											
VA21B4863-001	Anonymous	chemical oxygen demand [COD]	----	E559	80	mg/L	4470	4560	1.87%	20%	----
Volatile Organic Compounds (QC Lot: 250705)											
VA21B5000-001	Wetland 4	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 250706)											
VA21B5000-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 249056)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 249057)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 249058)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 249091)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 249092)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 249093)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 249094)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 249095)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 253166)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 253168)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 253169)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 253165)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 251604)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 253164)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 253164) - continued						
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	17341-25-2	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	----
Aggregate Organics (QCLot: 250130)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 252456)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 250705)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 250706)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 252384)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 254202)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 249055)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 249056)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 249057)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	98.9	85.0	115	----
Anions and Nutrients (QCLot: 249058)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	91.2	80.0	120	----
Anions and Nutrients (QCLot: 249091)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 249092)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 249093)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 249094)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
Anions and Nutrients (QCLot: 249095)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 253166)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 253168)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 253169)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 253165)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	105	80.0	120	----
Total Metals (QCLot: 251604)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
Total Metals (QCLot: 253164)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	107	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 253164) - continued									
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	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	91.4	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	106	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.1	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	97.0	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	107	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	110	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	110	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	105	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	99.9	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	109	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.5	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.4	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	94.4	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	98.7	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	95.1	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	98.6	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	100	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Aggregate Organics (QCLot: 250130)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Aggregate Organics (QCLot: 250130) - continued									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	101	85.0	115	----
Aggregate Organics (QCLot: 252456)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	103	85.0	115	----
Volatile Organic Compounds (QCLot: 250705)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	91.2	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	78.8	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	96.3	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	77.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	90.4	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	82.7	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	77.5	70.0	130	----
Hydrocarbons (QCLot: 250706)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	85.3	70.0	130	----
Hydrocarbons (QCLot: 252384)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	119	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	119	70.0	130	----
Hydrocarbons (QCLot: 254202)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	100	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	99.7	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 249058)										
VA21B5000-002	DUP	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0432 mg/L	0.05 mg/L	86.5	70.0	130	----
Anions and Nutrients (QCLot: 249091)										
VA21B5000-002	DUP	sulfate (as SO4)	14808-79-8	E235.SO4	548 mg/L	500 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 249092)										
VA21B5000-002	DUP	nitrate (as N)	14797-55-8	E235.NO3-L	13.8 mg/L	12.5 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 249093)										
VA21B5000-002	DUP	nitrite (as N)	14797-65-0	E235.NO2-L	2.69 mg/L	2.5 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 249094)										
VA21B5000-002	DUP	fluoride	16984-48-8	E235.F	5.60 mg/L	5 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 249095)										
VA21B5000-002	DUP	chloride	16887-00-6	E235.Cl	549 mg/L	500 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 253166)										
VA21B4971-002	Anonymous	nitrogen, total	7727-37-9	E366	0.388 mg/L	0.4 mg/L	97.0	70.0	130	----
Anions and Nutrients (QCLot: 253168)										
VA21B4971-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.111 mg/L	0.1 mg/L	111	75.0	125	----
Anions and Nutrients (QCLot: 253169)										
VA21B4999-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.66 mg/L	2.5 mg/L	106	70.0	130	----
Organic / Inorganic Carbon (QCLot: 253165)										
VA21B4971-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.19 mg/L	5 mg/L	104	70.0	130	----
Total Metals (QCLot: 251604)										
VA21B4971-007	Anonymous	mercury, total	7439-97-6	E508	0.0000963 mg/L	0.0001 mg/L	96.3	70.0	130	----
Total Metals (QCLot: 253164)										
VA21B5000-002	DUP	aluminum, total	7429-90-5	E420	0.407 mg/L	0.4 mg/L	102	70.0	130	----
		antimony, total	7440-36-0	E420	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00910 mg/L	0.01 mg/L	91.0	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 253164) - continued										
VA21B5000-002	DUP	boron, total	7440-42-8	E420	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00387 mg/L	0.004 mg/L	96.7	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	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		chromium, total	7440-47-3	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		iron, total	7439-89-6	E420	1.94 mg/L	2 mg/L	96.8	70.0	130	----
		lead, total	7439-92-1	E420	0.0184 mg/L	0.02 mg/L	92.1	70.0	130	----
		lithium, total	7439-93-2	E420	0.0959 mg/L	0.1 mg/L	95.9	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		nickel, total	7440-02-0	E420	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.1 mg/L	10 mg/L	101	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E420	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	9.15 mg/L	10 mg/L	91.5	70.0	130	----
		silver, total	7440-22-4	E420	0.00384 mg/L	0.004 mg/L	95.9	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	20.9 mg/L	20 mg/L	104	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00365 mg/L	0.004 mg/L	91.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		tin, total	7440-31-5	E420	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		titanium, total	7440-32-6	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		uranium, total	7440-61-1	E420	0.00384 mg/L	0.004 mg/L	96.1	70.0	130	----
		vanadium, total	7440-62-2	E420	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		zinc, total	7440-66-6	E420	0.388 mg/L	0.4 mg/L	97.0	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0425 mg/L	0.04 mg/L	106	70.0	130	----
Aggregate Organics (QCLot: 252456)										
VA21B4999-001	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 250705)										

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
Volatile Organic Compounds (QCLot: 250705) - continued										
VA21B5000-002	DUP	benzene	71-43-2	E611A	89.6 µg/L	100 µg/L	89.6	60.0	140	----
		ethylbenzene	100-41-4	E611A	78.4 µg/L	100 µg/L	78.4	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		styrene	100-42-5	E611A	78.6 µg/L	100 µg/L	78.6	60.0	140	----
		toluene	108-88-3	E611A	87.8 µg/L	100 µg/L	87.8	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	164 µg/L	200 µg/L	81.8	60.0	140	----
		xylene, o-	95-47-6	E611A	78.1 µg/L	100 µg/L	78.1	60.0	140	----
Hydrocarbons (QCLot: 250706)										
VA21B5000-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	4680 µg/L	6310 µg/L	74.2	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

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Affix ALS barcode label here (lab use only)

COC Number: 17 -

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Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: hshinton@rdks.bc.ca
Email 2: nveikle@rdks.bc.ca
Email 3: eblaney@rdks.bc.ca;

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: anne-maries@rdks.bc.ca
Email 2: nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ ; 3 day [P3-25%] ☐ ; 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ ; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	
Job #:	Hazelton WMF Treated Leachate at Wetland 4
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals (P)	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia (P)	Nitrate	Nitrite	TOC (P)	Orthophosphorus	COD (P)	pH	BOD & Conductivity	Total Kjeldahl Nitrogen (P)	EPH (P)	BTEX/VPH (P)	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Wetland 4	20-Jul-21	13:53	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	20-Jul-21	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	20-Jul-21	--	Water	R	R	R	R	R				R									2
	Field Blank	20-Jul-21	13:23	Water	R	R	R	R	R				R			R		R	R			9
	Treated Leachate Post Sand Filter Pre Pump	20-Jul-21	14:22	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9

Terrace Shipping
#1 Coolers Ground ☐
#___ Carbouys Air ☑

Environmental Division
Vancouver
Work Order Reference
VA21B5000

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / British Columbia Appl ... drop-down list below ... Y, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.5				4			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:	Received by:	Date:	Time:
Hannah Shinton	July 21st, 2021		Chris	21 July 21	1210

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
	JUL 21 2021	9

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2021 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C1750**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 02-Oct-2021 12:00
PO	: ----	Date Analysis Commenced	: 05-Oct-2021
C-O-C number	: ----	Issue Date	: 18-Oct-2021 13:07
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, 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*
µg/L	micrograms per litre
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*
HTD	*Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time: 28-Sep-2021 11:42	28-Sep-2021 12:00	28-Sep-2021	28-Sep-2021 12:08	----
					VA21C1750-001	VA21C1750-002	VA21C1750-003	VA21C1750-004	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	233	230	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm	527	535	----	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	205	198	<0.60	<0.60	----
pH	----	E108	0.10	pH units	8.44	8.42	----	5.49	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0288	0.0314	<0.0050	<0.0050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	37.4	37.8	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.117	0.113	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.740	0.824	----	<0.050	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.666	0.664	----	<0.0050	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0051	0.0061	----	<0.0010	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.31	1.31	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	7.86	7.81	<0.30	<0.30	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	10.2	9.41	----	<0.50	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.334	0.318	<0.0030	<0.0030	----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00013	0.00013	<0.00010	<0.00010	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00120	0.00110	<0.00010	<0.00010	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0431	0.0421	<0.00010	<0.00010	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
boron, total	7440-42-8	E420	0.010	mg/L	0.320	0.298	<0.010	<0.010	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
calcium, total	7440-70-2	E420	0.050	mg/L	57.5	54.7	<0.050	<0.050	----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000027	0.000026	<0.000010	<0.000010	----
chromium, total	7440-47-3	E420	0.00050	mg/L	0.00053	<0.00050	<0.00050	<0.00050	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00023	0.00023	<0.00010	<0.00010	----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00157	0.00154	<0.00050	<0.00050	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time: 28-Sep-2021 11:42	28-Sep-2021 12:00	28-Sep-2021	28-Sep-2021 12:08	----
					VA21C1750-001	VA21C1750-002	VA21C1750-003	VA21C1750-004	--------
					Result	Result	Result	Result	----
Total Metals									
iron, total	7439-89-6	E420	0.010	mg/L	0.386	0.377	<0.010	<0.010	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.000071	0.000071	<0.000050	<0.000050	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	14.9	14.8	<0.0050	<0.0050	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0376	0.0374	<0.00010	<0.00010	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000552	0.000548	<0.000050	<0.000050	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00267	0.00256	<0.00050	<0.00050	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E420	0.050	mg/L	6.31	6.11	<0.050	<0.050	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00081	0.00074	<0.00020	<0.00020	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000066	0.000054	<0.000050	<0.000050	----
silicon, total	7440-21-3	E420	0.10	mg/L	3.76	3.72	<0.10	<0.10	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
sodium, total	17341-25-2	E420	0.050	mg/L	38.7	37.8	<0.050	<0.050	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.358	0.358	<0.00020	<0.00020	----
sulfur, total	7704-34-9	E420	0.50	mg/L	3.26	3.22	<0.50	<0.50	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00703	0.00736	<0.00030	<0.00030	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000259	0.000252	<0.000010	<0.000010	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00086	0.00081	<0.00050	<0.00050	----
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----
Aggregate Organics									
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0 HTD	<2.0 HTD	----	<2.0 HTD	----
chemical oxygen demand [COD]	----	E559	20	mg/L	34	30	----	<20	----
Volatile Organic Compounds [Fuels]									

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time: 28-Sep-2021 11:42	28-Sep-2021 12:00	28-Sep-2021	28-Sep-2021 12:08	----
					VA21C1750-001	VA21C1750-002	VA21C1750-003	VA21C1750-004	--------
					Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]									
benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	----	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	----	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	<0.50	----	<0.50	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	96.2	97.0	----	94.9	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	98.9	104	----	99.3	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	----	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	<250	----	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	----	<100	----
VPHw	----	EC580A	100	µg/L	<100	<100	----	<100	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	76.2	82.5	----	80.9	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	101	99.3	----	93.0	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C1750**	Page	: 1 of 15
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 02-Oct-2021 12:00
PO	: ----	Issue Date	: 18-Oct-2021 13:07
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Physical Tests	QC-MRG2-3111680 01	----	alkalinity, total (as CaCO3)	----	E290	1.6 mg/L [B]	1.5 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	166 hrs	× EHTR
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	166 hrs	× EHTR
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	166 hrs	× EHTR
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	28-Sep-2021	----	----	----		08-Oct-2021	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Field Blank	E559	28-Sep-2021	----	----	----		08-Oct-2021	28 days	10 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	28-Sep-2021	----	----	----		08-Oct-2021	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Field Blank	E298	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	28-Sep-2021	----	----	----		05-Oct-2021	28 days	8 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	28-Sep-2021	----	----	----		06-Oct-2021	3 days	8 days	× EHT
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	28-Sep-2021	----	----	----		06-Oct-2021	72 hrs	183 hrs	× EHTR

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE DUP	E378-U	28-Sep-2021	----	----	----		06-Oct-2021	72 hrs	184 hrs	× EHTR
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE Wetland 4	E378-U	28-Sep-2021	----	----	----		06-Oct-2021	72 hrs	184 hrs	× EHTR
Anions and Nutrients : Fluoride in Water by IC										
HDPE DUP	E235.F	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Wetland 4	E235.F	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	28-Sep-2021	----	----	----		05-Oct-2021	28 days	8 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	177 hrs	× EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	177 hrs	× EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO3-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	178 hrs	× EHTR

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	177 hrs	× EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO2-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	177 hrs	× EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	28-Sep-2021	----	----	----		05-Oct-2021	72 hrs	178 hrs	× EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	28-Sep-2021	----	----	----		05-Oct-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	28-Sep-2021	----	----	----		05-Oct-2021	28 days	8 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Field Blank	E318	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Travel Blank	E366	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	28-Sep-2021	11-Oct-2021	----	----		13-Oct-2021	28 days	15 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	28-Sep-2021	12-Oct-2021	13 days	14 days	✓	12-Oct-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	28-Sep-2021	12-Oct-2021	14 days	14 days	✓	12-Oct-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	28-Sep-2021	12-Oct-2021	14 days	14 days	✓	12-Oct-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Field Blank	E581.VH+F1	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Wetland 4	E581.VH+F1	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP	E355-L	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Field Blank	E355-L	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E355-L	28-Sep-2021	11-Oct-2021	----	----		12-Oct-2021	28 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	28-Sep-2021	----	----	----		06-Oct-2021	14 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	28-Sep-2021	----	----	----		06-Oct-2021	14 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	28-Sep-2021	----	----	----		06-Oct-2021	14 days	8 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	28-Sep-2021	----	----	----		06-Oct-2021	14 days	8 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE DUP	E100	28-Sep-2021	----	----	----		06-Oct-2021	28 days	8 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	28-Sep-2021	----	----	----		06-Oct-2021	28 days	8 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	28-Sep-2021	----	----	----		06-Oct-2021	28 days	8 days	✓
Physical Tests : pH by Meter										
HDPE DUP	E108	28-Sep-2021	----	----	----		06-Oct-2021	0.25 hrs	191 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Field Blank	E108	28-Sep-2021	----	----	----		06-Oct-2021	0.25 hrs	191 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	28-Sep-2021	----	----	----		06-Oct-2021	0.25 hrs	191 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	28-Sep-2021	----	----	----		12-Oct-2021	28 days	14 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	28-Sep-2021	----	----	----		12-Oct-2021	28 days	14 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	28-Sep-2021	----	----	----		12-Oct-2021	28 days	14 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved)										
Travel Blank	E508	28-Sep-2021	----	----	----		12-Oct-2021	28 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
DUP	E420	28-Sep-2021	----	----	----		09-Oct-2021	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Field Blank	E420	28-Sep-2021	----	----	----		09-Oct-2021	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Wetland 4	E420	28-Sep-2021	----	----	----		09-Oct-2021	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved)										
Travel Blank	E420	28-Sep-2021	----	----	----		09-Oct-2021	180 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
DUP	E611A	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Field Blank	E611A	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	28-Sep-2021	08-Oct-2021	----	----		09-Oct-2021	14 days	10 days	✓

Legend & Qualifier Definitions

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

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

EHT: Exceeded ALS recommended hold time prior to analysis.

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	311168	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	316570	1	18	5.5	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	311237	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	315479	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	314794	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	311171	1	14	7.1	5.0	✓
Conductivity in Water	E100	311169	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	311176	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	311170	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	311172	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	311173	1	13	7.6	5.0	✓
pH by Meter	E108	311167	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	311174	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	316568	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	317297	2	23	8.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	315552	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	316571	1	6	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	316569	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	315478	1	3	33.3	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	311168	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	316570	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	316768	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	311237	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	315479	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	314794	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	311171	1	14	7.1	5.0	✓
Conductivity in Water	E100	311169	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	311176	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	311170	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	311172	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	311173	1	13	7.6	5.0	✓
pH by Meter	E108	311167	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	311174	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	316568	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	317297	2	23	8.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	315552	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	316571	1	6	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	316569	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	315478	1	3	33.3	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	311168	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	316570	1	18	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	316768	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	311237	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	315479	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	314794	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	311171	1	14	7.1	5.0	✓
Conductivity in Water	E100	311169	1	13	7.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	311176	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	311170	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	311172	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	311173	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	311174	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	316568	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	317297	2	23	8.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	315552	2	20	10.0	5.0	✓
Total Nitrogen by Colourimetry	E366	316571	1	6	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	316569	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	315478	1	3	33.3	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	316570	1	18	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	315479	1	8	12.5	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	314794	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	311171	1	14	7.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	311176	1	16	6.2	5.0	✓
Fluoride in Water by IC	E235.F	311170	1	14	7.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	311172	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	311173	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	311174	1	14	7.1	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	316568	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	317297	2	23	8.7	5.0	✓
Total Metals in Water by CRC ICPMS	E420	315552	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	316571	1	6	16.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	316569	1	7	14.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	315478	1	3	33.3	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C1750**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 02-Oct-2021 12:00
PO	: ----	Date Analysis Commenced	: 05-Oct-2021
C-O-C number	: ----	Issue Date	: 18-Oct-2021 13:07
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 311167)											
VA21C1750-001	Wetland 4	pH	----	E108	0.10	pH units	8.44	8.44	0.00%	4%	----
Physical Tests (QC Lot: 311168)											
VA21C1750-001	Wetland 4	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	233	229	1.62%	20%	----
Physical Tests (QC Lot: 311169)											
VA21C1750-001	Wetland 4	conductivity	----	E100	2.0	µS/cm	527	533	1.13%	10%	----
Anions and Nutrients (QC Lot: 311170)											
VA21C1807-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.166	0.162	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 311171)											
VA21C1807-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	8.77	8.73	0.465%	20%	----
Anions and Nutrients (QC Lot: 311172)											
VA21C1807-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.194	0.191	1.25%	20%	----
Anions and Nutrients (QC Lot: 311173)											
VA21C1807-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	0.0010	0.00003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 311174)											
VA21C1807-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	75.6	75.6	0.00132%	20%	----
Anions and Nutrients (QC Lot: 311176)											
VA21C1750-001	Wetland 4	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 316568)											
VA21C1569-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.142	0.146	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 316570)											
VA21C1545-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0132	0.0127	0.0004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 316571)											
VA21C1559-001	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.150	0.144	0.006	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 316569)											
VA21C1569-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.47	1.54	0.07	Diff <2x LOR	----
Total Metals (QC Lot: 315552)											
CG2104632-008	Anonymous	arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
CG2104632-008	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		beryllium, total	7440-41-7	E420	0.020	mg/L	<0.020 µg/L	<0.000020	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 315552) - continued											
CG2104632-008	Anonymous	bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0050	mg/L	<0.0050 µg/L	<0.0000050	0	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.10	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.050	mg/L	<0.050 µg/L	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Total Metals (QC Lot: 317297)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 317297) - continued											
FJ2101047-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 317298)											
VA21C1750-003	Travel Blank	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 311237)											
FJ2101030-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 314794)											
FJ2101024-007	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	638	639	0.0720%	20%	----
Volatile Organic Compounds (QC Lot: 315479)											
VA21C1750-001	Wetland 4	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 315478)											
VA21C1750-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 311168)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	# 1.6	B
Physical Tests (QCLot: 311169)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 311170)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 311171)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 311172)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 311173)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 311174)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 311176)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 316568)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 316570)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 316571)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Organic / Inorganic Carbon (QCLot: 316569)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 315552)						
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	MBRR
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 315552) - continued						
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 317297)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 317298)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 311237)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 314794)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 315479)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 315478)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 316768)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*
MBRR	*Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible*

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 311167)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 311168)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Physical Tests (QCLot: 311169)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 311170)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 311171)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.2	90.0	110	----
Anions and Nutrients (QCLot: 311172)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 311173)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 311174)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 311176)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	100	80.0	120	----
Anions and Nutrients (QCLot: 316568)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 316570)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.8	85.0	115	----
Anions and Nutrients (QCLot: 316571)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 316569)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Total Metals (QCLot: 315552)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	108	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	98.0	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	94.3	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	LCS Recovery (%)	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 315552) - continued									
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	90.6	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	103	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	97.4	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	106	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	97.8	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	110	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.6	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.3	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	97.9	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	99.7	80.0	120	----
sodium, total	17341-25-2	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	93.5	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	96.2	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	95.5	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	100	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.9	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	110	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	109	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	96.3	80.0	120	----
Total Metals (QCLot: 317297)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	98.1	80.0	120	----
Total Metals (QCLot: 317298)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 317298) - continued									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.9	80.0	120	----
Aggregate Organics (QCLot: 311237)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	93.5	85.0	115	----
Aggregate Organics (QCLot: 314794)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	108	85.0	115	----
Volatile Organic Compounds (QCLot: 315479)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	121	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	123	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	124	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	112	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	127	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	126	70.0	130	----
Hydrocarbons (QCLot: 315478)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	127	70.0	130	----
Hydrocarbons (QCLot: 316768)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	85.6	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	84.8	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 311170)										
VA21C1807-002	Anonymous	fluoride	16984-48-8	E235.F	51.7 mg/L	50 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 311171)										
VA21C1807-002	Anonymous	chloride	16887-00-6	E235.Cl	4940 mg/L	5000 mg/L	98.9	75.0	125	----
Anions and Nutrients (QCLot: 311172)										
VA21C1807-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	124 mg/L	125 mg/L	99.1	75.0	125	----
Anions and Nutrients (QCLot: 311173)										
VA21C1807-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	25.2 mg/L	25 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 311174)										
VA21C1807-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	4960 mg/L	5000 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 311176)										
VA21C1750-002	DUP	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0326 mg/L	0.03 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 316568)										
VA21C1571-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.70 mg/L	2.5 mg/L	108	70.0	130	----
Anions and Nutrients (QCLot: 316570)										
VA21C1545-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.115 mg/L	0.1 mg/L	115	75.0	125	----
Anions and Nutrients (QCLot: 316571)										
VA21C1569-001	Anonymous	nitrogen, total	7727-37-9	E366	2.00 mg/L	2 mg/L	99.8	70.0	130	----
Organic / Inorganic Carbon (QCLot: 316569)										
VA21C1571-001	Anonymous	carbon, total organic [TOC]	----	E355-L	5.18 mg/L	5 mg/L	104	70.0	130	----
Total Metals (QCLot: 315552)										
FJ2101047-001	Anonymous	aluminum, total	7429-90-5	E420	0.208 mg/L	0.2 mg/L	104	70.0	130	----
		antimony, total	7440-36-0	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		barium, total	7440-39-3	E420	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00924 mg/L	0.01 mg/L	92.4	70.0	130	----
		boron, total	7440-42-8	E420	0.092 mg/L	0.1 mg/L	91.7	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00410 mg/L	0.004 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
Total Metals (QCLot: 315552) - continued										
FJ2101047-001	Anonymous	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	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0191 mg/L	0.02 mg/L	95.3	70.0	130	----
		copper, total	7440-50-8	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	99.0	70.0	130	----
		lead, total	7439-92-1	E420	0.0185 mg/L	0.02 mg/L	92.4	70.0	130	----
		lithium, total	7439-93-2	E420	ND mg/L	0.1 mg/L	ND	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	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0197 mg/L	0.02 mg/L	98.4	70.0	130	----
		nickel, total	7440-02-0	E420	0.0370 mg/L	0.04 mg/L	92.5	70.0	130	----
		phosphorus, total	7723-14-0	E420	11.0 mg/L	10 mg/L	110	70.0	130	----
		potassium, total	7440-09-7	E420	3.85 mg/L	4 mg/L	96.2	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		selenium, total	7782-49-2	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		silicon, total	7440-21-3	E420	9.39 mg/L	10 mg/L	93.9	70.0	130	----
		silver, total	7440-22-4	E420	0.00380 mg/L	0.004 mg/L	95.1	70.0	130	----
		sodium, total	17341-25-2	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	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		thallium, total	7440-28-0	E420	0.00364 mg/L	0.004 mg/L	90.9	70.0	130	----
		thorium, total	7440-29-1	E420	0.0220 mg/L	0.02 mg/L	110	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		titanium, total	7440-32-6	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.105 mg/L	0.1 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.384 mg/L	0.4 mg/L	96.1	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0409 mg/L	0.04 mg/L	102	70.0	130	----
Total Metals (QCLot: 317297)										
FJ2101047-002	Anonymous	mercury, total	7439-97-6	E508	0.0000982 mg/L	0.0001 mg/L	98.2	70.0	130	----
Total Metals (QCLot: 317298)										
VA21C1750-004	Field Blank	mercury, total	7439-97-6	E508	0.0000987 mg/L	0.0001 mg/L	98.7	70.0	130	----
Aggregate Organics (QCLot: 314794)										

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
Aggregate Organics (QCLot: 314794) - continued										
VA21C1545-001	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 315479)										
VA21C1750-001	Wetland 4	benzene	71-43-2	E611A	101 µg/L	100 µg/L	101	60.0	140	----
		ethylbenzene	100-41-4	E611A	124 µg/L	100 µg/L	124	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	124 µg/L	100 µg/L	124	60.0	140	----
		styrene	100-42-5	E611A	124 µg/L	100 µg/L	124	60.0	140	----
		toluene	108-88-3	E611A	115 µg/L	100 µg/L	115	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	263 µg/L	200 µg/L	132	60.0	140	----
		xylene, o-	95-47-6	E611A	127 µg/L	100 µg/L	127	60.0	140	----
Hydrocarbons (QCLot: 315478)										
VA21C1750-002	DUP	VHw (C6-C10)	----	E581.VH+F1	7270 µg/L	6310 µg/L	115	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax hshinton@rdks.bc.ca
Email 2 nveikle@rdks.bc.ca
Email 3 eblaney@rdks.bc.ca;

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax anne-maries@rdks.bc.ca
Email 2 nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐
EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton WMF Treated Leachate at Wetland 4	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
	Wetland 4	28-Sept-21	11:42	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	28-Sept-21	12:00	Effluent Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank			Water	R	R	R	R	R				R									2
	Field Blank	28-Sept-21	12:08	Water	R	R	R	R	R				R			R		R	R			9

Environmental Division
Vancouver
Work Order Reference
VA21C1750

Telephone : +1 604 263 4188

Terrace Shipping
1 Coolers
____ Carbouys
Ground ☐
Air ☒
SFX ☐

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
3.1				3.1			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: October 1st 2021	Time:	Received by: Chris	Date: 1 Oct 21	Time: 1255	Received by:	Date: Oct 2/21	Time: 12:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C3197**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Date Analysis Commenced	: 21-Oct-2021
C-O-C number	: ----	Issue Date	: 05-Nov-2021 15:25
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Shaneel Dayal	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).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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.

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH-01	----	----	----	----
					Client sampling date / time	18-Oct-2021 12:02	----	----	----	----
					VA21C3197-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		300	----	----	----	----
conductivity	----	E100	2.0	µS/cm		514	----	----	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		245	----	----	----	----
pH	----	E108	0.10	pH units		8.35	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<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		0.064	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		<0.050	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	----	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	----	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		1.25	----	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		0.80	----	----	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0026	----	----	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	----	----	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00147	----	----	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.467	----	----	----	----
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		0.097	----	----	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000478	----	----	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		29.1	----	----	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	----	----	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	----	----	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		<0.00010	----	----	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00055	----	----	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		<0.010	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-01	----	----	----	----
					Client sampling date / time	18-Oct-2021 12:02	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C3197-001	--------	--------	--------	--------
						Result	----	----	----	----
Dissolved Metals										
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	----	----	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0011	----	----	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		41.9	----	----	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.00202	----	----	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	----	----	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.00226	----	----	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		<0.00050	----	----	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	----	----	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		2.08	----	----	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00024	----	----	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	----	----	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		1.75	----	----	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	----	----	----	----
sodium, dissolved	17341-25-2	E421	0.050	mg/L		29.5	----	----	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		1.04	----	----	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	----	----	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	----	----	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	----	----	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	----	----	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		0.00014	----	----	----	----
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		0.000328	----	----	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	----	----	----	----
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0014	----	----	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	----	----	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	----	----	----	----
dissolved metals filtration location	----	EP421	-	-		Field	----	----	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		<20	----	----	----	----
Volatile Organic Compounds [Fuels]										

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	BH-01	----	----	----	----
					Client sampling date / time	18-Oct-2021 12:02	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C3197-001	--------	--------	--------	--------
						Result	----	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	----	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	----	----	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	----	----	----	----
toluene	108-88-3	E611A	0.50	µg/L		2.28	----	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	----	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	----	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	----	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		86.3	----	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		104	----	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	----	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	----	----	----	----
EPH (C10-C32)	----	E601A	400	µg/L		<400	----	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	----	----	----	----
VPHw	----	EC580A	100	µg/L		<100	----	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		70.8	----	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		104	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C3197**	Page	: 1 of 10
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Issue Date	: 05-Nov-2021 15:27
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Physical Tests	QC-MRG2-325259001	----	alkalinity, total (as CaCO3)	----	E290	3.6 mg/L B	1.5 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Recoveries								
Dissolved Metals	QC-329766-002	----	bismuth, dissolved	7440-69-9	E421	73.7 % MES	80.0-120%	Recovery less than lower control limit

Result Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-01	E559	18-Oct-2021	----	----	----		02-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-01	E298	18-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
BH-01	E235.Br-L	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-01	E235.Cl	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
BH-01	E235.F	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
BH-01	E235.NO3-L	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
BH-01	E235.NO2-L	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-01	E235.SO4	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-01	E318	18-Oct-2021	01-Nov-2021	----	----		04-Nov-2021	28 days	17 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-01	E509	18-Oct-2021	28-Oct-2021	----	----		28-Oct-2021	28 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-01	E421	18-Oct-2021	26-Oct-2021	----	----		26-Oct-2021	180 days	8 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-01	E601A	18-Oct-2021	01-Nov-2021	14 days	14 days	✓	01-Nov-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-01	E581.VH+F1	18-Oct-2021	30-Oct-2021	----	----		01-Nov-2021	14 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
BH-01	E355-L	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
BH-01	E290	18-Oct-2021	----	----	----		21-Oct-2021	14 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE										
BH-01	E100	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
BH-01	E108	18-Oct-2021	----	----	----		21-Oct-2021	0.25 hrs	68 hrs	× EHTR-FM
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-01	E611A	18-Oct-2021	30-Oct-2021	----	----		01-Nov-2021	14 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	325260	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	335164	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325252	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	333712	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325251	1	11	9.0	5.0	✓
Conductivity in Water	E100	325259	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	331908	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	329766	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	325250	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325247	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325248	1	17	5.8	5.0	✓
pH by Meter	E108	325258	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	325249	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335162	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335163	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	333713	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	325260	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	335164	1	16	6.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	334315	1	17	5.8	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325252	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	333712	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325251	1	11	9.0	5.0	✓
Conductivity in Water	E100	325259	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	331908	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	329766	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	325250	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325247	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325248	1	17	5.8	5.0	✓
pH by Meter	E108	325258	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	325249	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335162	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335163	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	333713	1	16	6.2	5.0	✓
Method Blanks (MB)							

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Alkalinity Species by Titration	E290	325260	1	14	7.1	5.0	✓
Ammonia by Fluorescence	E298	335164	1	16	6.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	334315	1	17	5.8	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325252	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	333712	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325251	1	11	9.0	5.0	✓
Conductivity in Water	E100	325259	1	14	7.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	331908	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	329766	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	325250	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325247	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325248	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	325249	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335162	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335163	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	333713	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	335164	1	16	6.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325252	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	333712	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325251	1	11	9.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	331908	1	7	14.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	329766	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	325250	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325247	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325248	1	17	5.8	5.0	✓
Sulfate in Water by IC	E235.SO4	325249	1	11	9.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335162	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335163	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	333713	1	16	6.2	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C3197**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Date Analysis Commenced	: 21-Oct-2021
C-O-C number	: ----	Issue Date	: 05-Nov-2021 15:25
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 325258)											
VA21C3178-001	Anonymous	pH	----	E108	0.10	pH units	7.81	7.79	0.256%	4%	----
Physical Tests (QC Lot: 325259)											
VA21C3178-001	Anonymous	conductivity	----	E100	2.0	µS/cm	1490	1490	0.134%	10%	----
Physical Tests (QC Lot: 325260)											
VA21C3178-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	125	126	0.559%	20%	----
Anions and Nutrients (QC Lot: 325247)											
VA21C3178-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	38.8	38.7	0.252%	20%	----
Anions and Nutrients (QC Lot: 325248)											
VA21C3178-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	1.30	1.30	0.329%	20%	----
Anions and Nutrients (QC Lot: 325249)											
VA21C3178-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	375	374	0.208%	20%	----
Anions and Nutrients (QC Lot: 325250)											
VA21C3178-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	1.06	1.06	0.437%	20%	----
Anions and Nutrients (QC Lot: 325251)											
VA21C3178-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	26.8	26.8	0.0229%	20%	----
Anions and Nutrients (QC Lot: 325252)											
VA21C3178-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335162)											
VA21C3197-001	BH-01	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335164)											
VA21C3197-001	BH-01	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 335163)											
VA21C3197-001	BH-01	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	0.80	1.17	0.36	Diff <2x LOR	----
Dissolved Metals (QC Lot: 329766)											
FJ2101139-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0032	0.0030	0.0002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00010	0.000004	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.180	0.184	2.10%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 329766) - continued											
FJ2101139-001	Anonymous	cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000068	0.0000109	0.0000041	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	47.4	47.2	0.521%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00031	0.00033	0.00001	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.041	0.041	0.0005	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0056	0.0054	0.00010	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	16.5	15.9	3.69%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00544	0.00551	1.26%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000352	0.000363	0.000011	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.614	0.622	1.18%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00024	0.00022	0.00003	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00126	0.00125	0.722%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.91	1.92	0.481%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	8.89	8.78	1.26%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.178	0.182	2.40%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	16.9	17.9	5.48%	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	0.000440	0.000427	3.15%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 331908)											
VA21C3069-019	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 335937)											

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*
Aggregate Organics (QC Lot: 335937) - continued											
KS2103484-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 333712)											
FJ2101148-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 333713)											
VA21C3197-001	BH-01	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 325259)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 325260)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	# 3.6	B
Anions and Nutrients (QCLot: 325247)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 325248)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 325249)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 325250)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 325251)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 325252)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 335162)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 335164)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 335163)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 329766)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 329766) - continued						
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 331908)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 335937)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 333712)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 333712) - continued						
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 333713)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 334315)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 325258)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 325259)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.9	90.0	110	----
Physical Tests (QCLot: 325260)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 325247)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 325248)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 325249)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 325250)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 325251)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 325252)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	102	85.0	115	----
Anions and Nutrients (QCLot: 335162)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	111	75.0	125	----
Anions and Nutrients (QCLot: 335164)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Organic / Inorganic Carbon (QCLot: 335163)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	111	80.0	120	----
Dissolved Metals (QCLot: 329766)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	108	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	106	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	# 73.7	80.0	120	MES
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.3	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 329766) - continued									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	105	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	96.8	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	104	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	103	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	105	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	98.3	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	106	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.0	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	104	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	111	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.8	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	88.3	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.9	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.5	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	97.7	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	101	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
Aggregate Organics (QCLot: 335937)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	109	85.0	115	----
Volatile Organic Compounds (QCLot: 333712)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 333712) - continued									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	86.5	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	86.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	100	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	97.5	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	89.5	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	89.7	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	94.8	70.0	130	----
Hydrocarbons (QCLot: 333713)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	79.5	70.0	130	----
Hydrocarbons (QCLot: 334315)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	108	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	109	70.0	130	----

Qualifiers

Qualifier	Description
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 325247)										
VA21C3178-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	12.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 325248)										
VA21C3178-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	2.60 mg/L	2.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 325249)										
VA21C3178-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	506 mg/L	500 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 325250)										
VA21C3178-002	Anonymous	fluoride	16984-48-8	E235.F	5.35 mg/L	5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 325251)										
VA21C3178-002	Anonymous	chloride	16887-00-6	E235.Cl	508 mg/L	500 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 325252)										
VA21C3178-002	Anonymous	bromide	24959-67-9	E235.Br-L	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 335162)										
VA21C3222-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.80 mg/L	2.5 mg/L	112	70.0	130	----
Anions and Nutrients (QCLot: 335164)										
VA21C3222-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0962 mg/L	0.1 mg/L	96.2	75.0	125	----
Organic / Inorganic Carbon (QCLot: 335163)										
VA21C3222-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Dissolved Metals (QCLot: 329766)										
FJ2101139-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.4	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0193 mg/L	0.02 mg/L	96.6	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	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.0417 mg/L	0.04 mg/L	104	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00811 mg/L	0.01 mg/L	81.1	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.097 mg/L	0.1 mg/L	97.4	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00408 mg/L	0.004 mg/L	102	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00981 mg/L	0.01 mg/L	98.1	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 329766) - continued										
FJ2101139-002	Anonymous	cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.3	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	1.97 mg/L	2 mg/L	98.4	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.103 mg/L	0.1 mg/L	103	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	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	9.60 mg/L	10 mg/L	96.0	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.92 mg/L	4 mg/L	98.1	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0421 mg/L	0.04 mg/L	105	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.19 mg/L	10 mg/L	91.9	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00382 mg/L	0.004 mg/L	95.5	70.0	130	----
		sodium, dissolved	17341-25-2	E421	1.91 mg/L	2 mg/L	95.7	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	21.1 mg/L	20 mg/L	106	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00378 mg/L	0.004 mg/L	94.4	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0390 mg/L	0.04 mg/L	97.4	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.400 mg/L	0.4 mg/L	100	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0399 mg/L	0.04 mg/L	99.8	70.0	130	----
Dissolved Metals (QCLot: 331908)										
VA21C3069-020	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000997 mg/L	0.0001 mg/L	99.7	70.0	130	----
Aggregate Organics (QCLot: 335937)										
KS2103484-002	Anonymous	chemical oxygen demand [COD]	----	E559	108 mg/L	100 mg/L	108	75.0	125	----
Volatile Organic Compounds (QCLot: 333712)										
FJ2101148-001	Anonymous	benzene	71-43-2	E611A	86.4 µg/L	100 µg/L	86.4	60.0	140	----
		ethylbenzene	100-41-4	E611A	82.8 µg/L	100 µg/L	82.8	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	98.0 µg/L	100 µg/L	98.0	60.0	140	----

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
Volatile Organic Compounds (QCLot: 333712) - continued										
FJ2101148-001	Anonymous	styrene	100-42-5	E611A	96.5 µg/L	100 µg/L	96.5	60.0	140	----
		toluene	108-88-3	E611A	87.2 µg/L	100 µg/L	87.2	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	176 µg/L	200 µg/L	88.1	60.0	140	----
		xylene, o-	95-47-6	E611A	92.3 µg/L	100 µg/L	92.3	60.0	140	----
Hydrocarbons (QCLot: 333713)										
VA21C3410-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	4950 µg/L	6310 µg/L	78.4	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	eblaney@rdks.bc.ca
Email 3	nveikle@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	
Job #:	Hazelton WMF Groundwater
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals F/P	Dissolved Mercury F/P	Alkalinity	Chloride	Fluoride, Sulphate, Hardness	Ammonia P	Nitrate	Nitrite	TOC P	COD P	pH	Conductivity	Total Kjeldahl Nitrogen P	EPH P	BTEX/VPH P	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	BH-01	18-Oct-21	12:02	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			

Environmental Division
Vancouver
Work Order Reference
VA21C3197

Telephone : +1 604 253 4188

Terrace Shipping
1 Coolers
Carbouys
Ground ☐
Air ☑
SFX ☐

Drinking Water (DW) Samples (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.0						6.5	

SHIPMENT RELEASE (client use)

Released by: Hannah Shinton	Date: Tuesday, October 19th, 2021	Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Chris	Date: 19 Oct 21	Time: 1245

FINAL SHIPMENT RECEPTION (lab use only)

Received by: PD	Date: OCT 19 2021	Time: 21:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C3191**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4 & BH01	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Date Analysis Commenced	: 20-Oct-2021
C-O-C number	: ----	Issue Date	: 05-Nov-2021 19:09
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
µg/L	micrograms per litre
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*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time: 18-Oct-2021 12:55	18-Oct-2021 12:00	[18-Oct-2021]	18-Oct-2021 13:15	----
					VA21C3191-001	VA21C3191-002	VA21C3191-003	VA21C3191-004	--------
					Result	Result	Result	Result	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	254	242	<1.0	<1.0	----
conductivity	----	E100	2.0	µS/cm	614	603	----	<2.0	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	232	228	<0.60	<0.60	----
pH	----	E108	0.10	pH units	8.37	8.35	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0086	0.0092	<0.0050	<0.0050	----
bromide	24959-67-9	E235.Br-L	0.050	mg/L	0.167	0.167	<0.050	<0.050	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	41.6	40.8	<0.50	<0.50	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.100	0.098	<0.020	<0.020	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.670	0.640	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.734	0.740	<0.0050	<0.0050	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0013	<0.0010	<0.0010	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	1.22	1.25	<0.030	<0.030	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0012	<0.0010	<0.0010	<0.0010	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	10.8	10.6	<0.30	<0.30	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	9.03	9.21	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0277	0.0254	<0.0030	<0.0030	----
antimony, total	7440-36-0	E420	0.00010	mg/L	0.00010	0.00010	<0.00010	<0.00010	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00069	0.00069	<0.00010	<0.00010	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0466	0.0460	<0.00010	<0.00010	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
boron, total	7440-42-8	E420	0.010	mg/L	0.322	0.327	<0.010	<0.010	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000054	<0.0000050	<0.0000050	<0.0000050	----
calcium, total	7440-70-2	E420	0.050	mg/L	66.5	65.6	<0.050	<0.050	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00014	0.00013	<0.00010	<0.00010	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time	18-Oct-2021 12:55	18-Oct-2021 12:00	[18-Oct-2021]	18-Oct-2021 13:15	----
Analyte	CAS Number	Method	LOR	Unit		VA21C3191-001	VA21C3191-002	VA21C3191-003	VA21C3191-004	--------
						Result	Result	Result	Result	----
Total Metals										
copper, total	7440-50-8	E420	0.00050	mg/L		0.00129	0.00126	<0.00050	<0.00050	----
iron, total	7439-89-6	E420	0.010	mg/L		0.046	0.042	<0.010	<0.010	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	----
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		16.0	15.6	<0.0050	<0.0050	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.0149	0.0114	<0.00010	<0.00010	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000482	0.000462	<0.000050	<0.000050	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00248	0.00235	<0.00050	<0.00050	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	----
potassium, total	7440-09-7	E420	0.050	mg/L		6.02	5.89	<0.050	<0.050	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00048	0.00051	<0.00020	<0.00020	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000074	0.000060	<0.000050	<0.000050	----
silicon, total	7440-21-3	E420	0.10	mg/L		2.39	2.34	<0.10	<0.10	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
sodium, total	17341-25-2	E420	0.050	mg/L		36.7	36.4	<0.050	<0.050	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.431	0.422	<0.00020	<0.00020	----
sulfur, total	7704-34-9	E420	0.50	mg/L		4.04	3.91	<0.50	<0.50	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
titanium, total	7440-32-6	E420	0.00030	mg/L		<0.00060 DLM	<0.00060 DLM	<0.00030	<0.00030	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000346	0.000334	<0.000010	<0.000010	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	<0.0030	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Aggregate Organics										
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L		<2.0	<2.0	----	<2.0	----
chemical oxygen demand [COD]	----	E559	20	mg/L		25	24	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wetland 4	DUP	Travel Blank	Field Blank	----
					Client sampling date / time	18-Oct-2021 12:55	18-Oct-2021 12:00	[18-Oct-2021]	18-Oct-2021 13:15	----
Analyte	CAS Number	Method	LOR	Unit		VA21C3191-001	VA21C3191-002	VA21C3191-003	VA21C3191-004	--------
						Result	Result	Result	Result	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	----	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	----	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	----	<0.50	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		79.3	98.4	----	85.3	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		98.4	102	----	97.9	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	----	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	----	<100	----
EPH (C10-C32)	----	E601A	400	µg/L		<400	<400	----	<400	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	----	<250	----
VPHw	----	EC580A	100	µg/L		<100	<100	----	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		85.6	88.5	----	88.6	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		87.1	102	----	111	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C3191**	Page	: 1 of 16
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4 & BH01	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Issue Date	: 05-Nov-2021 19:08
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] DUP	E550	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Field Blank	E550	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d] Wetland 4	E550	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	18-Oct-2021	----	----	----		02-Nov-2021	28 days	15 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) Wetland 4	E559	18-Oct-2021	----	----	----		02-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Field Blank	E298	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	15 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
DUP	E235.Br-L	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Field Blank	E235.Br-L	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Travel Blank	E235.Br-L	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.Br-L	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Travel Blank	E378-U	18-Oct-2021	----	----	----		21-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Field Blank	E378-U	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	18-Oct-2021	----	----	----		21-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Field Blank	E235.F	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Travel Blank	E235.F	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Wetland 4	E235.F	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE DUP	E235.NO3-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO3-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Wetland 4	E235.NO2-L	18-Oct-2021	----	----	----		20-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE DUP	E235.SO4	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Field Blank	E235.SO4	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Travel Blank	E235.SO4	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	18-Oct-2021	----	----	----		20-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	18-Oct-2021	01-Nov-2021	----	----		04-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	18-Oct-2021	01-Nov-2021	----	----		04-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	18-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Field Blank	E366	18-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Travel Blank	E366	18-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	18-Oct-2021	01-Nov-2021	----	----		03-Nov-2021	28 days	16 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	18-Oct-2021	01-Nov-2021	14 days	14 days	✓	01-Nov-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	18-Oct-2021	01-Nov-2021	14 days	14 days	✓	01-Nov-2021	40 days	0 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	18-Oct-2021	01-Nov-2021	14 days	14 days	✓	01-Nov-2021	40 days	0 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 days	11 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Wetland 4	E581.VH+F1	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 days	11 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	14 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E355-L	18-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	28 days	14 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
DUP	E290	18-Oct-2021	----	----	----		21-Oct-2021	14 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	18-Oct-2021	----	----	----		21-Oct-2021	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	18-Oct-2021	----	----	----		21-Oct-2021	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	18-Oct-2021	----	----	----		21-Oct-2021	14 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	18-Oct-2021	----	----	----		21-Oct-2021	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	18-Oct-2021	----	----	----		21-Oct-2021	0.25 hrs	65 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	18-Oct-2021	----	----	----		21-Oct-2021	0.25 hrs	66 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	18-Oct-2021	----	----	----		03-Nov-2021	28 days	15 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	18-Oct-2021	----	----	----		03-Nov-2021	28 days	16 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	18-Oct-2021	----	----	----		03-Nov-2021	28 days	16 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	18-Oct-2021	----	----	----		03-Nov-2021	28 days	16 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	18-Oct-2021	----	----	----		03-Nov-2021	180 days	16 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	18-Oct-2021	----	----	----		03-Nov-2021	180 days	16 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	18-Oct-2021	----	----	----		03-Nov-2021	180 days	16 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Wetland 4	E420	18-Oct-2021	----	----	----		03-Nov-2021	180 days	16 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 days	11 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Field Blank	E611A	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
Wetland 4	E611A	18-Oct-2021	28-Oct-2021	----	----		30-Oct-2021	14 days	11 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	325175	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	335229	1	19	5.2	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	325410	2	24	8.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325182	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	332456	1	12	8.3	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325181	1	10	10.0	5.0	✓
Conductivity in Water	E100	325174	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	325183	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	325180	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325177	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325178	1	15	6.6	5.0	✓
pH by Meter	E108	325173	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	325179	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335230	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	336392	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	333690	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	335227	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335226	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	332457	1	10	10.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	325175	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	335229	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	334315	1	17	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	325410	2	24	8.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325182	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	332456	1	12	8.3	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325181	1	10	10.0	5.0	✓
Conductivity in Water	E100	325174	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	325183	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	325180	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325177	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325178	1	15	6.6	5.0	✓
pH by Meter	E108	325173	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	325179	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335230	1	14	7.1	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Mercury in Water by CVAAS	E508	336392	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	333690	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	335227	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335226	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	332457	1	10	10.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	325175	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	335229	1	19	5.2	5.0	✓
BC PHC - EPH by GC-FID	E601A	334315	1	17	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	325410	2	24	8.3	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325182	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	332456	1	12	8.3	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325181	1	10	10.0	5.0	✓
Conductivity in Water	E100	325174	1	9	11.1	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	325183	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	325180	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325177	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325178	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	325179	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335230	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	336392	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	333690	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	335227	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335226	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	332457	1	10	10.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	335229	1	19	5.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	325182	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	332456	1	12	8.3	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	335937	1	18	5.5	5.0	✓
Chloride in Water by IC	E235.Cl	325181	1	10	10.0	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	325183	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	325180	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	325177	1	15	6.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	325178	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	325179	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	335230	1	14	7.1	5.0	✓
Total Mercury in Water by CVAAS	E508	336392	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	333690	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Total Nitrogen by Colourimetry	E366	335227	1	7	14.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	335226	1	12	8.3	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	332457	1	10	10.0	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.
Bromide in Water by IC (Low Level)	E235.Br-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Vancouver - Environmental	Water	APHA 4500-Norg D (mod)	Total Kjeldahl Nitrogen is determined using block digestion followed by flow-injection analysis with fluorescence detection.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P E (mod)	Dissolved Orthophosphate is determined colourimetrically on a water 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C3191**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4 & BH01	Date Samples Received	: 19-Oct-2021 21:10
PO	: ----	Date Analysis Commenced	: 20-Oct-2021
C-O-C number	: ----	Issue Date	: 05-Nov-2021 19:08
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 4		
No. of samples analysed	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Instrumentation	Organics, 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
Owen Cheng		Metals, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

The 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 325173)											
VA21C3191-001	Wetland 4	pH	----	E108	0.10	pH units	8.37	8.37	0.00%	4%	----
Physical Tests (QC Lot: 325174)											
VA21C3191-001	Wetland 4	conductivity	----	E100	2.0	µS/cm	614	621	1.13%	10%	----
Physical Tests (QC Lot: 325175)											
VA21C3191-001	Wetland 4	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	254	247	2.55%	20%	----
Anions and Nutrients (QC Lot: 325177)											
VA21C3180-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	8.44	8.44	0.0257%	20%	----
Anions and Nutrients (QC Lot: 325178)											
VA21C3180-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0582	0.0586	0.579%	20%	----
Anions and Nutrients (QC Lot: 325179)											
VA21C3180-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	58.6	58.6	0.0188%	20%	----
Anions and Nutrients (QC Lot: 325180)											
VA21C3180-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.169	0.171	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 325181)											
VA21C3180-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.30	2.30	0.004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 325182)											
VA21C3180-001	Anonymous	bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 325183)											
KS2103435-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.200	mg/L	6.15	6.86	10.8%	20%	----
Anions and Nutrients (QC Lot: 335227)											
VA21C2131-005	Anonymous	nitrogen, total	7727-37-9	E366	0.030	mg/L	<0.030	<0.030	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335229)											
VA21C2131-005	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335230)											
VA21C3191-001	Wetland 4	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.670	0.603	10.5%	20%	----
Organic / Inorganic Carbon (QC Lot: 335226)											
VA21C2131-005	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Total Metals (QC Lot: 333690)											
VA21C3175-003	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.237	0.232	2.07%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00022	0.00025	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*
Total Metals (QC Lot: 333690) - continued											
VA21C3175-003	Anonymous	barium, total	7440-39-3	E420	0.00010	mg/L	0.0195	0.0194	0.0407%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000064	0.0000075	0.0000011	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	7.24	7.29	0.637%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000023	0.000022	0.000002	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00061	0.00060	0.00001	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.209	0.212	1.22%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000070	0.000068	0.000002	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	1.24	1.23	0.794%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0151	0.0153	1.16%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000305	0.000275	0.000031	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00055	0.00057	0.00002	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	0.324	0.320	0.004	Diff <2x LOR	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00048	0.00049	0.00001	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000260	0.000237	0.000023	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	4.34	4.33	0.299%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	2.91	2.86	1.56%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0524	0.0529	0.864%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	2.22	2.21	0.008	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.00280	0.00258	0.00022	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000031	0.000030	0.000001	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 333690) - continued											
VA21C3175-003	Anonymous	zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00033	0.00031	0.00002	Diff <2x LOR	----
Total Metals (QC Lot: 336392)											
VA21C3175-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 325410)											
FJ2101141-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 325411)											
VA21C3191-002	DUP	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 335937)											
KS2103484-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	<20	<20	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 332456)											
VA21C3041-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 332457)											
VA21C3152-003	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 325174)						
conductivity	----	E100	1	µS/cm	1.1	----
Physical Tests (QCLot: 325175)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 325177)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 325178)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 325179)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 325180)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 325181)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 325182)						
bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 325183)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 335227)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 335229)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 335230)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 335226)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 333690)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 333690) - continued						
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 336392)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 325410)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 325411)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 335937)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 332456)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 332457)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 334315)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 325173)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 325174)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 325175)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 325177)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 325178)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 325179)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 325180)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 325181)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 325182)									
bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	99.0	85.0	115	----
Anions and Nutrients (QCLot: 325183)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	105	80.0	120	----
Anions and Nutrients (QCLot: 335227)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 335229)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	88.4	85.0	115	----
Anions and Nutrients (QCLot: 335230)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 335226)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Total Metals (QCLot: 333690)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	97.8	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 333690) - continued									
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	94.8	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	99.0	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	87.0	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	97.5	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	98.9	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	94.8	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	95.4	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	96.7	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.4	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	96.0	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	93.5	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	93.4	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	96.9	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	95.9	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	109	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	94.7	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	100	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	99.9	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	100	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	86.2	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	98.1	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	96.9	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	99.7	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	97.4	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	89.3	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.7	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	99.3	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	96.0	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.2	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	95.1	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	89.8	80.0	120	----
Total Metals (QCLot: 336392)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 336392) - continued									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	95.7	80.0	120	----
Aggregate Organics (QCLot: 325410)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	101	85.0	115	----
Aggregate Organics (QCLot: 325411)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	99.3	85.0	115	----
Aggregate Organics (QCLot: 335937)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	109	85.0	115	----
Volatile Organic Compounds (QCLot: 332456)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	112	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	101	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	115	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	113	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	111	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	105	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	113	70.0	130	----
Hydrocarbons (QCLot: 332457)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	106	70.0	130	----
Hydrocarbons (QCLot: 334315)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	108	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	109	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 325177)										
VA21C3180-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	ND mg/L	2.5 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 325178)										
VA21C3180-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.533 mg/L	0.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 325179)										
VA21C3180-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 325180)										
VA21C3180-002	Anonymous	fluoride	16984-48-8	E235.F	1.10 mg/L	1 mg/L	110	75.0	125	----
Anions and Nutrients (QCLot: 325181)										
VA21C3180-002	Anonymous	chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 325182)										
VA21C3180-002	Anonymous	bromide	24959-67-9	E235.Br-L	0.516 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 325183)										
KS2103435-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	7.32 mg/L	6 mg/L	122	70.0	130	----
Anions and Nutrients (QCLot: 335227)										
VA21C3191-001	Wetland 4	nitrogen, total	7727-37-9	E366	1.89 mg/L	2 mg/L	94.6	70.0	130	----
Anions and Nutrients (QCLot: 335229)										
VA21C3191-001	Wetland 4	ammonia, total (as N)	7664-41-7	E298	0.0957 mg/L	0.1 mg/L	95.7	75.0	125	----
Anions and Nutrients (QCLot: 335230)										
VA21C3191-002	DUP	Kjeldahl nitrogen, total [TKN]	----	E318	2.53 mg/L	2.5 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 335226)										
VA21C3191-001	Wetland 4	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 333690)										
VA21C3175-004	Anonymous	aluminum, total	7429-90-5	E420	0.190 mg/L	0.2 mg/L	95.1	70.0	130	----
		antimony, total	7440-36-0	E420	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00946 mg/L	0.01 mg/L	94.6	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 333690) - continued										
VA21C3175-004	Anonymous	boron, total	7440-42-8	E420	0.085 mg/L	0.1 mg/L	85.2	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00401 mg/L	0.004 mg/L	100	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	0.00959 mg/L	0.01 mg/L	95.9	70.0	130	----
		chromium, total	7440-47-3	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		iron, total	7439-89-6	E420	1.85 mg/L	2 mg/L	92.7	70.0	130	----
		lead, total	7439-92-1	E420	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		lithium, total	7439-93-2	E420	0.0920 mg/L	0.1 mg/L	92.0	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	0.0190 mg/L	0.02 mg/L	95.3	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		nickel, total	7440-02-0	E420	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.88 mg/L	10 mg/L	98.8	70.0	130	----
		potassium, total	7440-09-7	E420	3.81 mg/L	4 mg/L	95.2	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		selenium, total	7782-49-2	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		silicon, total	7440-21-3	E420	9.28 mg/L	10 mg/L	92.8	70.0	130	----
		silver, total	7440-22-4	E420	0.00387 mg/L	0.004 mg/L	96.6	70.0	130	----
		sodium, total	17341-25-2	E420	1.80 mg/L	2 mg/L	90.1	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	20.1 mg/L	20 mg/L	101	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0398 mg/L	0.04 mg/L	99.5	70.0	130	----
		thallium, total	7440-28-0	E420	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		thorium, total	7440-29-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		tin, total	7440-31-5	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		titanium, total	7440-32-6	E420	0.0374 mg/L	0.04 mg/L	93.5	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0198 mg/L	0.02 mg/L	98.8	70.0	130	----
		uranium, total	7440-61-1	E420	0.00376 mg/L	0.004 mg/L	94.0	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0958 mg/L	0.1 mg/L	95.8	70.0	130	----
		zinc, total	7440-66-6	E420	0.389 mg/L	0.4 mg/L	97.2	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
Total Metals (QCLot: 336392)										
VA21C3175-007	Anonymous	mercury, total	7439-97-6	E508	0.0000958 mg/L	0.0001 mg/L	95.8	70.0	130	----
Aggregate Organics (QCLot: 335937)										

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
Aggregate Organics (QCLot: 335937) - continued										
KS2103484-002	Anonymous	chemical oxygen demand [COD]	----	E559	108 mg/L	100 mg/L	108	75.0	125	----
Volatile Organic Compounds (QCLot: 332456)										
VA21C3041-001	Anonymous	benzene	71-43-2	E611A	115 µg/L	100 µg/L	115	60.0	140	----
		ethylbenzene	100-41-4	E611A	104 µg/L	100 µg/L	104	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	120 µg/L	100 µg/L	120	60.0	140	----
		styrene	100-42-5	E611A	114 µg/L	100 µg/L	114	60.0	140	----
		toluene	108-88-3	E611A	113 µg/L	100 µg/L	113	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	209 µg/L	200 µg/L	104	60.0	140	----
		xylene, o-	95-47-6	E611A	116 µg/L	100 µg/L	116	60.0	140	----
Hydrocarbons (QCLot: 332457)										
VA21C3152-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	6150 µg/L	6310 µg/L	97.4	60.0	140	----

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca
Email 3	eblaney@rdks.bc.ca;
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton WMF Treated Leachate at Wetland 4 & BH-01	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: H. Shinton

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P				P	P	P			
	Wetland 4	18-Oct-21	12:55	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	18-Oct-21	12:00	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	–	–	Water	R	R	R	R	R				R									2
	Field Blank	18-Oct-21	13:15	Water	R	R	R	R	R				R			R		R	R			9

Terrace Shipping
1 Coolers Ground ☐
___ Carbouys Air ☑
SFX ☐

Environmental Division Vancouver
Work Order Reference
VA21C3191
Telephone : – 1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

ab use only)

Frozen ☐ No ☐
Ice Packs ☑ No ☐
Cooling Initiated

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.7							6.5

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: Tuesday, October 19th, 2021	Time:	Received by: Chris	Date: 19 Oct 21	Time: 1245	Received by: PD	Date: OCT 19 2021	Time: 21:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C3730**	Page	: 1 of 9
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Date Analysis Commenced	: 27-Oct-2021
C-O-C number	: ----	Issue Date	: 12-Nov-2021 18:04
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Jay Jang	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
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Woochan Song	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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*
DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW-02	SW-05	SW-07	DUP
					Client sampling date / time	22-Oct-2021 09:27	22-Oct-2021 12:27	22-Oct-2021 14:04	22-Oct-2021 16:14	22-Oct-2021 12:00
						VA21C3730-001	VA21C3730-002	VA21C3730-003	VA21C3730-004	VA21C3730-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		28.7	55.3	26.2	14.9	26.2
conductivity	----	E100	2.0	µS/cm		65.7	132	196	180	196
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		30.8	65.0	46.2	34.4	40.1
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		30.8	63.4	42.7	34.3	41.9
pH	----	E108	0.10	pH units		6.42	6.68	6.61	6.87	6.63
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		<0.0050	0.0064	0.0140	0.0077	0.0088
chloride	16887-00-6	E235.Cl	0.50	mg/L		1.23	0.66	39.4	42.0	39.4
fluoride	16984-48-8	E235.F	0.020	mg/L		0.031	<0.072 DLCI	0.032	0.023	0.031
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.739	1.47	1.07	0.611	1.10
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	0.0121	<0.0050	0.0302	<0.0050
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		<0.30	0.33	0.46	0.70	0.43
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		18.6	44.0	33.7	19.9	32.6
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.252	0.212	0.276	0.150	0.198
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	0.00012	<0.00010	<0.00010	<0.00010
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00106	0.00317	0.00080	0.00039	0.00068
barium, total	7440-39-3	E420	0.00010	mg/L		0.0142	0.0195	0.0176	0.0142	0.0159
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, total	7440-42-8	E420	0.010	mg/L		<0.010	0.012	<0.010	<0.010	<0.010
cadmium, total	7440-43-9	E420	0.0000050	mg/L		0.0000364	0.0000987	0.0000089	0.0000101	0.0000070
calcium, total	7440-70-2	E420	0.050	mg/L		8.54	17.1	12.7	10.1	12.4
cesium, total	7440-46-2	E420	0.000010	mg/L		0.000020	0.000012	0.000010	<0.000010	<0.000010
chromium, total	7440-47-3	E420	0.00050	mg/L		0.00057	0.00050	<0.00050	<0.00050	<0.00050
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00081	0.00087	0.00082	<0.00010	0.00030
copper, total	7440-50-8	E420	0.00050	mg/L		0.00149	0.00311	0.00120	0.00163	0.00100
iron, total	7439-89-6	E420	0.010	mg/L		1.24	1.47	1.40	0.207	0.931

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW-02	SW-05	SW-07	DUP
					Client sampling date / time	22-Oct-2021 09:27	22-Oct-2021 12:27	22-Oct-2021 14:04	22-Oct-2021 16:14	22-Oct-2021 12:00
						VA21C3730-001	VA21C3730-002	VA21C3730-003	VA21C3730-004	VA21C3730-005
						Result	Result	Result	Result	Result
Total Metals										
lead, total	7439-92-1	E420	0.000050	mg/L		0.000074	0.000144	0.000185	<0.000050	0.000087
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, total	7439-95-4	E420	0.0050	mg/L		2.30	5.03	2.66	2.20	2.66
manganese, total	7439-96-5	E420	0.00010	mg/L		0.200	0.245	0.222	0.00435	0.0693
mercury, total	7439-97-6	E508	0.0000050	mg/L		0.0000084	0.0000062	<0.0000050	0.0000059	<0.0000050
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000079	0.000073	0.000057	<0.000050	<0.000050
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00117	0.00107	0.00098	0.00061	0.00086
phosphorus, total	7723-14-0	E420	0.050	mg/L		0.188	0.831	<0.050	<0.050	<0.050
potassium, total	7440-09-7	E420	0.050	mg/L		2.26	6.08	0.672	0.523	0.662
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00266	0.00169	0.00049	0.00025	0.00046
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000088	0.000129	<0.000050	<0.000050	0.000076
silicon, total	7440-21-3	E420	0.10	mg/L		4.43	3.71	2.88	3.05	2.83
silver, total	7440-22-4	E420	0.000010	mg/L		0.000015	0.000033	<0.000010	<0.000010	<0.000010
sodium, total	17341-25-2	E420	0.050	mg/L		1.75	2.45	23.1	20.3	23.2
strontium, total	7440-24-6	E420	0.00020	mg/L		0.0544	0.0839	0.0790	0.0652	0.0787
sulfur, total	7704-34-9	E420	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00391	0.00486	0.00273	0.00118	0.00164
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000013	0.000051	<0.000010	0.000011	<0.000010
vanadium, total	7440-62-2	E420	0.00050	mg/L		0.00053	0.00074	0.00056	<0.00050	<0.00050
zinc, total	7440-66-6	E420	0.0030	mg/L		0.0078	0.0196	0.0102	<0.0030	0.0087
zirconium, total	7440-67-7	E420	0.00020	mg/L		0.00129	0.00071	0.00033	0.00026	0.00024
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.204	0.211	0.209	0.134	0.168
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	0.00010	<0.00010	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00094	0.00310	0.00070	0.00034	0.00054
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0134	0.0184	0.0168	0.0141	0.0155

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW-02	SW-05	SW-07	DUP
					Client sampling date / time	22-Oct-2021 09:27	22-Oct-2021 12:27	22-Oct-2021 14:04	22-Oct-2021 16:14	22-Oct-2021 12:00
						VA21C3730-001	VA21C3730-002	VA21C3730-003	VA21C3730-004	VA21C3730-005
						Result	Result	Result	Result	Result
Dissolved Metals										
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000231	0.0000873	0.0000062	0.0000054	0.0000051
calcium, dissolved	7440-70-2	E421	0.050	mg/L		8.58	17.7	14.0	10.4	12.0
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		0.000014	<0.000010	<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		0.00070	0.00082	0.00032	<0.00010	0.00026
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00137	0.00274	0.00099	0.00166	0.00103
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.868	1.29	0.840	0.165	0.712
lead, dissolved	7439-92-1	E421	0.000050	mg/L		0.000051	0.000114	0.000070	<0.000050	0.000060
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		2.28	5.04	2.72	2.06	2.46
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.171	0.225	0.0658	0.00302	0.0589
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		0.000073	<0.000050	<0.000050	<0.000050	<0.000050
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00103	0.00096	0.00088	0.00060	0.00082
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		0.130	0.817	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		2.22	6.19	0.701	0.520	0.635
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00268	0.00162	0.00040	0.00022	0.00038
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000085	0.000076	0.000069	0.000080	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L		4.27	3.56	2.88	2.97	2.58
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	0.000016	<0.000010	<0.000010	<0.000010
sodium, dissolved	17341-25-2	E421	0.050	mg/L		1.73	2.42	24.0	19.6	21.9
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.0572	0.0874	0.0862	0.0696	0.0764
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	<0.50	<0.50	<0.50	<0.50
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		0.00280	0.00456	0.00212	0.00088	0.00118

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-01	SW-02	SW-05	SW-07	DUP
					Client sampling date / time	22-Oct-2021 09:27	22-Oct-2021 12:27	22-Oct-2021 14:04	22-Oct-2021 16:14	22-Oct-2021 12:00
						VA21C3730-001	VA21C3730-002	VA21C3730-003	VA21C3730-004	VA21C3730-005
						Result	Result	Result	Result	Result
Dissolved Metals										
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		<0.000010	0.000053	<0.000010	<0.000010	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	0.00071	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0066	0.0176	0.0086	<0.0010	0.0076
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		0.00049	0.00032	0.00023	0.00024	<0.00020
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	Field
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		66	168	107	59	111
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
styrene	100-42-5	E611A	0.50	µg/L		<0.50	1.54	<0.50	<0.50	<0.50
toluene	108-88-3	E611A	0.50	µg/L		1.34	6.42	<0.50	<0.50	<0.50
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	<0.40
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	<0.50
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		91.6	94.3	92.6	87.3	94.0
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		107	107	107	109	95.1
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	<250	<250	<250
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	<100
EPH (C10-C32)	----	E601A	400	µg/L		<400	<400	<400	<400	<400
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	<250	<250	<250
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	<100
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		88.2	97.6	83.6	82.1	92.2
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		115	115	112	110	74.5

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

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Travel Blank	----	----	----	----
					Client sampling date / time: 22-Oct-2021	----	----	----	----
					VA21C3730-006	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
conductivity	----	E100	2.0	µS/cm	<2.0	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	<0.60	----	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	----	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	----	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	----	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	----	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	----	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	----	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	----	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	----	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	----	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	----	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	----	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	----	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	----	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	----	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	----	----	----	----
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	----	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	----	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	----	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	----	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	----	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	----	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	----	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	----	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	----	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	----	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	----	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Travel Blank	----	----	----	----
					Client sampling date / time	22-Oct-2021	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA21C3730-006	--------	--------	--------	--------	
					Result	----	----	----	----	
Total Metals										
silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	----	----	----	----	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	----	----	----	----	
sodium, total	17341-25-2	E420	0.050	mg/L	<0.050	----	----	----	----	
strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	----	----	----	----	
sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	----	----	----	----	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	----	----	----	----	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	----	----	----	----	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	----	----	----	----	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	----	----	----	----	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	----	----	----	----	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	----	----	----	----	
uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	----	----	----	----	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	----	----	----	----	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	----	----	----	----	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	----	----	----	----	

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C3730**	Page	: 1 of 19
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Issue Date	: 12-Nov-2021 18:04
C-O-C number	: ----		
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-337503-001	----	magnesium, total	7439-95-4	E420	0.0090 B mg/L	0.005 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) DUP	E559	22-Oct-2021	----	----	----		08-Nov-2021	28 days	17 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SW-01	E559	22-Oct-2021	----	----	----		08-Nov-2021	28 days	17 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SW-02	E559	22-Oct-2021	----	----	----		08-Nov-2021	28 days	17 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SW-05	E559	22-Oct-2021	----	----	----		08-Nov-2021	28 days	17 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid) SW-07	E559	22-Oct-2021	----	----	----		08-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) DUP	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) SW-01	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-02	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-05	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-07	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-01	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-02	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-05	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-07	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-01	E235.F	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-02	E235.F	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-05	E235.F	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-07	E235.F	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
SW-01	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
SW-02	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	× EHTR

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-05	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SW-07	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE DUP	E235.NO2-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-01	E235.NO2-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-02	E235.NO2-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-05	E235.NO2-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SW-07	E235.NO2-L	22-Oct-2021	----	----	----		27-Oct-2021	3 days	5 days	✖ EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE DUP	E235.SO4	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-01	E235.SO4	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-02	E235.SO4	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-05	E235.SO4	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-07	E235.SO4	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	22-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	21 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-01	E318	22-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	21 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-02	E318	22-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	21 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-05	E318	22-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	21 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-07	E318	22-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	21 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) DUP	E509	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-01	E509	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-02	E509	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-05	E509	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SW-07	E509	22-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	16 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) DUP	E421	22-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	15 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-01	E421	22-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	15 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-02	E421	22-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	15 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-05	E421	22-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	15 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SW-07	E421	22-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	15 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) DUP	E601A	22-Oct-2021	04-Nov-2021	14 days	13 days	✓	05-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) SW-01	E601A	22-Oct-2021	04-Nov-2021	14 days	13 days	✓	05-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) SW-02	E601A	22-Oct-2021	04-Nov-2021	14 days	13 days	✓	05-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) SW-05	E601A	22-Oct-2021	04-Nov-2021	14 days	13 days	✓	05-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) SW-07	E601A	22-Oct-2021	04-Nov-2021	14 days	13 days	✓	05-Nov-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) DUP	E581.VH+F1	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-02	E581.VH+F1	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-05	E581.VH+F1	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-07	E581.VH+F1	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) SW-01	E581.VH+F1	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	11 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP	E355-L	22-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	17 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-01	E355-L	22-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	17 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-02	E355-L	22-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	17 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-05	E355-L	22-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	17 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) SW-07	E355-L	22-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	17 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	22-Oct-2021	----	----	----		27-Oct-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-01	E290	22-Oct-2021	----	----	----		27-Oct-2021	14 days	5 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE SW-02	E290	22-Oct-2021	----	----	----		27-Oct-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-05	E290	22-Oct-2021	----	----	----		27-Oct-2021	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE SW-07	E290	22-Oct-2021	----	----	----		27-Oct-2021	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-01	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-02	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-05	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-07	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	22-Oct-2021	----	----	----		27-Oct-2021	28 days	5 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE SW-07	E108	22-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	113 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-05	E108	22-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	115 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-02	E108	22-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	116 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	22-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	117 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-01	E108	22-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	119 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	22-Oct-2021	----	----	----		03-Nov-2021	28 days	12 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-01	E508	22-Oct-2021	----	----	----		03-Nov-2021	28 days	12 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-02	E508	22-Oct-2021	----	----	----		03-Nov-2021	28 days	12 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-05	E508	22-Oct-2021	----	----	----		03-Nov-2021	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	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-07	E508	22-Oct-2021	----	----	----		03-Nov-2021	28 days	12 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Travel Blank	E508	22-Oct-2021	----	----	----		03-Nov-2021	28 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-01	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-02	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-05	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-07	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Travel Blank	E420	22-Oct-2021	----	----	----		06-Nov-2021	180 days	15 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-02	E611A	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-05	E611A	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-07	E611A	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SW-01	E611A	22-Oct-2021	01-Nov-2021	----	----		02-Nov-2021	14 days	11 days	✓

Legend & Qualifier Definitions

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

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	330501	1	5	20.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	335132	1	19	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330504	1	6	16.6	5.0	✓
Conductivity in Water	E100	330502	1	6	16.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336461	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	330503	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330506	1	6	16.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330507	1	5	20.0	5.0	✓
pH by Meter	E108	330500	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	330508	1	5	20.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	336880	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	337503	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	335133	1	13	7.6	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	330501	1	5	20.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	337751	2	30	6.6	5.0	✓
BTEX by Headspace GC-MS	E611A	335132	1	19	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330504	1	6	16.6	5.0	✓
Conductivity in Water	E100	330502	1	6	16.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336461	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	330503	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330506	1	6	16.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330507	1	5	20.0	5.0	✓
pH by Meter	E108	330500	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	330508	1	5	20.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	336880	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	337503	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
VH and F1 by Headspace GC-FID	E581.VH+F1	335133	1	13	7.6	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	330501	1	5	20.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	337751	2	30	6.6	5.0	✓
BTEX by Headspace GC-MS	E611A	335132	1	19	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330504	1	6	16.6	5.0	✓
Conductivity in Water	E100	330502	1	6	16.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336461	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	330503	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330506	1	6	16.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330507	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	330508	1	5	20.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	336880	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	337503	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	335133	1	13	7.6	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	335132	1	19	5.2	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330504	1	6	16.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336461	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	330503	1	5	20.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330506	1	6	16.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330507	1	5	20.0	5.0	✓
Sulfate in Water by IC	E235.SO4	330508	1	5	20.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	336880	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	337503	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	335133	1	13	7.6	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21C3730**	Page	: 1 of 18
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Date Analysis Commenced	: 27-Oct-2021
C-O-C number	: ----	Issue Date	: 12-Nov-2021 18:04
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 6		
No. of samples analysed	: 6		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Jay Jang	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
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Woochan Song	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 330500)											
VA21C3730-001	SW-01	pH	----	E108	0.10	pH units	6.42	6.42	0.00%	4%	----
Physical Tests (QC Lot: 330501)											
VA21C3730-003	SW-05	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	26.2	26.0	0.766%	20%	----
Physical Tests (QC Lot: 330502)											
VA21C3730-001	SW-01	conductivity	----	E100	2.0	µS/cm	65.7	66.5	1.21%	10%	----
Anions and Nutrients (QC Lot: 330503)											
VA21C3730-001	SW-01	fluoride	16984-48-8	E235.F	0.020	mg/L	0.031	0.031	0.0003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330504)											
VA21C3730-001	SW-01	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.23	1.23	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330506)											
VA21C3730-001	SW-01	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330507)											
VA21C3730-001	SW-01	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330508)											
VA21C3730-001	SW-01	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339952)											
VA21C3730-001	SW-01	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0057	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339953)											
VA21C3730-001	SW-01	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.739	0.724	2.11%	20%	----
Organic / Inorganic Carbon (QC Lot: 339951)											
VA21C3730-001	SW-01	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	18.6	19.5	4.44%	20%	----
Total Metals (QC Lot: 336880)											
KS2103507-001	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 336881)											
VA21C3730-004	SW-07	mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000059	0.0000055	0.0000004	Diff <2x LOR	----
Total Metals (QC Lot: 337503)											
KS2103507-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	0.0031	0.00007	Diff <2x LOR	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00024	0.00025	0.000005	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0564	0.0552	2.06%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 337503) - continued											
KS2103507-001	Anonymous	bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000060	0.0000064	0.0000003	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	57.2	54.5	4.74%	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	0.00479	0.00478	0.00001	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.024	0.026	0.002	Diff <2x LOR	----
		lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0011	0.0011	0.00002	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	12.6	12.7	0.930%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.00607	0.00646	6.22%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00899	0.00911	1.35%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	2.78	2.80	0.614%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	5.66	5.69	0.447%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	14.4	14.4	0.0670%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.534	0.541	1.33%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	10.1	10.6	5.37%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.00608	0.00604	0.666%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 336461)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 336461) - continued											
VA21C3666-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0080	0.0080	0.000002	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	0.00011	0.0000006	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00069	0.00065	0.00004	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00433	0.00429	0.981%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	31.1	30.4	2.43%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00069	0.00068	0.00002	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	0.013	0.012	0.0006	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.32	3.28	1.09%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00120	0.00132	9.69%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000411	0.000405	0.000006	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.347	0.322	0.024	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00043	0.00039	0.00004	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000107	0.000134	0.000027	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.35	2.36	0.537%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	0.861	0.835	3.02%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.112	0.111	1.09%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.67	1.63	0.04	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 336461) - continued											
VA21C3666-001	Anonymous	uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000031	0.000033	0.000001	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 339819)											
VA21C3666-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 340413)											
VA21C3730-001	SW-01	chemical oxygen demand [COD]	----	E559	20	mg/L	66	74	9	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 335132)											
VA21C3518-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 335133)											
VA21C3604-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 330501)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 330502)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 330503)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 330504)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 330506)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 330507)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 330508)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 339952)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 339953)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 339951)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 336880)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 336881)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 337503)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 337503) - continued						
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0090	B
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	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 336461)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 336461) - continued						
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	MBRR
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 339819)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Aggregate Organics (QCLot: 340413)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 335132)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 335133)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 337751)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 337953)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*
MBRR	*Initial MB for this submission had positive results for flagged analyte (data not shown). Low level samples were repeated with new QC (2nd MB results shown). High level results (>5x initial MB level) and non-detect results were reported and are defensible*

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 330500)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 330501)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Physical Tests (QCLot: 330502)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.0	90.0	110	----
Anions and Nutrients (QCLot: 330503)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 330504)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 330506)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 330507)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.0	90.0	110	----
Anions and Nutrients (QCLot: 330508)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 339952)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.2	85.0	115	----
Anions and Nutrients (QCLot: 339953)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.9	75.0	125	----
Organic / Inorganic Carbon (QCLot: 339951)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	93.8	80.0	120	----
Total Metals (QCLot: 336880)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.4	80.0	120	----
Total Metals (QCLot: 336881)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.2	80.0	120	----
Total Metals (QCLot: 337503)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	107	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	99.5	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	100	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	95.7	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 337503) - continued									
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	93.1	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	99.2	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	105	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	106	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	97.9	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	96.0	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	96.8	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	97.8	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	101	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	89.3	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	104	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	91.0	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	88.6	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	96.4	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	110	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.6	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	105	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	111	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	99.3	80.0	120	----
Dissolved Metals (QCLot: 336461)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.2	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 336461) - continued									
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.4	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	93.3	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.6	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	81.3	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.1	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	90.9	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.1	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.2	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.1	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	95.5	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.6	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.6	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.2	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.3	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.6	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	103	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	98.1	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	84.1	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	99.3	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	94.7	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.5	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.6	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	99.3	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	91.6	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.1	80.0	120	----
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	102	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	88.9	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Aggregate Organics (QCLot: 340413)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	110	85.0	115	----
Volatile Organic Compounds (QCLot: 335132)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	107	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	121	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	123	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	130	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	121	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	120	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	122	70.0	130	----
Hydrocarbons (QCLot: 335133)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	111	70.0	130	----
Hydrocarbons (QCLot: 337751)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	101	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	100	70.0	130	----
Hydrocarbons (QCLot: 337953)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	108	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	104	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 330503)										
VA21C3730-002	SW-02	fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 330504)										
VA21C3730-002	SW-02	chloride	16887-00-6	E235.Cl	106 mg/L	100 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 330506)										
VA21C3730-002	SW-02	nitrate (as N)	14797-55-8	E235.NO3-L	2.65 mg/L	2.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 330507)										
VA21C3730-002	SW-02	nitrite (as N)	14797-65-0	E235.NO2-L	0.512 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 330508)										
VA21C3730-002	SW-02	sulfate (as SO4)	14808-79-8	E235.SO4	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 339952)										
VA21C3730-002	SW-02	ammonia, total (as N)	7664-41-7	E298	0.0995 mg/L	0.1 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 339953)										
VA21C3730-002	SW-02	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
Organic / Inorganic Carbon (QCLot: 339951)										
VA21C3730-002	SW-02	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 336880)										
KS2103514-001	Anonymous	mercury, total	7439-97-6	E508	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Total Metals (QCLot: 336881)										
VA21C3730-005	DUP	mercury, total	7439-97-6	E508	0.0000985 mg/L	0.0001 mg/L	98.5	70.0	130	----
Total Metals (QCLot: 337503)										
KS2103514-001	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	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		boron, total	7440-42-8	E420	0.093 mg/L	0.1 mg/L	93.4	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00413 mg/L	0.004 mg/L	103	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 337503) - continued										
KS2103514-001	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0105 mg/L	0.01 mg/L	105	70.0	130	----
		chromium, total	7440-47-3	E420	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		copper, total	7440-50-8	E420	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		iron, total	7439-89-6	E420	1.98 mg/L	2 mg/L	99.1	70.0	130	----
		lead, total	7439-92-1	E420	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		lithium, total	7439-93-2	E420	0.0999 mg/L	0.1 mg/L	99.9	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		nickel, total	7440-02-0	E420	0.0388 mg/L	0.04 mg/L	97.1	70.0	130	----
		phosphorus, total	7723-14-0	E420	10.6 mg/L	10 mg/L	106	70.0	130	----
		potassium, total	7440-09-7	E420	3.99 mg/L	4 mg/L	99.7	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		selenium, total	7782-49-2	E420	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		silicon, total	7440-21-3	E420	8.87 mg/L	10 mg/L	88.7	70.0	130	----
		silver, total	7440-22-4	E420	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		sodium, total	17341-25-2	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	19.3 mg/L	20 mg/L	96.7	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0359 mg/L	0.04 mg/L	89.8	70.0	130	----
		thallium, total	7440-28-0	E420	0.00372 mg/L	0.004 mg/L	93.1	70.0	130	----
		thorium, total	7440-29-1	E420	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		titanium, total	7440-32-6	E420	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		uranium, total	7440-61-1	E420	0.00423 mg/L	0.004 mg/L	106	70.0	130	----
		vanadium, total	7440-62-2	E420	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		zinc, total	7440-66-6	E420	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 336461)										
VA21C3666-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.161 mg/L	0.2 mg/L	80.4	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0211 mg/L	0.02 mg/L	105	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		barium, dissolved	7440-39-3	E421	0.0198 mg/L	0.02 mg/L	99.2	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
Dissolved Metals (QCLot: 336461) - continued										
VA21C3666-002	Anonymous	beryllium, dissolved	7440-41-7	E421	0.0427 mg/L	0.04 mg/L	107	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00944 mg/L	0.01 mg/L	94.4	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	98.3	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00390 mg/L	0.004 mg/L	97.5	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	0.0101 mg/L	0.01 mg/L	101	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.90 mg/L	2 mg/L	95.1	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.108 mg/L	0.1 mg/L	108	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0214 mg/L	0.02 mg/L	107	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	10.5 mg/L	10 mg/L	105	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.00 mg/L	4 mg/L	99.9	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0197 mg/L	0.02 mg/L	98.5	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0433 mg/L	0.04 mg/L	108	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.01 mg/L	10 mg/L	90.1	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00413 mg/L	0.004 mg/L	103	70.0	130	----
		sodium, dissolved	17341-25-2	E421	1.95 mg/L	2 mg/L	97.6	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0471 mg/L	0.04 mg/L	118	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00412 mg/L	0.004 mg/L	103	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0258 mg/L	0.02 mg/L	129	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0363 mg/L	0.04 mg/L	90.7	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0212 mg/L	0.02 mg/L	106	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00449 mg/L	0.004 mg/L	112	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0982 mg/L	0.1 mg/L	98.2	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.406 mg/L	0.4 mg/L	101	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0435 mg/L	0.04 mg/L	109	70.0	130	----
Dissolved Metals (QCLot: 339819)										

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 339819) - continued										
VA21C3666-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000983 mg/L	0.0001 mg/L	98.3	70.0	130	----
Aggregate Organics (QCLot: 340413)										
VA21C3730-002	SW-02	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 335132)										
VA21C3518-001	Anonymous	benzene	71-43-2	E611A	118 µg/L	100 µg/L	118	60.0	140	----
		ethylbenzene	100-41-4	E611A	114 µg/L	100 µg/L	114	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	129 µg/L	100 µg/L	129	60.0	140	----
		styrene	100-42-5	E611A	124 µg/L	100 µg/L	124	60.0	140	----
		toluene	108-88-3	E611A	114 µg/L	100 µg/L	114	60.0	140	----
		xylene, m+p-	179601-23-1	E611A	228 µg/L	200 µg/L	114	60.0	140	----
		xylene, o-	95-47-6	E611A	116 µg/L	100 µg/L	116	60.0	140	----
Hydrocarbons (QCLot: 335133)										
VA21C3604-002	Anonymous	VHw (C6-C10)	----	E581.VH+F1	6430 µg/L	6310 µg/L	102	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax hshinton@rdks.bc.ca
Email 2 nveikle@rdks.bc.ca
Email 3 eblaney@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax anne-maries@rdks.bc.ca, nveikle@rdks.bc.ca
Email 2

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:
Job #: Hazelton Surface Water
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):
ALS Contact: Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals P	Dissolved Metals F/P	Alkalinity	Chloride	Fluoride, sulphate, hardness	Ammonia P	Nitrate	Nitrite	Total Kjeldahl Nitrogen P	TOC P	pH	COD P	Conductivity	EPH P	BTEX / VPH P	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	SW-01	22-Oct-21	9:27	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-02	22-Oct-21	12:27	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-05	22-Oct-21	14:04	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	SW-07	22-Oct-21	16:14	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	DUP	22-Oct-21	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			10
	Travel Blank	22-Oct-21	-	Water	R	R		R		R	R						R	R	R			4

Environmental Division
Vancouver
Work Order Reference
VA21C3730

Telephone : +1 604 253 4188

Terrace Shipping
2 Coolers
___ Carbouys
Ground ☐
Air ☒
SFX ☐

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
7.0	7.5			5			

SHIPMENT RELEASE (client use)

Released by: Hannah Shinton	Date: October 25th, 2021	Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Chris	Date: 25 Oct 21	Time: 1300

FINAL SHIPMENT RECEPTION (lab use only)

Received by: TC	Date: OCT 25 2021	Time: 1616

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

[1] If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C3737**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Date Analysis Commenced	: 27-Oct-2021
C-O-C number	: ----	Issue Date	: 15-Nov-2021 17:10
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Woochan Song	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH-02	BH-03	BH-4B	BH-5B	Field Blank
					Client sampling date / time	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]
						VA21C3737-001	VA21C3737-002	VA21C3737-003	VA21C3737-004	VA21C3737-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		490	255	69.4	630	<1.0
conductivity	----	E100	2.0	µS/cm		921	815	141	1710	<2.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		489	231	45.7	766	<0.60
pH	----	E108	0.10	pH units		7.79	8.13	6.88	7.02	5.64
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0940	<0.0050	0.0185	0.108	<0.0050
chloride	16887-00-6	E235.Cl	0.50	mg/L		<2.50 DLDS	<2.50 DLDS	<0.50	209	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L		<0.100 DLDS	<0.100 DLDS	0.191	<0.100 DLDS	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.936	0.054	1.51	0.527	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0250 DLDS	0.217	<0.0050	<0.0250 DLDS	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0050 DLDS	<0.0050 DLDS	<0.0010	0.0110	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		64.0	186	1.86	1.76	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		1.26	0.87	26.9	6.86	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0033	0.0040	0.724	0.0061	<0.0010
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		0.00020	0.00037	0.00019	0.00020	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00054	0.00034	0.00199	0.00850	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0656	0.0288	0.0276	0.270	<0.00010
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	0.000119	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		0.080	0.059	<0.010	0.011	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000332	0.000135	0.000527	0.0000192	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L		84.3	68.0	13.9	206	<0.050
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	<0.000010	0.000036	<0.000010	<0.000010
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	<0.00050	0.00111	<0.00050	<0.00050
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00020	<0.00010	0.00390	0.00269	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L		<0.00020	0.00053	0.0183	<0.00020	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L		<0.010	<0.010	2.90	12.2	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	<0.000050	0.00147	<0.000050	<0.000050
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		0.0045	0.0020	0.0052	0.0028	<0.0010

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH-02	BH-03	BH-4B	BH-5B	Field Blank
					Client sampling date / time	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]
						VA21C3737-001	VA21C3737-002	VA21C3737-003	VA21C3737-004	VA21C3737-005
						Result	Result	Result	Result	Result
Dissolved Metals										
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		67.7	14.8	2.68	61.2	<0.0050
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.0964	0.00388	0.546	3.85	<0.00010
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	<0.0000050	0.0000067	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.00226	0.00520	0.000149	0.000267	<0.000050
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00220	<0.00050	0.0159	0.00605	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	<0.050	0.267	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		2.76	2.04	0.427	5.29	<0.050
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00067	0.00050	0.00082	0.00108	<0.00020
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000144	0.000447	0.000104	0.000111	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L		7.13	3.68	6.36	8.80	<0.050
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	0.000015	<0.000010	<0.000010
sodium, dissolved	17341-25-2	E421	0.050	mg/L		25.2	96.9	12.0	72.5	<0.050
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		1.91	0.900	0.0714	1.49	<0.00020
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		22.2	61.9	<0.50	<0.50	<0.50
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		0.000014	0.000013	0.000019	<0.000010	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	0.00028	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	0.00013	0.00013	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	<0.00030	0.0125	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	0.00015	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.00124	0.00213	0.000721	0.000933	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	0.00277	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		0.0014	0.0025	0.0092	0.0022	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	<0.00020	0.00105	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	Field
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	Field
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		46	<20	99	32	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	BH-02	BH-03	BH-4B	BH-5B	Field Blank
					Client sampling date / time	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]	[25-Oct-2021]
						VA21C3737-001	VA21C3737-002	VA21C3737-003	VA21C3737-004	VA21C3737-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L		1.01	<0.50	4.20	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		97.2	99.3	99.4	97.1	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		102	102	97.2	96.3	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	<250	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	<100	----
EPH (C10-C32)	----	E601A	400	µg/L		<400	<400	<400	<400	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	<250	<250	----
VPHw	----	EC580A	100	µg/L		<100	<100	<100	<100	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		81.3	97.0	84.3	88.2	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		120	113	127	73.0	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C3737**	Page	: 1 of 15
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Issue Date	: 15-Nov-2021 17:09
C-O-C number	: ----		
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-02	E559	25-Oct-2021	----	----	----		08-Nov-2021	28 days	15 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-03	E559	25-Oct-2021	----	----	----		08-Nov-2021	28 days	15 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-4B	E559	25-Oct-2021	----	----	----		08-Nov-2021	28 days	15 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
BH-5B	E559	25-Oct-2021	----	----	----		08-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-02	E298	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-03	E298	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-4B	E298	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
BH-5B	E298	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Field Blank	E298	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-02	E235.Cl	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-03	E235.Cl	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-4B	E235.Cl	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
BH-5B	E235.Cl	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
BH-02	E235.F	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
BH-03	E235.F	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE BH-4B	E235.F	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE BH-5B	E235.F	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BH-02	E235.NO3-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BH-03	E235.NO3-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BH-4B	E235.NO3-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE BH-5B	E235.NO3-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE BH-02	E235.NO2-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE BH-03	E235.NO2-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE BH-4B	E235.NO2-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
BH-5B	E235.NO2-L	25-Oct-2021	----	----	----		27-Oct-2021	3 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-02	E235.SO4	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-03	E235.SO4	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-4B	E235.SO4	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
BH-5B	E235.SO4	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-02	E318	25-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	19 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-03	E318	25-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	19 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-4B	E318	25-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	19 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
BH-5B	E318	25-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	19 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-02	E509	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	13 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-03	E509	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	13 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-4B	E509	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	13 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
BH-5B	E509	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	13 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
Field Blank	E509	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	13 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-02	E421	25-Oct-2021	04-Nov-2021	----	----		05-Nov-2021	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-03	E421	25-Oct-2021	04-Nov-2021	----	----		05-Nov-2021	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-4B	E421	25-Oct-2021	04-Nov-2021	----	----		05-Nov-2021	180 days	12 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
BH-5B	E421	25-Oct-2021	04-Nov-2021	----	----		05-Nov-2021	180 days	12 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Field Blank	E421	25-Oct-2021	04-Nov-2021	----	----		05-Nov-2021	180 days	12 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-02	E601A	25-Oct-2021	06-Nov-2021	14 days	12 days	✓	07-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-03	E601A	25-Oct-2021	06-Nov-2021	14 days	12 days	✓	07-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-4B	E601A	25-Oct-2021	06-Nov-2021	14 days	12 days	✓	07-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
BH-5B	E601A	25-Oct-2021	06-Nov-2021	14 days	12 days	✓	07-Nov-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-02	E581.VH+F1	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-03	E581.VH+F1	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-4B	E581.VH+F1	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
BH-5B	E581.VH+F1	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BH-02	E355-L	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BH-03	E355-L	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BH-4B	E355-L	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) BH-5B	E355-L	25-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	15 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BH-02	E290	25-Oct-2021	----	----	----		27-Oct-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BH-03	E290	25-Oct-2021	----	----	----		27-Oct-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BH-4B	E290	25-Oct-2021	----	----	----		27-Oct-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE BH-5B	E290	25-Oct-2021	----	----	----		27-Oct-2021	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Field Blank	E290	25-Oct-2021	----	----	----		27-Oct-2021	14 days	2 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE BH-02	E100	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE BH-03	E100	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE BH-4B	E100	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE BH-5B	E100	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	25-Oct-2021	----	----	----		27-Oct-2021	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE BH-02	E108	25-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	57 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE BH-03	E108	25-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	57 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE BH-4B	E108	25-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	57 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE BH-5B	E108	25-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	57 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
Field Blank	E108	25-Oct-2021	----	----	----		27-Oct-2021	0.25 hrs	57 hrs	× EHTR-FM
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-02	E611A	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-03	E611A	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-4B	E611A	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
BH-5B	E611A	25-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	13 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	330395	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	339890	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	339787	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330399	1	13	7.6	5.0	✓
Conductivity in Water	E100	330396	1	15	6.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336469	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	330398	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330401	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330402	1	16	6.2	5.0	✓
pH by Meter	E108	330397	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	330403	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339888	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339891	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339786	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	330395	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	339890	1	20	5.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	339326	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	339787	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330399	1	13	7.6	5.0	✓
Conductivity in Water	E100	330396	1	15	6.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336469	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	330398	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330401	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330402	1	16	6.2	5.0	✓
pH by Meter	E108	330397	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	330403	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339888	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339891	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339786	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	330395	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	339890	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
BC PHC - EPH by GC-FID	E601A	339326	1	8	12.5	5.0	✓
BTEX by Headspace GC-MS	E611A	339787	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330399	1	13	7.6	5.0	✓
Conductivity in Water	E100	330396	1	15	6.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336469	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	330398	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330401	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330402	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	330403	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339888	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339891	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339786	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	339890	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	339787	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340413	1	17	5.8	5.0	✓
Chloride in Water by IC	E235.Cl	330399	1	13	7.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339819	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336469	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	330398	1	12	8.3	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	330401	1	16	6.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	330402	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	330403	1	12	8.3	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339888	1	15	6.6	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339891	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339786	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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Vancouver - Environmental			
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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C3737**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 25-Oct-2021 22:10
PO	: ----	Date Analysis Commenced	: 27-Oct-2021
C-O-C number	: ----	Issue Date	: 15-Nov-2021 17:09
Sampler	: ----		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia
Woochan Song	Lab Analyst	Metals, Burnaby, British Columbia

General Comments

The 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 330395)											
VA21C3737-001	BH-02	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	490	490	0.0612%	20%	----
Physical Tests (QC Lot: 330396)											
VA21C3737-001	BH-02	conductivity	----	E100	2.0	µS/cm	921	918	0.326%	10%	----
Physical Tests (QC Lot: 330397)											
VA21C3737-001	BH-02	pH	----	E108	0.10	pH units	7.79	7.85	0.767%	4%	----
Anions and Nutrients (QC Lot: 330398)											
FJ2101187-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.060	0.059	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330399)											
FJ2101187-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	1.28	1.28	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330401)											
FJ2101187-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0248	0.0247	0.00004	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330402)											
FJ2101187-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 330403)											
FJ2101187-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	66.4	66.5	0.0576%	20%	----
Anions and Nutrients (QC Lot: 339888)											
VA21C3737-001	BH-02	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.936	0.926	1.07%	20%	----
Anions and Nutrients (QC Lot: 339890)											
VA21C3737-001	BH-02	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0940	0.0907	3.52%	20%	----
Organic / Inorganic Carbon (QC Lot: 339891)											
VA21C3737-001	BH-02	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.26	1.36	0.10	Diff <2x LOR	----
Dissolved Metals (QC Lot: 336469)											
VA21C3737-001	BH-02	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0033	0.0025	0.0008	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00020	0.00020	0.000003	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00054	0.00058	0.00004	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0656	0.0664	1.18%	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	0.080	0.080	0.000006	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000332	0.0000312	0.0000020	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	84.3	85.4	1.20%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 336469) - continued											
VA21C3737-001	BH-02	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	0.00020	0.00021	0.000006	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	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0045	0.0045	0.000010	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	67.7	68.9	1.85%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0964	0.0982	1.91%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00226	0.00230	2.08%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00220	0.00224	0.00004	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.76	2.87	3.63%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00067	0.00071	0.00004	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000144	0.000202	0.000059	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	7.13	7.12	0.130%	20%	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	25.2	25.9	2.42%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.91	1.97	3.18%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	22.2	22.4	1.13%	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	0.000014	0.000014	0.0000008	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	0.00124	0.00122	1.39%	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	0.0014	0.0015	0.00010	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 339819)											
VA21C3666-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 339820)											
VA21C3737-002	BH-03	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 340413)											

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*
Aggregate Organics (QC Lot: 340413) - continued											
VA21C3730-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	66	74	9	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 339787)											
VA21C3737-001	BH-02	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	1.01	1.07	0.06	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 339786)											
VA21C3737-001	BH-02	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 330395)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 330396)						
conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 330398)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 330399)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 330401)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 330402)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 330403)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 339888)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 339890)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 339891)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 336469)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 336469) - continued						
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 339819)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 339820)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 340413)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 339787)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 339787) - continued						
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 339326)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Hydrocarbons (QCLot: 339786)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 330395)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 330396)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.2	90.0	110	----
Physical Tests (QCLot: 330397)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Anions and Nutrients (QCLot: 330398)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 330399)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 330401)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 330402)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 330403)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 339888)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	98.5	75.0	125	----
Anions and Nutrients (QCLot: 339890)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Organic / Inorganic Carbon (QCLot: 339891)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
Dissolved Metals (QCLot: 336469)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	109	80.0	120	----
barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	110	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	96.4	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.3	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	109	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.0	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 336469) - continued									
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	103	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	108	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.6	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.7	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	103	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	108	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	99.2	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	113	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	109	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	94.4	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	116	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	97.4	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	115	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.7	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	93.3	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	104	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	99.2	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	108	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	110	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.8	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.9	80.0	120	----
Aggregate Organics (QCLot: 340413)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	110	85.0	115	----
Volatile Organic Compounds (QCLot: 339787)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	86.5	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 339787) - continued									
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	72.2	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	84.9	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	77.9	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	70.7	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	76.1	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	76.5	70.0	130	----
Hydrocarbons (QCLot: 339326)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	109	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	108	70.0	130	----
Hydrocarbons (QCLot: 339786)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	72.4	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 330398)										
FJ2101187-002	Anonymous	fluoride	16984-48-8	E235.F	0.992 mg/L	1 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 330399)										
FJ2101187-002	Anonymous	chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 330401)										
FJ2101187-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.51 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 330402)										
FJ2101187-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.479 mg/L	0.5 mg/L	95.8	75.0	125	----
Anions and Nutrients (QCLot: 330403)										
FJ2101187-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	98.1 mg/L	100 mg/L	98.1	75.0	125	----
Anions and Nutrients (QCLot: 339888)										
VA21C3737-002	BH-03	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
Anions and Nutrients (QCLot: 339890)										
VA21C3737-002	BH-03	ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
Organic / Inorganic Carbon (QCLot: 339891)										
VA21C3737-002	BH-03	carbon, total organic [TOC]	----	E355-L	5.19 mg/L	5 mg/L	104	70.0	130	----
Dissolved Metals (QCLot: 336469)										
VA21C3737-002	BH-03	aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.6	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	0.0393 mg/L	0.04 mg/L	98.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00866 mg/L	0.01 mg/L	86.6	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.093 mg/L	0.1 mg/L	92.8	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00375 mg/L	0.004 mg/L	93.8	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.00994 mg/L	0.01 mg/L	99.4	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	90.3	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 336469) - continued										
VA21C3737-002	BH-03	iron, dissolved	7439-89-6	E421	1.87 mg/L	2 mg/L	93.4	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0180 mg/L	0.02 mg/L	90.1	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0360 mg/L	0.04 mg/L	90.1	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.79 mg/L	4 mg/L	94.8	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0400 mg/L	0.04 mg/L	99.9	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.04 mg/L	10 mg/L	90.4	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00313 mg/L	0.004 mg/L	78.2	70.0	130	----
		sodium, dissolved	17341-25-2	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	0.0397 mg/L	0.04 mg/L	99.2	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00353 mg/L	0.004 mg/L	88.2	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00371 mg/L	0.004 mg/L	92.7	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0997 mg/L	0.1 mg/L	99.7	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.371 mg/L	0.4 mg/L	92.8	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
Dissolved Metals (QCLot: 339819)										
VA21C3666-002	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000983 mg/L	0.0001 mg/L	98.3	70.0	130	----
Dissolved Metals (QCLot: 339820)										
VA21C3737-003	BH-4B	mercury, dissolved	7439-97-6	E509	0.0000983 mg/L	0.0001 mg/L	98.3	70.0	130	----
Aggregate Organics (QCLot: 340413)										
VA21C3730-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 339787)										
VA21C3737-002	BH-03	benzene	71-43-2	E611A	74.9 µg/L	100 µg/L	74.9	70.0	130	----
		ethylbenzene	100-41-4	E611A	81.2 µg/L	100 µg/L	81.2	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
Volatile Organic Compounds (QCLot: 339787) - continued										
VA21C3737-002	BH-03	methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	90.9 µg/L	100 µg/L	90.9	70.0	130	----
		styrene	100-42-5	E611A	81.5 µg/L	100 µg/L	81.5	70.0	130	----
		toluene	108-88-3	E611A	77.9 µg/L	100 µg/L	77.9	70.0	130	----
		xylene, m+p-	179601-23-1	E611A	171 µg/L	200 µg/L	85.3	70.0	130	----
		xylene, o-	95-47-6	E611A	83.2 µg/L	100 µg/L	83.2	70.0	130	----
Hydrocarbons (QCLot: 339786)										
VA21C3737-003	BH-4B	VHw (C6-C10)	----	E581.VH+F1	4970 µg/L	6310 µg/L	78.7	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: hshinton@rdks.bc.ca

Email 2: eblaney@rdks.bc.ca;

Email 3: nveikle@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: anne-maries@rdks.bc.ca

Email 2: nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	
Job #:	Hazelton WMF Groundwater
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals F/P	Dissolved Mercury F/P	Alkalinity	Chloride	Fluoride, Sulphate, Hardness	Ammonia P	Nitrate	Nitrite	TOC P	COD P	pH	Conductivity	Total Kjeldahl Nitrogen P	EPH P	BTEX/VPH P	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	BH-02			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	BH-03			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	BH-4B			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	BH-5B			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	Field Blank			Water	R	R	R	R		R					R	R						

Terrace Shipping
#1 Coolers
#___ Carbouys
Ground ☐
Air ☑
SFX ☐

Environmental Division
Vancouver
Work Order Reference
VA21C3737

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION A

Frozen ☐ SIF Observatio

Ice Packs ☑ Ice Cubes ☐ Custody seal i

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C

6.5

SHIPMENT RELEASE (client use)

Released by: Hannah Shinton | Date: October 25th, 2021 | Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Chris | Date: 25 Oct 21 | Time: 1300

FINAL SHIPMENT RECEPTION (lab use only)

Received by: | Date: OCT 25 2021 | Time: 1010

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C4148**	Page	: 1 of 5
Amendment	: **1**		
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Date Analysis Commenced	: 02-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 11:40
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Saron Kim	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).

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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.

Workorder Comments

Amended COA(1): COD data has been revised for all samples.

Qualifiers

Qualifier	*Description*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SGW-1	SGW-2	SGW-4	SGW-5	Travel Blank
					Client sampling date / time	26-Oct-2021 12:31	26-Oct-2021 14:28	26-Oct-2021 14:52	26-Oct-2021 13:09	26-Oct-2021
						VA21C4148-001	VA21C4148-002	VA21C4148-003	VA21C4148-004	VA21C4148-005
						Result	Result	Result	Result	Result
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		223	209	546	314	<1.0
conductivity	----	E100	2.0	µS/cm		406	603	951	560	<2.0
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		187	208	464	276	<0.60
pH	----	E108	0.10	pH units		7.68	7.69	7.34	7.94	5.30
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.310	0.0093	0.0426	0.119	<0.0050
chloride	16887-00-6	E235.Cl	0.50	mg/L		1.95	67.3	7.44	2.59	<0.50
fluoride	16984-48-8	E235.F	0.020	mg/L		0.104	0.063	<0.100 DLDS	0.058	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		2.15	1.35	0.760	0.609	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		<0.0050	<0.0050	<0.0250 DLDS	0.0096	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		0.0032	<0.0010	<0.0050 DLDS	0.0020	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		0.42	1.92	5.26	4.80	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		24.3	29.1	14.9	10.2	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0093	0.0505	0.0322	0.0128	<0.0010
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	0.00010	0.00015	<0.00010	<0.00010
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00075	0.00344	0.00180	0.00157	<0.00010
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0545	0.0528	0.134	0.0776	<0.00010
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
boron, dissolved	7440-42-8	E421	0.010	mg/L		0.012	0.258	0.017	<0.010	<0.010
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		0.0000175	0.0000136	0.0000920	0.0000152	<0.0000050
calcium, dissolved	7440-70-2	E421	0.050	mg/L		39.0	58.2	113	80.4	<0.050
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	<0.000010	<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		0.00176	0.00149	0.00344	0.00202	<0.00010
copper, dissolved	7440-50-8	E421	0.00020	mg/L		<0.00020	0.00057	0.00475	0.00053	<0.00020
iron, dissolved	7439-89-6	E421	0.010	mg/L		7.05	1.82	0.302	2.65	<0.010
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	<0.000050	0.000061	<0.000050	<0.000050

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SGW-1	SGW-2	SGW-4	SGW-5	Travel Blank
					Client sampling date / time	26-Oct-2021 12:31	26-Oct-2021 14:28	26-Oct-2021 14:52	26-Oct-2021 13:09	26-Oct-2021
						VA21C4148-001	VA21C4148-002	VA21C4148-003	VA21C4148-004	VA21C4148-005
						Result	Result	Result	Result	Result
Dissolved Metals										
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	0.0020	0.0014	<0.0010
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		21.7	15.1	44.3	18.2	<0.0050
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		3.49	1.02	2.31	1.63	<0.00010
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.000521	0.000146	0.00204	0.00176	<0.000050
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00414	0.00316	0.00401	0.00254	<0.00050
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	<0.050	<0.050	<0.050
potassium, dissolved	7440-09-7	E421	0.050	mg/L		1.78	3.50	2.30	1.69	<0.050
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00076	0.00078	0.00031	0.00038	<0.00020
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		<0.000050	0.000111	0.000076	<0.000050	<0.000050
silicon, dissolved	7440-21-3	E421	0.050	mg/L		1.59	4.92	6.02	5.49	<0.050
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
sodium, dissolved	17341-25-2	E421	0.050	mg/L		8.16	41.1	9.30	6.51	<0.050
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.290	0.362	1.09	0.596	<0.00020
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		<0.50	0.75	2.50	1.52	<0.50
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	0.00147	0.00105	<0.00030	<0.00030
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.000114	0.000084	0.00109	0.000405	<0.000010
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		<0.0010	0.0023	0.0024	<0.0010	<0.0010
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		<0.00020	0.00026	<0.00020	<0.00020	<0.00020
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Field	Field	N/A
dissolved metals filtration location	----	EP421	-	-		Field	Field	Field	Field	N/A
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		109	106	67	38	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	<0.50	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: SGW-1	SGW-2	SGW-4	SGW-5	Travel Blank
					Client sampling date / time: 26-Oct-2021 12:31	26-Oct-2021 14:28	26-Oct-2021 14:52	26-Oct-2021 13:09	26-Oct-2021
					VA21C4148-001	VA21C4148-002	VA21C4148-003	VA21C4148-004	VA21C4148-005
					Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]									
ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
toluene	108-88-3	E611A	0.50	µg/L	<0.50	1.71	<0.50	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	<0.40	<0.40	----
xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	<0.30	<0.30	----
xylenes, total	1330-20-7	E611A	0.50	µg/L	<0.50	<0.50	<0.50	<0.50	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%	89.4	89.6	91.4	89.8	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%	109	111	110	110	----
Hydrocarbons									
EPH (C10-C19)	----	E601A	250	µg/L	<250	<250	<250	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	1570	<250	<250	<250	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	<100	<100	----
VPHw	----	EC580A	100	µg/L	<100	<100	<100	<100	----
Hydrocarbons Surrogates									
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%	88.6	108	87.2	97.3	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%	108	115	106	113	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C4148**	Page	: 1 of 15
Amendment	: 1		
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Issue Date	: 22-Nov-2021 11:40
C-O-C number	: ----		
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SGW-1	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SGW-2	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SGW-4	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SGW-5	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SGW-1	E298	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SGW-2	E298	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SGW-4	E298	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SGW-5	E298	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Travel Blank	E298	26-Oct-2021	08-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SGW-1	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SGW-2	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SGW-4	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SGW-5	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Travel Blank	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SGW-1	E235.F	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SGW-2	E235.F	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE SGW-4	E235.F	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE SGW-5	E235.F	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SGW-1	E235.NO3-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SGW-2	E235.NO3-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SGW-4	E235.NO3-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE SGW-5	E235.NO3-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SGW-1	E235.NO2-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SGW-2	E235.NO2-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SGW-4	E235.NO2-L	26-Oct-2021	----	----	----		02-Nov-2021	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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE SGW-5	E235.NO2-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Sulfate in Water by IC										
HDPE SGW-1	E235.SO4	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SGW-2	E235.SO4	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SGW-4	E235.SO4	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE SGW-5	E235.SO4	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SGW-1	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SGW-2	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SGW-4	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) SGW-5	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SGW-1	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SGW-2	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SGW-4	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid) SGW-5	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial - dissolved (lab preserved) Travel Blank	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SGW-1	E421	26-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SGW-2	E421	26-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SGW-4	E421	26-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) SGW-5	E421	26-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE - dissolved (lab preserved)										
Travel Blank	E421	26-Oct-2021	05-Nov-2021	----	----		06-Nov-2021	180 days	11 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SGW-1	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SGW-2	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SGW-4	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SGW-5	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SGW-1	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SGW-2	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SGW-4	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SGW-5	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SGW-1	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SGW-2	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SGW-4	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SGW-5	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
SGW-1	E290	26-Oct-2021	----	----	----		02-Nov-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
SGW-2	E290	26-Oct-2021	----	----	----		02-Nov-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
SGW-4	E290	26-Oct-2021	----	----	----		02-Nov-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
SGW-5	E290	26-Oct-2021	----	----	----		02-Nov-2021	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Travel Blank	E290	26-Oct-2021	----	----	----		02-Nov-2021	14 days	7 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE SGW-1	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SGW-2	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SGW-4	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE SGW-5	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE SGW-2	E108	26-Oct-2021	----	----	----		02-Nov-2021	0.25 hrs	169 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SGW-4	E108	26-Oct-2021	----	----	----		02-Nov-2021	0.25 hrs	169 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	26-Oct-2021	----	----	----		02-Nov-2021	0.25 hrs	169 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SGW-1	E108	26-Oct-2021	----	----	----		02-Nov-2021	0.25 hrs	171 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
SGW-5	E108	26-Oct-2021	----	----	----		02-Nov-2021	0.25 hrs	171 hrs	× EHTR-FM
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SGW-1	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SGW-2	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SGW-4	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate)										
SGW-5	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	335866	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	339837	2	36	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	335870	1	19	5.2	5.0	✓
Conductivity in Water	E100	335867	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	338399	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	335869	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	335872	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	335873	1	16	6.2	5.0	✓
pH by Meter	E108	335865	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	335874	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339840	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339838	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	335866	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	339837	2	36	5.5	5.0	✓
BC PHC - EPH by GC-FID	E601A	340896	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	335870	1	19	5.2	5.0	✓
Conductivity in Water	E100	335867	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	338399	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	335869	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	335872	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	335873	1	16	6.2	5.0	✓
pH by Meter	E108	335865	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	335874	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339840	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339838	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	335866	1	17	5.8	5.0	✓
Ammonia by Fluorescence	E298	339837	2	36	5.5	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
BC PHC - EPH by GC-FID	E601A	340896	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	335870	1	19	5.2	5.0	✓
Conductivity in Water	E100	335867	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	338399	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	335869	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	335872	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	335873	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	335874	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339840	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339838	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	339837	2	36	5.5	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	335870	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	338399	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	335869	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	335872	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	335873	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	335874	1	18	5.5	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339840	1	10	10.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339838	1	16	6.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Vancouver - Environmental			
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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C4148**	Page	: 1 of 14
Amendment	: **1**		

Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Groundwater	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Date Analysis Commenced	: 02-Nov-2021
C-O-C number	: ----	Issue Date	: 22-Nov-2021 11:40
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 5		
No. of samples analysed	: 5		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
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General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 335865)											
VA21C4099-003	Anonymous	pH	----	E108	0.10	pH units	6.72	6.73	0.163%	4%	----
Physical Tests (QC Lot: 335866)											
VA21C4099-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	5.0	4.9	0.1	Diff <2x LOR	----
Physical Tests (QC Lot: 335867)											
VA21C4099-003	Anonymous	conductivity	----	E100	2.0	µS/cm	18.8	18.9	0.07	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335869)											
VA21C4099-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335870)											
VA21C4099-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335872)											
VA21C4099-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335873)											
VA21C4099-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335874)											
VA21C4099-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339837)											
FJ2101193-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339840)											
FJ2101237-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.114	0.135	0.022	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 340316)											
FJ2101241-015	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 339838)											
FJ2101193-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.72	1.77	0.06	Diff <2x LOR	----
Dissolved Metals (QC Lot: 338399)											
VA21C4080-003	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 338399) - continued											
VA21C4080-003	Anonymous	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	<0.050	<0.050	0	Diff <2x LOR	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000177	0.000178	0.0000005	Diff <2x LOR	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<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	<0.000010	<0.000010	0	Diff <2x LOR	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 339483)											
VA21C4126-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 340597)											

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*
Aggregate Organics (QC Lot: 340597) - continued											
VA21C4121-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	130	137	7	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 339789)											
VA21C4053-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 339790)											
VA21C4111-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 335866)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 335867)						
conductivity	----	E100	1	µS/cm	1.0	----
Anions and Nutrients (QCLot: 335869)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 335870)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 335872)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 335873)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 335874)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 339837)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 339840)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 340316)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 339838)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 338399)						
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 338399) - continued						
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	17341-25-2	E421	0.05	mg/L	<0.050	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 339483)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 340597)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 339789)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 339789) - continued						
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 339790)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 340896)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 335865)									
pH	----	E108	----	pH units	7 pH units	99.8	98.0	102	----
Physical Tests (QCLot: 335866)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 335867)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.7	90.0	110	----
Anions and Nutrients (QCLot: 335869)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	95.0	90.0	110	----
Anions and Nutrients (QCLot: 335870)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 335872)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 335873)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 335874)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	105	90.0	110	----
Anions and Nutrients (QCLot: 339837)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Anions and Nutrients (QCLot: 339840)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 340316)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
Organic / Inorganic Carbon (QCLot: 339838)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	99.2	80.0	120	----
Dissolved Metals (QCLot: 338399)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.2	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	104	80.0	120	----
beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.6	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	90.5	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 338399) - continued									
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.3	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	94.8	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.4	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.1	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	98.0	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	95.7	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.2	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	96.7	80.0	120	----
manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.1	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.0	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	99.9	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	96.7	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.0	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.0	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	90.6	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	101	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	91.0	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	102	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	94.9	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.2	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.0	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.8	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
Aggregate Organics (QCLot: 340597)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	108	85.0	115	----
Volatile Organic Compounds (QCLot: 339789)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 339789) - continued									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	78.4	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	81.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	82.1	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	81.3	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	90.4	70.0	130	----
Hydrocarbons (QCLot: 339790)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	88.3	70.0	130	----
Hydrocarbons (QCLot: 340896)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	99.7	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	98.4	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 335869)										
VA21C4099-002	Anonymous	fluoride	16984-48-8	E235.F	1.07 mg/L	1 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 335870)										
VA21C4099-002	Anonymous	chloride	16887-00-6	E235.Cl	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 335872)										
VA21C4099-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.81 mg/L	2.5 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 335873)										
VA21C4099-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.533 mg/L	0.5 mg/L	107	75.0	125	----
Anions and Nutrients (QCLot: 335874)										
VA21C4099-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	116 mg/L	100 mg/L	116	75.0	125	----
Anions and Nutrients (QCLot: 339837)										
FJ2101194-005	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.103 mg/L	0.1 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 339840)										
FJ2101237-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.48 mg/L	2.5 mg/L	99.0	70.0	130	----
Anions and Nutrients (QCLot: 340316)										
FJ2101241-016	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
Organic / Inorganic Carbon (QCLot: 339838)										
FJ2101194-005	Anonymous	carbon, total organic [TOC]	----	E355-L	5.47 mg/L	5 mg/L	109	70.0	130	----
Dissolved Metals (QCLot: 338399)										
VA21C4080-004	Anonymous	aluminum, dissolved	7429-90-5	E421	0.192 mg/L	0.2 mg/L	96.0	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0200 mg/L	0.02 mg/L	100	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	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00905 mg/L	0.01 mg/L	90.5	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.092 mg/L	0.1 mg/L	91.8	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00382 mg/L	0.004 mg/L	95.5	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	0.00947 mg/L	0.01 mg/L	94.7	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0389 mg/L	0.04 mg/L	97.2	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
Dissolved Metals (QCLot: 338399) - continued										
VA21C4080-004	Anonymous	cobalt, dissolved	7440-48-4	E421	0.0187 mg/L	0.02 mg/L	93.3	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	89.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	1.89 mg/L	2 mg/L	94.4	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0976 mg/L	0.1 mg/L	97.6	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0362 mg/L	0.04 mg/L	90.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	----
		potassium, dissolved	7440-09-7	E421	3.91 mg/L	4 mg/L	97.7	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	8.60 mg/L	10 mg/L	86.0	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		sodium, dissolved	17341-25-2	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, dissolved	7704-34-9	E421	20.4 mg/L	20 mg/L	102	70.0	130	----
		tellurium, dissolved	13494-80-9	E421	0.0401 mg/L	0.04 mg/L	100	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00368 mg/L	0.004 mg/L	92.0	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.0964 mg/L	0.1 mg/L	96.4	70.0	130	----
		zinc, dissolved	7440-66-6	E421	0.365 mg/L	0.4 mg/L	91.3	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
Dissolved Metals (QCLot: 339483)										
VA21C4126-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000991 mg/L	0.0001 mg/L	99.1	70.0	130	----
Aggregate Organics (QCLot: 340597)										
VA21C4121-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 339789)										
VA21C4053-001	Anonymous	benzene	71-43-2	E611A	78.0 µg/L	100 µg/L	78.0	70.0	130	----
		ethylbenzene	100-41-4	E611A	78.5 µg/L	100 µg/L	78.5	70.0	130	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	89.9 µg/L	100 µg/L	89.9	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
Volatile Organic Compounds (QCLot: 339789) - continued										
VA21C4053-001	Anonymous	styrene	100-42-5	E611A	90.2 µg/L	100 µg/L	90.2	70.0	130	----
		toluene	108-88-3	E611A	81.1 µg/L	100 µg/L	81.1	70.0	130	----
		xylene, m+p-	179601-23-1	E611A	162 µg/L	200 µg/L	80.8	70.0	130	----
		xylene, o-	95-47-6	E611A	88.0 µg/L	100 µg/L	88.0	70.0	130	----
Hydrocarbons (QCLot: 339790)										
VA21C4112-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	3840 µg/L	6310 µg/L	60.9	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17

Page

Environmental Division Vancouver
Work Order Reference
VA21C4148

Telephone : +1 604 253 4188

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	hshinton@rdks.bc.ca
Email 2	eblaney@rdks.bc.ca;
Email 3	nveikle@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to c

Regular [R] ☑ Standard TAT if received by 3 pm

PRIORITY (Business Days): 4 day [P4-20%] ☐ · 3 day [P3-25%] ☐ · 2 day [P2-50%] ☐

EMERGENCY: 1 Business · Same Day, W · (Laboratory

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selec

Analysis Re

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton WMF Groundwater	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	4148	ALS Contact:	Sampler: H. Shinton

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals (F/P)	Dissolved Mercury (F/P)	Alkalinity	Chloride	Fluoride, Sulphate, Hardness	Ammonia (P)	Nitrate	Nitrite	TOC (P)	COD (P)	pH	Conductivity	Total Kjeldahl Nitrogen (P)	EPH (P)	BTEX/VPH (P)	SAMPLES ON HOLD	Sample is hazardous (please provide further detail	NUMBER OF CONTAINERS
1	SGW-1	26-Oct-21	12:31	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
2	SGW-2	26-Oct-21	2:28	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
3	SGW-4	26-Oct-21	2:52	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
4	SGW-5	26-Oct-21	1:09	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
5	Travel Blank	26-Oct-21	-	Water	R		R	R		R					R	R						

Terrace Shipping
#1 Coolers
#___ Carbouys
Ground ☐
Air ☒
SFX ☐

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ · SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ · Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
8.8						8	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: October, 28th 2021	Time:	Received by: Chris	Date: 28 Oct 21	Time: 1150	Received by: PD	Date: OCT 28 2021	Time: 21:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C4142**	Page	: 1 of 6
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Date Analysis Commenced	: 29-Oct-2021
C-O-C number	: ----	Issue Date	: 19-Nov-2021 13:17
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Jay Jang	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
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Saron Kim	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
-	No Unit
µg/L	micrograms per litre
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.

Sample Comments

Sample	Client Id	*Comment*
VA21C4142-003	Field Blank	Sample 3: Water sample for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

Qualifier	*Description*
DTSE	*Dissolved Se concentration exceeds total. Positive bias on D-Se suspected due to signal enhancement from volatile selenium species. Contact ALS if an alternative test to address this interference is needed.*

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	SW-09	DUP	Field Blank	----	----
					Client sampling date / time	26-Oct-2021	26-Oct-2021	26-Oct-2021	----	----
						VA21C4142-001	VA21C4142-002	VA21C4142-003	--------	--------
						Result	Result	Result	----	----
Physical Tests										
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L		257	257	----	----	----
conductivity	----	E100	2.0	µS/cm		600	600	<2.0	----	----
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L		227	231	<0.60	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L		223	223	<0.60	----	----
pH	----	E108	0.10	pH units		8.35	8.36	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L		0.0076	0.0119	<0.0050	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L		45.8	45.8	<0.50	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L		0.091	0.088	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L		0.517	0.521	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L		0.103	0.0943	<0.0050	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L		<0.0010	0.0010	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L		7.11	7.08	----	----	----
Organic / Inorganic Carbon										
carbon, total organic [TOC]	----	E355-L	0.50	mg/L		11.8	11.6	----	----	----
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L		0.0184	0.0144	<0.0030	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L		0.00057	0.00057	<0.00010	----	----
barium, total	7440-39-3	E420	0.00010	mg/L		0.0421	0.0420	<0.00010	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
boron, total	7440-42-8	E420	0.010	mg/L		0.294	0.290	<0.010	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
calcium, total	7440-70-2	E420	0.050	mg/L		63.4	63.2	<0.050	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L		0.00011	0.00011	<0.00010	----	----
copper, total	7440-50-8	E420	0.00050	mg/L		0.00060	0.00107	<0.00050	----	----
iron, total	7439-89-6	E420	0.010	mg/L		0.022	0.022	<0.010	----	----
lead, total	7439-92-1	E420	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-09	DUP	Field Blank	----	----
					Client sampling date / time	26-Oct-2021	26-Oct-2021	26-Oct-2021	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C4142-001	VA21C4142-002	VA21C4142-003	--------	--------
						Result	Result	Result	----	----
Total Metals										
lithium, total	7439-93-2	E420	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L		15.8	15.8	<0.0050	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L		0.00733	0.00643	<0.00010	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L		0.000449	0.000429	<0.000050	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L		0.00236	0.00243	<0.00050	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L		<0.050	<0.050	<0.050	----	----
potassium, total	7440-09-7	E420	0.050	mg/L		6.03	5.99	<0.050	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L		0.00079	0.00086	<0.00020	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L		0.000070	0.000059	<0.000050	----	----
silicon, total	7440-21-3	E420	0.10	mg/L		3.01	3.02	<0.10	----	----
silver, total	7440-22-4	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
sodium, total	17341-25-2	E420	0.050	mg/L		37.9	38.4	<0.050	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L		0.418	0.408	<0.00020	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L		2.75	2.81	<0.50	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
tin, total	7440-31-5	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L		0.00031	<0.00030	<0.00030	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L		0.000355	0.000332	<0.000010	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L		<0.0030	<0.0030	<0.0030	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L		0.0081	0.0072	<0.0010	----	----
antimony, dissolved	7440-36-0	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L		0.00061	0.00061	<0.00010	----	----
barium, dissolved	7440-39-3	E421	0.00010	mg/L		0.0435	0.0422	<0.00010	----	----
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L		<0.000100	<0.000100	<0.000100	----	----
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-09	DUP	Field Blank	----	----
					Client sampling date / time	26-Oct-2021	26-Oct-2021	26-Oct-2021	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C4142-001	VA21C4142-002	VA21C4142-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
boron, dissolved	7440-42-8	E421	0.010	mg/L		0.267	0.274	<0.010	----	----
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
calcium, dissolved	7440-70-2	E421	0.050	mg/L		62.8	65.8	<0.050	----	----
cesium, dissolved	7440-46-2	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
chromium, dissolved	7440-47-3	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L		0.00010	0.00010	<0.00010	----	----
copper, dissolved	7440-50-8	E421	0.00020	mg/L		0.00054	0.00054	<0.00020	----	----
iron, dissolved	7439-89-6	E421	0.010	mg/L		0.012	0.012	<0.010	----	----
lead, dissolved	7439-92-1	E421	0.000050	mg/L		<0.000050	<0.000050	<0.000050	----	----
lithium, dissolved	7439-93-2	E421	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L		17.0	16.2	<0.0050	----	----
manganese, dissolved	7439-96-5	E421	0.00010	mg/L		0.00666	0.00537	<0.00010	----	----
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L		<0.0000050	<0.0000050	<0.0000050	----	----
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L		0.000405	0.000382	<0.000050	----	----
nickel, dissolved	7440-02-0	E421	0.00050	mg/L		0.00241	0.00240	<0.00050	----	----
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L		<0.050	<0.050	<0.050	----	----
potassium, dissolved	7440-09-7	E421	0.050	mg/L		6.32	6.34	<0.050	----	----
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L		0.00087	0.00086	<0.00020	----	----
selenium, dissolved	7782-49-2	E421	0.000050	mg/L		0.000548 DTSE	0.000290 DTSE	<0.000050	----	----
silicon, dissolved	7440-21-3	E421	0.050	mg/L		2.95	2.96	<0.050	----	----
silver, dissolved	7440-22-4	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
sodium, dissolved	17341-25-2	E421	0.050	mg/L		39.2	38.4	<0.050	----	----
strontium, dissolved	7440-24-6	E421	0.00020	mg/L		0.410	0.419	<0.00020	----	----
sulfur, dissolved	7704-34-9	E421	0.50	mg/L		2.66	2.42	<0.50	----	----
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L		<0.00020	<0.00020	<0.00020	----	----
thallium, dissolved	7440-28-0	E421	0.000010	mg/L		<0.000010	<0.000010	<0.000010	----	----
thorium, dissolved	7440-29-1	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
tin, dissolved	7440-31-5	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
titanium, dissolved	7440-32-6	E421	0.00030	mg/L		<0.00030	<0.00030	<0.00030	----	----
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L		<0.00010	<0.00010	<0.00010	----	----
uranium, dissolved	7440-61-1	E421	0.000010	mg/L		0.000376	0.000367	<0.000010	----	----
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L		<0.00050	<0.00050	<0.00050	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	SW-09	DUP	Field Blank	----	----
					Client sampling date / time	26-Oct-2021	26-Oct-2021	26-Oct-2021	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C4142-001	VA21C4142-002	VA21C4142-003	--------	--------
						Result	Result	Result	----	----
Dissolved Metals										
zinc, dissolved	7440-66-6	E421	0.0010	mg/L		<0.0010	<0.0010	<0.0010	----	----
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L		0.00024	<0.00020	<0.00020	----	----
dissolved mercury filtration location	----	EP509	-	-		Field	Field	Laboratory	----	----
dissolved metals filtration location	----	EP421	-	-		Field	Field	Laboratory	----	----
Aggregate Organics										
chemical oxygen demand [COD]	----	E559	20	mg/L		41	32	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	<0.40	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	<0.30	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	<0.50	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		89.8	83.2	91.2	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		105	104	109	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	<250	----	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	<250	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	<100	----	----
VPHw	----	EC580A	100	µg/L		<100	<100	<100	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		101	91.6	87.6	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		106	86.6	104	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C4142**	Page	: 1 of 12
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Issue Date	: 19-Nov-2021 13:17
C-O-C number	: ----		
Sampler	: H. 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.

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
SW-09	E559	26-Oct-2021	----	----	----		08-Nov-2021	28 days	13 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
DUP	E298	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Field Blank	E298	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
SW-09	E298	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	28 days	12 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
SW-09	E235.Cl	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Field Blank	E235.Cl	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
SW-09	E235.F	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	26-Oct-2021	----	----	----		29-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
SW-09	E235.NO3-L	26-Oct-2021	----	----	----		29-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Field Blank	E235.NO3-L	26-Oct-2021	----	----	----		02-Nov-2021	3 days	7 days	× EHTL
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	26-Oct-2021	----	----	----		29-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
SW-09	E235.NO2-L	26-Oct-2021	----	----	----		29-Oct-2021	3 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
SW-09	E235.SO4	26-Oct-2021	----	----	----		29-Oct-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
SW-09	E318	26-Oct-2021	07-Nov-2021	----	----		12-Nov-2021	28 days	17 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
HDPE dissolved (nitric acid)										
Field Blank	E509	26-Oct-2021	09-Nov-2021	----	----		09-Nov-2021	----	14 days	
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
DUP	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
SW-09	E509	26-Oct-2021	06-Nov-2021	----	----		06-Nov-2021	28 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
DUP	E421	26-Oct-2021	05-Nov-2021	----	----		05-Nov-2021	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
SW-09	E421	26-Oct-2021	05-Nov-2021	----	----		05-Nov-2021	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Field Blank	E421	26-Oct-2021	03-Nov-2021	----	----		04-Nov-2021	180 days	9 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : BC PHC - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
SW-09	E601A	26-Oct-2021	09-Nov-2021	14 days	14 days	✓	10-Nov-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
Field Blank	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
SW-09	E581.VH+F1	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
SW-09	E355-L	26-Oct-2021	07-Nov-2021	----	----		08-Nov-2021	28 days	13 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
DUP	E290	26-Oct-2021	----	----	----		30-Oct-2021	14 days	4 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE SW-09	E290	26-Oct-2021	----	----	----		30-Oct-2021	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	26-Oct-2021	----	----	----		30-Oct-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE SW-09	E100	26-Oct-2021	----	----	----		30-Oct-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	26-Oct-2021	----	----	----		02-Nov-2021	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE DUP	E108	26-Oct-2021	----	----	----		30-Oct-2021	0.25 hrs	93 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE SW-09	E108	26-Oct-2021	----	----	----		30-Oct-2021	0.25 hrs	93 hrs	× EHTR-FM
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	26-Oct-2021	----	----	----		09-Nov-2021	28 days	14 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Field Blank	E508	26-Oct-2021	----	----	----		09-Nov-2021	28 days	14 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) SW-09	E508	26-Oct-2021	----	----	----		09-Nov-2021	28 days	14 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	26-Oct-2021	----	----	----		09-Nov-2021	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	26-Oct-2021	----	----	----		09-Nov-2021	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) SW-09	E420	26-Oct-2021	----	----	----		09-Nov-2021	180 days	14 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Field Blank	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) SW-09	E611A	26-Oct-2021	07-Nov-2021	----	----		07-Nov-2021	14 days	12 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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	333316	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	333319	2	39	5.1	5.0	✓
Conductivity in Water	E100	333317	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	2	22	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336456	2	39	5.1	5.0	✓
Fluoride in Water by IC	E235.F	333318	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	333321	2	37	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	333322	1	20	5.0	5.0	✓
pH by Meter	E108	333315	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	333323	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	340909	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	340911	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	333316	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	340896	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	333319	2	39	5.1	5.0	✓
Conductivity in Water	E100	333317	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	2	22	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336456	2	39	5.1	5.0	✓
Fluoride in Water by IC	E235.F	333318	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	333321	2	37	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	333322	1	20	5.0	5.0	✓
pH by Meter	E108	333315	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	333323	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	340909	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	340911	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	333316	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BC PHC - EPH by GC-FID	E601A	340896	1	17	5.8	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	333319	2	39	5.1	5.0	✓
Conductivity in Water	E100	333317	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	2	22	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336456	2	39	5.1	5.0	✓
Fluoride in Water by IC	E235.F	333318	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	333321	2	37	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	333322	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	333323	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	340909	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	340911	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	339952	1	11	9.0	5.0	✓
BTEX by Headspace GC-MS	E611A	339789	1	20	5.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	340597	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	333319	2	39	5.1	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	339483	2	22	9.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	336456	2	39	5.1	5.0	✓
Fluoride in Water by IC	E235.F	333318	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	333321	2	37	5.4	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	333322	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	333323	1	20	5.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	339953	1	7	14.2	5.0	✓
Total Mercury in Water by CVAAS	E508	340909	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	340911	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	339951	1	8	12.5	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	339790	1	19	5.2	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 Vancouver - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHC - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Extractable Petroleum Hydrocarbons (EPH) are analyzed by GC-FID.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **VA21C4142**	Page	: 1 of 22
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton Surface Water	Date Samples Received	: 28-Oct-2021 21:45
PO	: ----	Date Analysis Commenced	: 29-Oct-2021
C-O-C number	: ----	Issue Date	: 19-Nov-2021 13:17
Sampler	: H. Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 3		
No. of samples analysed	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Jay Jang	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
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Monica Ko	Lab Assistant	Metals, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Saron Kim	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 333315)											
VA21C4126-003	Anonymous	pH	----	E108	0.10	pH units	8.11	8.09	0.247%	4%	----
Physical Tests (QC Lot: 333316)											
VA21C4126-003	Anonymous	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	77.6	77.3	0.387%	20%	----
Physical Tests (QC Lot: 333317)											
VA21C4126-003	Anonymous	conductivity	----	E100	2.0	µS/cm	340	340	0.00%	10%	----
Physical Tests (QC Lot: 335867)											
VA21C4099-003	Anonymous	conductivity	----	E100	2.0	µS/cm	18.8	18.9	0.07	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 333318)											
VA21C4126-001	Anonymous	fluoride	16984-48-8	E235.F	0.020	mg/L	0.168	0.166	0.002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 333319)											
VA21C4126-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 333321)											
VA21C4126-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0069	0.0063	0.0006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 333322)											
VA21C4126-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 333323)											
VA21C4126-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	165	166	0.246%	20%	----
Anions and Nutrients (QC Lot: 335870)											
VA21C4099-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 335872)											
VA21C4099-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339952)											
VA21C3730-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	0.0057	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 339953)											
VA21C3730-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.739	0.724	2.11%	20%	----
Organic / Inorganic Carbon (QC Lot: 339951)											
VA21C3730-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	18.6	19.5	4.44%	20%	----
Total Metals (QC Lot: 340909)											
CG2105487-014	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 340911)											
VA21C4169-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.314	0.323	2.93%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 340911) - continued											
VA21C4169-001	Anonymous	antimony, total	7440-36-0	E420	0.00010	mg/L	0.0159	0.0158	0.536%	20%	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.0245	0.0251	2.28%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.144	0.147	1.91%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	0.0167	0.0170	1.88%	20%	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.0118	0.0120	1.60%	20%	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.013	0.012	0.001	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0837	0.0852	1.73%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	13.4	13.5	1.26%	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	0.155	0.160	3.07%	20%	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.126	0.127	0.664%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.189	0.193	2.17%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.345	0.338	2.17%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.332	0.336	1.35%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0146	0.0149	2.14%	20%	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	3.38	3.56	5.17%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.190	0.192	1.43%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.210	0.210	0.418%	20%	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.269	0.272	1.43%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	0.651	0.680	4.40%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0151	0.0154	1.41%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.0214	0.0216	0.864%	20%	----
		silicon, total	7440-21-3	E420	0.10	mg/L	0.20	0.21	0.002	Diff <2x LOR	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.0144	0.0143	1.08%	20%	----
		sodium, total	17341-25-2	E420	0.050	mg/L	5.70	5.86	2.88%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.273	0.270	1.32%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	3.87	3.68	0.19	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	0.0172	0.0175	1.66%	20%	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.0188	0.0190	1.38%	20%	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.110	0.112	2.07%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00809	0.00816	0.961%	20%	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.0220	0.0226	2.74%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 340911) - continued											
VA21C4169-001	Anonymous	vanadium, total	7440-62-2	E420	0.00050	mg/L	0.137	0.139	1.47%	20%	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.258	0.265	2.73%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 336456)											
VA21C3601-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00050	mg/L	0.00133	0.00125	0.00008	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00050	mg/L	0.0373	0.0369	1.11%	20%	----
		beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		bismuth, dissolved	7440-69-9	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		boron, dissolved	7440-42-8	E421	0.050	mg/L	2.99	3.13	4.62%	20%	----
		cadmium, dissolved	7440-43-9	E421	0.0000300	mg/L	<0.0000300	<0.0000300	0	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.250	mg/L	236	238	0.808%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000050	mg/L	0.000058	<0.000050	0.000008	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0050	mg/L	0.0091	0.0090	0.00008	Diff <2x LOR	----
		magnesium, dissolved	7439-95-4	E421	0.0250	mg/L	4.80	4.83	0.782%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00050	mg/L	0.896	0.894	0.189%	20%	----
		molybdenum, dissolved	7439-98-7	E421	0.000250	mg/L	0.183	0.180	1.77%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.250	mg/L	<0.250	<0.250	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.250	mg/L	3.47	3.60	3.66%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00100	mg/L	0.00268	0.00250	0.00018	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000250	mg/L	<0.000250	<0.000250	0	Diff <2x LOR	----
		silicon, dissolved	7440-21-3	E421	0.250	mg/L	4.99	4.85	2.70%	20%	----
		silver, dissolved	7440-22-4	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		sodium, dissolved	17341-25-2	E421	0.250	mg/L	1330	1320	0.740%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00100	mg/L	4.36	4.46	2.16%	20%	----
		sulfur, dissolved	7704-34-9	E421	2.50	mg/L	642	632	1.49%	20%	----
		tellurium, dissolved	13494-80-9	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		thallium, dissolved	7440-28-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 336456) - continued											
VA21C3601-001	Anonymous	thorium, dissolved	7440-29-1	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		tin, dissolved	7440-31-5	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		titanium, dissolved	7440-32-6	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
		tungsten, dissolved	7440-33-7	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		uranium, dissolved	7440-61-1	E421	0.000050	mg/L	0.00171	0.00176	2.56%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00250	mg/L	<0.00250	<0.00250	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00150	mg/L	<0.00150	<0.00150	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 338416)											
FJ2101213-001	Anonymous	aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00037	0.00038	0.000001	Diff <2x LOR	----
		arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0363	0.0369	1.64%	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	0.022	0.023	0.0006	Diff <2x LOR	----
		cadmium, dissolved	7440-43-9	E421	0.0000150	mg/L	<0.0000150	<0.0000100	0.0000050	Diff <2x LOR	----
		calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.0	27.4	1.55%	20%	----
		cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00050	0.00051	0.000007	Diff <2x LOR	----
		iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0178	0.0177	0.569%	20%	----
		magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	32.0	31.7	0.688%	20%	----
		manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00736	0.00744	0.986%	20%	----
		nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.19	1.17	2.13%	20%	----
		rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00059	0.00059	0.000002	Diff <2x LOR	----
		selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.0290	0.0299	3.07%	20%	----
		silicon, dissolved	7440-21-3	E421	0.050	mg/L	0.641	0.686	6.88%	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*
Dissolved Metals (QC Lot: 338416) - continued											
FJ2101213-001	Anonymous	sodium, dissolved	17341-25-2	E421	0.050	mg/L	0.972	0.969	0.275%	20%	----
		strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0713	0.0705	1.07%	20%	----
		sulfur, dissolved	7704-34-9	E421	0.50	mg/L	23.4	24.4	3.92%	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	0.00154	0.00150	2.64%	20%	----
		vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 339483)											
VA21C4126-004	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 340957)											
VA21C4142-003	Field Blank	mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 340597)											
VA21C4121-001	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	130	137	7	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 339789)											
VA21C4053-001	Anonymous	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 339790)											
VA21C4111-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 333316)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 333317)						
conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 335867)						
conductivity	----	E100	1	µS/cm	1.0	----
Anions and Nutrients (QCLot: 333318)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 333319)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 333321)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 333322)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 333323)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 335870)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 335872)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 339952)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 339953)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 339951)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 340909)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 340911)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 340911) - continued						
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 336456)						
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 336456) - continued						
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	17341-25-2	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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 336456) - continued						
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 338416)						
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	17341-25-2	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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 338416) - continued						
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
Dissolved Metals (QCLot: 339483)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 340957)						
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 340597)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----
Volatile Organic Compounds (QCLot: 339789)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 339790)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 340896)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 333315)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 333316)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	102	85.0	115	----
Physical Tests (QCLot: 333317)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.5	90.0	110	----
Physical Tests (QCLot: 335867)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.7	90.0	110	----
Anions and Nutrients (QCLot: 333318)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.6	90.0	110	----
Anions and Nutrients (QCLot: 333319)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 333321)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 333322)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 333323)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 335870)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 335872)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	104	90.0	110	----
Anions and Nutrients (QCLot: 339952)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.2	85.0	115	----
Anions and Nutrients (QCLot: 339953)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.9	75.0	125	----
Organic / Inorganic Carbon (QCLot: 339951)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	93.8	80.0	120	----
Total Metals (QCLot: 340909)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Total Metals (QCLot: 340911)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 340911) - continued									
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	106	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	89.8	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	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	99.9	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	105	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	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	105	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	103	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	97.9	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	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	99.0	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	106	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	94.6	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	104	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	96.4	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	99.3	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	99.6	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.4	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	100	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 336456)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.7	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.5	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	93.5	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	106	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	97.5	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.4	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	90.7	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	107	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	92.5	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.3	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	102	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	94.5	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.1	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	108	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.7	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	95.5	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	108	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	98.6	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	100.0	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	107	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.4	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	88.6	80.0	120	----
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	103	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	114	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.7	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 336456) - continued									
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.2	80.0	120	----
zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.9	80.0	120	----
Dissolved Metals (QCLot: 338416)									
aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.6	80.0	120	----
antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	97.3	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	91.8	80.0	120	----
bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	96.4	80.0	120	----
boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.4	80.0	120	----
cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.9	80.0	120	----
calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	93.5	80.0	120	----
cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	108	80.0	120	----
chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.1	80.0	120	----
iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.1	80.0	120	----
lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	91.1	80.0	120	----
magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.7	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	97.9	80.0	120	----
nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.5	80.0	120	----
phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	96.4	80.0	120	----
potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.5	80.0	120	----
silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	94.8	80.0	120	----
silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.2	80.0	120	----
sodium, dissolved	17341-25-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	108	80.0	120	----
sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	96.8	80.0	120	----
tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	95.6	80.0	120	----
thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.0	80.0	120	----
titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.5	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 338416) - continued									
tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	110	80.0	120	----
vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
zirconium, dissolved	7440-67-7	E421	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	104	80.0	120	----
mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Aggregate Organics (QCLot: 340597)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	108	85.0	115	----
Volatile Organic Compounds (QCLot: 339789)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	78.4	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	81.3	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	95.4	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	94.2	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	82.1	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	81.3	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	90.4	70.0	130	----
Hydrocarbons (QCLot: 339790)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	88.3	70.0	130	----
Hydrocarbons (QCLot: 340896)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	99.7	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	98.4	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 333318)										
VA21C4126-002	Anonymous	fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 333319)										
VA21C4126-002	Anonymous	chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 333321)										
VA21C4126-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 333322)										
VA21C4126-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.501 mg/L	0.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 333323)										
VA21C4126-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
Anions and Nutrients (QCLot: 335870)										
VA21C4099-002	Anonymous	chloride	16887-00-6	E235.Cl	108 mg/L	100 mg/L	108	75.0	125	----
Anions and Nutrients (QCLot: 335872)										
VA21C4099-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.81 mg/L	2.5 mg/L	112	75.0	125	----
Anions and Nutrients (QCLot: 339952)										
VA21C3730-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0995 mg/L	0.1 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 339953)										
VA21C3730-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.51 mg/L	2.5 mg/L	100	70.0	130	----
Organic / Inorganic Carbon (QCLot: 339951)										
VA21C3730-002	Anonymous	carbon, total organic [TOC]	----	E355-L	ND mg/L	5 mg/L	ND	70.0	130	----
Total Metals (QCLot: 340909)										
CG2105487-015	Anonymous	mercury, total	7439-97-6	E508	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
Total Metals (QCLot: 340911)										
VA21C4169-002	Anonymous	aluminum, total	7429-90-5	E420	0.186 mg/L	0.2 mg/L	92.9	70.0	130	----
		antimony, total	7440-36-0	E420	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		barium, total	7440-39-3	E420	0.0183 mg/L	0.02 mg/L	91.4	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0382 mg/L	0.04 mg/L	95.5	70.0	130	----
		bismuth, total	7440-69-9	E420	ND mg/L	0.01 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 340911) - continued										
VA21C4169-002	Anonymous	boron, total	7440-42-8	E420	0.092 mg/L	0.1 mg/L	91.7	70.0	130	----
		cadmium, total	7440-43-9	E420	ND mg/L	0.004 mg/L	ND	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	0.00981 mg/L	0.01 mg/L	98.1	70.0	130	----
		chromium, total	7440-47-3	E420	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		copper, total	7440-50-8	E420	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		iron, total	7439-89-6	E420	1.89 mg/L	2 mg/L	94.5	70.0	130	----
		lead, total	7439-92-1	E420	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		lithium, total	7439-93-2	E420	0.0963 mg/L	0.1 mg/L	96.3	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	0.0185 mg/L	0.02 mg/L	92.4	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		nickel, total	7440-02-0	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.35 mg/L	10 mg/L	93.5	70.0	130	----
		potassium, total	7440-09-7	E420	3.87 mg/L	4 mg/L	96.8	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		selenium, total	7782-49-2	E420	0.0377 mg/L	0.04 mg/L	94.4	70.0	130	----
		silicon, total	7440-21-3	E420	8.77 mg/L	10 mg/L	87.7	70.0	130	----
		silver, total	7440-22-4	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		sodium, total	17341-25-2	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	19.0 mg/L	20 mg/L	95.2	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0390 mg/L	0.04 mg/L	97.4	70.0	130	----
		thallium, total	7440-28-0	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		thorium, total	7440-29-1	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		tin, total	7440-31-5	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		titanium, total	7440-32-6	E420	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.004 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0961 mg/L	0.1 mg/L	96.1	70.0	130	----
		zinc, total	7440-66-6	E420	0.384 mg/L	0.4 mg/L	95.9	70.0	130	----
		zirconium, total	7440-67-7	E420	0.0393 mg/L	0.04 mg/L	98.2	70.0	130	----
Dissolved Metals (QCLot: 336456)										
VA21C3601-002	Anonymous	aluminum, dissolved	7429-90-5	E421	1.02 mg/L	1 mg/L	102	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.105 mg/L	0.1 mg/L	105	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 336456) - continued										
VA21C3601-002	Anonymous	arsenic, dissolved	7440-38-2	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		beryllium, dissolved	7440-41-7	E421	0.190 mg/L	0.2 mg/L	95.2	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.0490 mg/L	0.05 mg/L	97.9	70.0	130	----
		boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.0197 mg/L	0.02 mg/L	98.7	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	0.0527 mg/L	0.05 mg/L	105	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0994 mg/L	0.1 mg/L	99.4	70.0	130	----
		iron, dissolved	7439-89-6	E421	10.0 mg/L	10 mg/L	100	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0993 mg/L	0.1 mg/L	99.3	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.461 mg/L	0.5 mg/L	92.1	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.197 mg/L	0.2 mg/L	98.6	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	52.9 mg/L	50 mg/L	106	70.0	130	----
		potassium, dissolved	7440-09-7	E421	19.9 mg/L	20 mg/L	99.6	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.206 mg/L	0.2 mg/L	103	70.0	130	----
		silicon, dissolved	7440-21-3	E421	50.2 mg/L	50 mg/L	100	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.0166 mg/L	0.02 mg/L	83.1	70.0	130	----
		sodium, dissolved	17341-25-2	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	0.195 mg/L	0.2 mg/L	97.6	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.0189 mg/L	0.02 mg/L	94.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.109 mg/L	0.1 mg/L	109	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0997 mg/L	0.1 mg/L	99.7	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.205 mg/L	0.2 mg/L	102	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.0215 mg/L	0.02 mg/L	107	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.525 mg/L	0.5 mg/L	105	70.0	130	----
		zinc, dissolved	7440-66-6	E421	2.00 mg/L	2 mg/L	100	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.220 mg/L	0.2 mg/L	110	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 338416)										
FJ2101213-002	Anonymous	aluminum, dissolved	7429-90-5	E421	0.195 mg/L	0.2 mg/L	97.7	70.0	130	----
		antimony, dissolved	7440-36-0	E421	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		arsenic, dissolved	7440-38-2	E421	0.0207 mg/L	0.02 mg/L	104	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	0.0369 mg/L	0.04 mg/L	92.4	70.0	130	----
		bismuth, dissolved	7440-69-9	E421	0.00907 mg/L	0.01 mg/L	90.7	70.0	130	----
		boron, dissolved	7440-42-8	E421	0.084 mg/L	0.1 mg/L	84.1	70.0	130	----
		cadmium, dissolved	7440-43-9	E421	0.00412 mg/L	0.004 mg/L	103	70.0	130	----
		calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, dissolved	7440-46-2	E421	0.0108 mg/L	0.01 mg/L	108	70.0	130	----
		chromium, dissolved	7440-47-3	E421	0.0415 mg/L	0.04 mg/L	104	70.0	130	----
		cobalt, dissolved	7440-48-4	E421	0.0196 mg/L	0.02 mg/L	98.0	70.0	130	----
		copper, dissolved	7440-50-8	E421	0.0186 mg/L	0.02 mg/L	92.8	70.0	130	----
		iron, dissolved	7439-89-6	E421	2.03 mg/L	2 mg/L	102	70.0	130	----
		lead, dissolved	7439-92-1	E421	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		lithium, dissolved	7439-93-2	E421	0.0916 mg/L	0.1 mg/L	91.6	70.0	130	----
		magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, dissolved	7439-96-5	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		molybdenum, dissolved	7439-98-7	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		nickel, dissolved	7440-02-0	E421	0.0396 mg/L	0.04 mg/L	98.9	70.0	130	----
		phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	----
		potassium, dissolved	7440-09-7	E421	4.09 mg/L	4 mg/L	102	70.0	130	----
		rubidium, dissolved	7440-17-7	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		selenium, dissolved	7782-49-2	E421	0.0445 mg/L	0.04 mg/L	111	70.0	130	----
		silicon, dissolved	7440-21-3	E421	9.26 mg/L	10 mg/L	92.6	70.0	130	----
		silver, dissolved	7440-22-4	E421	0.00396 mg/L	0.004 mg/L	99.1	70.0	130	----
		sodium, dissolved	17341-25-2	E421	1.86 mg/L	2 mg/L	92.8	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	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		thallium, dissolved	7440-28-0	E421	0.00370 mg/L	0.004 mg/L	92.6	70.0	130	----
		thorium, dissolved	7440-29-1	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		tin, dissolved	7440-31-5	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		titanium, dissolved	7440-32-6	E421	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		uranium, dissolved	7440-61-1	E421	0.00418 mg/L	0.004 mg/L	104	70.0	130	----
		vanadium, dissolved	7440-62-2	E421	0.104 mg/L	0.1 mg/L	104	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Dissolved Metals (QCLot: 338416) - continued										
FJ2101213-002	Anonymous	zinc, dissolved	7440-66-6	E421	0.406 mg/L	0.4 mg/L	102	70.0	130	----
		zirconium, dissolved	7440-67-7	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 339483)										
VA21C4126-005	Anonymous	mercury, dissolved	7439-97-6	E509	0.0000991 mg/L	0.0001 mg/L	99.1	70.0	130	----
Dissolved Metals (QCLot: 340957)										
VA21C4888-001	Anonymous	mercury, dissolved	7439-97-6	E509	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
Aggregate Organics (QCLot: 340597)										
VA21C4121-002	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 339789)										
VA21C4053-001	Anonymous	benzene	71-43-2	E611A	78.0 µg/L	100 µg/L	78.0	70.0	130	----
		ethylbenzene	100-41-4	E611A	78.5 µg/L	100 µg/L	78.5	70.0	130	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	89.9 µg/L	100 µg/L	89.9	70.0	130	----
		styrene	100-42-5	E611A	90.2 µg/L	100 µg/L	90.2	70.0	130	----
		toluene	108-88-3	E611A	81.1 µg/L	100 µg/L	81.1	70.0	130	----
		xylene, m+p-	179601-23-1	E611A	162 µg/L	200 µg/L	80.8	70.0	130	----
		xylene, o-	95-47-6	E611A	88.0 µg/L	100 µg/L	88.0	70.0	130	----
Hydrocarbons (QCLot: 339790)										
VA21C4112-004	Anonymous	VHw (C6-C10)	----	E581.VH+F1	3840 µg/L	6310 µg/L	60.9	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: hshinton@rdks.bc.ca

Email 2: nveikle@rdks.bc.ca

Email 3: eblaney@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: anne-maries@rdks.bc.ca, nveikle@rdks.bc.ca

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton Surface Water	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): 4142

ALS Contact: | Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Dissolved Metals	Alkalinity	Chloride	Fluoride, sulphate, hardness	Ammonia	Nitrate	Nitrite	Total Kjeldahl Nitrogen	TOC	pH	COD	Conductivity	EPH	BTEX / VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P	F/P				P			P	P		P		P	P			
	SW-09	26-Oct-21		Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	DUP	26-Oct-21		Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	Field Blank	26-Oct-21		Water	R	R		R		R	R						R	R	R			

Environmental Division Vancouver
Work Order Reference
VA21C4142

Telephone : +1 604 253 4188

Terrace Shipping
#1 Coolers
Carbouys
Ground ☐
Air ☑
SFX ☐

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
10.4						8	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: October, 28th 2021	Time:	Received by: Chris	Date: 28 Oct 21	Time: 1150	Received by: PD	Date: OCT 28 2021	Time: 21:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C6527**	Page	: 1 of 2
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 26-Nov-2021 21:30
PO	: ----	Date Analysis Commenced	: 30-Nov-2021
C-O-C number	: ----	Issue Date	: 13-Dec-2021 11:25
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Paolo Obillo	Account Manager Assistant	External Subcontracting, 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

<: less than.

>: greater than.

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

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

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

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)					*Client sample ID*	**Wetland 4 Outlet**	**----**	**----**	**----**	**----**
					Client sampling date / time	25-Nov-2021 14:40	----	----	----	----
Analyte	*CAS Number*	*Method*	*LOR*	*Unit*		**VA21C6527-001**	**--------**	**--------**	**--------**	**--------**
						Result	----	----	----	----
Bioassays										
Daphnia magna LC50	----	DAP-LC50-48	-	-		See attached	----	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C6527**	Page	: 1 of 4
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton EQ LC50	Date Samples Received	: 26-Nov-2021 21:30
PO	: ----	Issue Date	: 13-Dec-2021 11:25
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

Key

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

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)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Bioassays : Survival/LC50 Daphnia Magna 48 hours										
HDPE LC50										
Wetland 4 Outlet	DAP-LC50-48	25-Nov-2021	----	----	----		30-Nov-2021	----	5 days	

Legend & Qualifier Definitions

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

Quality Control Parameter Frequency Compliance

- **No Quality Control data available for this section.**

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
Survival/LC50 Daphnia Magna 48 hours	DAP-LC50-48 Nautilus Environmental (Burnaby) - 8664 Commerce Court Burnaby British Columbia Canada V5A 4N7	Water	EPS1/RM/14	See attached report.

QUALITY CONTROL REPORT

Work Order	: **VA21C6527**	Page	: 1 of 2
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
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Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 1		
No. of samples analysed	: 1		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
Paolo Obillo	Account Manager Assistant	External Subcontracting, Burnaby, British Columbia

General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Acute Toxicity Test Results

Sample VA21C6527-001 Wetland 4 Outlet,
collected November 25, 2021

Final Report

December 9, 2021

Submitted to: **ALS Environmental**
Burnaby, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

SAMPLE INFORMATION

Sample ID	Dates			Receipt temperature
	Collected	Received	*Daphnia magna* test initiation	
VA21C6527-001 Wetland 4 Outlet	25-Nov-21 at 1440h	29-Nov-21 at 1023h	30-Nov-21 at 1310h	6.0°C

TEST

- *Daphnia magna* 48-h LC50 test.

RESULTS

Toxicity test results

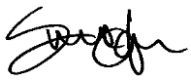
Sample ID	LC50 (%v/v)
VA21C6527-001 Wetland 4 Outlet	>100

LC = Lethal Concentration

QA/QC

QA/QC summary	*Daphnia magna*
Reference toxicant LC50 (95% CL)	6.1 (4.6 – 8.3) g/L NaCl[1]
Reference toxicant historical mean (2 SD range)	5.1 (3.7 – 7.2) g/L NaCl
Reference toxicant CV	17%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

[1] Test date: November 16, 2021, LC = Lethal Concentration, SD = Standard Deviation, CL = Confidence Limits, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Andy Diewald, B.Sc.
Senior Analyst

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	*Daphnia magna*
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Daphnia magna Summary Sheet

Client: ALS
Work Order No.: 212413

Start Date/Time: November 30, 2021 @ 1310h
Test Species: *Daphnia magna*
Set up by: KV

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤2 daphnids exibit immobility and/or mortality in any single control replicate.

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Sample Information:

Sample ID: VA21C6527-001 wetland 4 outlet
Sample Date: November 25, 2021
Date Received: November 29, 2021
Sample Volume: 2 x 1L

Test Organism Information:

Broodstock No.: 111021A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 27
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmDC85
Stock Solution ID: 21N03
Date Initiated: November 16, 2021
48-h LC50 (95% CL): 6.1 (4.6 - 8.3) g/LNaCL

Reference Toxicant Mean and Historical Range: 5.1 (3.7 - 7.2) g/L NaCL
Reference Toxicant CV (%): 17

Test Results: The 48h LC50 is estimated to be >100% (v/v)

Reviewed by: A
Date reviewed: Dec 7/21

Freshwater Acute
48 Hour Toxicity Test Data Sheet

Client: ALS
Sample ID: Wetland 4 Outlet ○VAZIC6527-001
Work Order No.: 212413
CER #: 5

Start Date/Time: November 30/21 @ 13:01
Test Organism: D.magna
Organisms/volume: 10/200mL
Set up by: KV

Thermometer: CER#5 pH meter/probe: 6 / 6 DO meter/probe: 6 / 6 Cond./Salinity meter/probe: 6 / 6

Concentration (o/o v/v)	Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0	24	48	0	24	48	0	24	48	0	48
control	A	10	10	0	19.5	20.0	20.0	8.8	8.6	8.4	8.0	8.0	7.9	372	372
	B														
	C														
	D														
6.25	A	10	9	0	20.0	20.0	20.0	8.8	8.5	8.5	8.0	8.0	8.0	373	373
	B														
	C														
	D														
12.5	A	10	10	0	20.0	20.0	20.0	8.8	8.5	8.5	8.0	8.0	8.0	376	376
	B														
	C														
	D														
25	A	10	10	0	20.0	20.0	20.0	8.8	8.5	8.5	7.9	8.0	8.0	380	381
	B														
	C														
	D														
50	A	10	10	0	20.0	20.0	20.0	8.8	8.5	8.5	7.7	8.0	8.1	391	389
	B														
	C														
	D														
100	A	10	10	0	20.5	20.0	20.0	8.8	8.6	8.5	7.4	8.0	8.2	420	411
	B														
	C														
	D														
Technician Initials		KV	KV	KV	KV	KV	KV	KV	KV	KV	KV	KV	KV	KV	KV

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCo3)	
Control (MHW)	100	90
Highest conc.	190	250
Hardness adjusted	—	

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.8		
pH	7.4		
Cond (µS/cm)	420		
Salinity (ppt)	0.2		

Sample Description: colourless, odourless, clear, no particulates

Comments:

Mortality: Heartbeat checked under microscope Yes

Batch#: 111021A 7-d previous # young/brood: 27 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: — Date reviewed: Dec 7/21

APPENDIX C – Chain-of-custody form

Chain of Custody
Vancouver - Environmental
8081 Lougheed Highway
Burnaby BC Canada V5A 1W9

PREVIEW COC

Destination Lab:	**Nautilus Environmental (Burnaby)**
Address:	8664 Commerce Court Burnaby BC Canada V5A 4N7
Work Order Number:	**VA21C6527**
Original Receipt Date/Time	Instructions Received
26/11/2021 21:30	

Relinquished By
Date/Time
Received By
Date/Time
Receipt Temp

Return as Indicated: Results: alsev.datasublet@alsglobal.com Invoice: alsev.datasublet@alsglobal.com Electronic Data: alsev.datasublet@alsglobal.com

Attention: Amber Springer

ALS Sample ID	Client ID	Matrix	Container Type	Test Codes	Method Description	Due Date	Sampling Date and Time	Remarks
VA21C6527-001	Wetland 4 Outlet	Water	HDPE LC50			03-12-2021	25/11/2021 14:40	
VA21C6527-001	Wetland 4 Outlet	Water	HDPE LC50	DAP-LC50-48	Survival/LC50 Daphnia Magna 48 hours	03-12-2021	25/11/2021 14:40	

TH
Nov. 29/21 @ 10:23
2x1L
212413
6.0°C

END OF REPORT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	eblaney@rdks.bc.ca
Email 2	hshinton@rdks.bc.ca
Email 3	nveikle@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	anne-maries@rdks.bc.ca
Email 2	nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)	
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days)	4 day [P4-20%] ☐
	3 day [P3-25%] ☐
	2 day [P2-50%] ☐
EMERGENCY	1 Business day [E1 - 100%] ☐
	Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)] ☐
Date and Time Required for all E&P TATs:	
For tests that can not be performed according to the service level selected, you will be contacted.	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	Hazelton EQ LC50	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact: Amber Springer **Sampler:** H.Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Acute toxicity LC50 Daphnia magna	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	Wetland 4 Outlet	25-Nov-21	12:40	Effluent	R			

Environmental Division
Vancouver
Work Order Reference
VA21C6527

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☑ Ice Cubes ☐	Custody seal intact	Yes ☐	No	☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5.6			6.5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: NOV. 26. 2021	Time:	Received by: Chris	Date: 26 Nov 21	Time: 1145	Received by: RJ	Date: NOV - 26	Time: 2113 0

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form.**

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA21C6525**	Page	: 1 of 5
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 26-Nov-2021 21:30
PO	: ----	Date Analysis Commenced	: 28-Nov-2021
C-O-C number	: ----	Issue Date	: 09-Dec-2021 11:33
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Laboratory Department*
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia

General Comments

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

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

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

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

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

Unit	*Description*
µg/L	micrograms per litre
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.

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	----	----	----
					Client sampling date / time: 25-Nov-2021 14:00	25-Nov-2021 12:00	----	----	----
					VA21C6525-001	VA21C6525-002	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	202	210	----	----	----
conductivity	----	E100	2.0	µS/cm	438	436	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	224	221	----	----	----
pH	----	E108	0.10	pH units	8.28	8.26	----	----	----
Anions and Nutrients									
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.263	0.264	----	----	----
chloride	16887-00-6	E235.Cl	0.50	mg/L	16.8	16.8	----	----	----
fluoride	16984-48-8	E235.F	0.020	mg/L	0.080	0.080	----	----	----
Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.714	0.641	----	----	----
nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0918	0.0796	----	----	----
nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.827	0.836	----	----	----
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	0.0095	0.0092	----	----	----
sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	7.50	7.30	----	----	----
Organic / Inorganic Carbon									
carbon, total organic [TOC]	----	E355-L	0.50	mg/L	8.36	8.48	----	----	----
Total Metals									
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.308	0.264	----	----	----
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00089	0.00083	----	----	----
barium, total	7440-39-3	E420	0.00010	mg/L	0.0572	0.0580	----	----	----
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	----	----	----
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	----	----	----
boron, total	7440-42-8	E420	0.010	mg/L	0.124	0.130	----	----	----
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000433	0.0000413	----	----	----
calcium, total	7440-70-2	E420	0.050	mg/L	63.1	61.8	----	----	----
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000031	0.000021	----	----	----
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	----	----	----
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00037	0.00035	----	----	----
copper, total	7440-50-8	E420	0.00050	mg/L	0.00192	0.00191	----	----	----

Analytical Results

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

Analyte	CAS Number	Method	LOR	Unit	Client sample ID: Wetland 4	DUP	----	----	----
					Client sampling date / time: 25-Nov-2021 14:00	25-Nov-2021 12:00	----	----	----
					VA21C6525-001	VA21C6525-002	--------	--------	--------
					Result	Result	----	----	----
Total Metals									
iron, total	7439-89-6	E420	0.010	mg/L	0.399	0.349	----	----	----
lead, total	7439-92-1	E420	0.000050	mg/L	0.000130	0.000120	----	----	----
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	----	----	----
magnesium, total	7439-95-4	E420	0.0050	mg/L	16.1	16.2	----	----	----
manganese, total	7439-96-5	E420	0.00010	mg/L	0.454	0.455	----	----	----
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000467	0.000462	----	----	----
nickel, total	7440-02-0	E420	0.00050	mg/L	0.00170	0.00165	----	----	----
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	----	----	----
potassium, total	7440-09-7	E420	0.050	mg/L	4.23	4.29	----	----	----
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00061	0.00055	----	----	----
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000053	0.000069	----	----	----
silicon, total	7440-21-3	E420	0.10	mg/L	3.29	3.26	----	----	----
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----
sodium, total	17341-25-2	E420	0.050	mg/L	18.3	18.3	----	----	----
strontium, total	7440-24-6	E420	0.00020	mg/L	0.387	0.388	----	----	----
sulfur, total	7704-34-9	E420	0.50	mg/L	3.39	3.38	----	----	----
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	----	----	----
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	----	----	----
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00477	0.00478	----	----	----
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	----	----	----
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000322	0.000332	----	----	----
vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00070	0.00059	----	----	----
zinc, total	7440-66-6	E420	0.0030	mg/L	0.0047	0.0046	----	----	----
zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00028	0.00025	----	----	----
Aggregate Organics									
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	----	----	----
chemical oxygen demand [COD]	----	E559	20	mg/L	25	26	----	----	----
Volatile Organic Compounds [Fuels]									

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Wetland 4	DUP	----	----	----
					Client sampling date / time	25-Nov-2021 14:00	25-Nov-2021 12:00	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA21C6525-001	VA21C6525-002	--------	--------	--------
						Result	Result	----	----	----
Volatile Organic Compounds [Fuels]										
benzene	71-43-2	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
ethylbenzene	100-41-4	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
styrene	100-42-5	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
toluene	108-88-3	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
xylene, m+p-	179601-23-1	E611A	0.40	µg/L		<0.40	<0.40	----	----	----
xylene, o-	95-47-6	E611A	0.30	µg/L		<0.30	<0.30	----	----	----
xylenes, total	1330-20-7	E611A	0.50	µg/L		<0.50	<0.50	----	----	----
Volatile Organic Compounds Surrogates										
bromofluorobenzene, 4-	460-00-4	E611A	1.0	%		88.8	91.7	----	----	----
difluorobenzene, 1,4-	540-36-3	E611A	1.0	%		104	99.5	----	----	----
Hydrocarbons										
EPH (C10-C19)	----	E601A	250	µg/L		<250	<250	----	----	----
VHw (C6-C10)	----	E581.VH+F1	100	µg/L		<100	<100	----	----	----
EPH (C10-C32)	----	E601A	400	µg/L		<400	<400	----	----	----
EPH (C19-C32)	----	E601A	250	µg/L		<250	<250	----	----	----
VPHw	----	EC580A	100	µg/L		<100	<100	----	----	----
Hydrocarbons Surrogates										
bromobenzotrifluoride, 2- (EPH surr)	392-83-6	E601A	1.0	%		77.1	75.5	----	----	----
dichlorotoluene, 3,4-	97-75-0	E581.VH+F1	1.0	%		87.8	86.0	----	----	----

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

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **VA21C6525**	Page	: 1 of 11
Client	: **Regional District of Kitimat-Stikine**	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 26-Nov-2021 21:30
PO	: ----	Issue Date	: 09-Dec-2021 11:33
C-O-C number	: ----		
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

Key

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

Summary of Outliers

Outliers : Quality Control Samples

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

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

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

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

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

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

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

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

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
DUP	E550	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Aggregate Organics : Biochemical Oxygen Demand - 5 day										
HDPE [BOD HT 3d]										
Wetland 4	E550	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E559	25-Nov-2021	----	----	----		07-Dec-2021	28 days	12 days	✓
Aggregate Organics : Chemical Oxygen Demand by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E559	25-Nov-2021	----	----	----		07-Dec-2021	28 days	12 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
DUP	E298	25-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	28 days	7 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Wetland 4	E298	25-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	28 days	7 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
DUP	E235.Cl	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Wetland 4	E235.Cl	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
DUP	E378-U	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)										
HDPE										
Wetland 4	E378-U	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
DUP	E235.F	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Wetland 4	E235.F	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
DUP	E235.NO3-L	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO3-L	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
DUP	E235.NO2-L	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE										
Wetland 4	E235.NO2-L	25-Nov-2021	----	----	----		28-Nov-2021	3 days	3 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
DUP	E235.SO4	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Wetland 4	E235.SO4	25-Nov-2021	----	----	----		28-Nov-2021	28 days	3 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
DUP	E318	25-Nov-2021	01-Dec-2021	----	----		08-Dec-2021	28 days	13 days	✓
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid)										
Wetland 4	E318	25-Nov-2021	01-Dec-2021	----	----		08-Dec-2021	28 days	13 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
DUP	E366	25-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	28 days	7 days	✓
Anions and Nutrients : Total Nitrogen by Colourimetry										
Amber glass total (sulfuric acid)										
Wetland 4	E366	25-Nov-2021	01-Dec-2021	----	----		02-Dec-2021	28 days	7 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
DUP	E601A	25-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate)										
Wetland 4	E601A	25-Nov-2021	07-Dec-2021	14 days	12 days	✓	08-Dec-2021	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate)										
DUP	E581.VH+F1	25-Nov-2021	05-Dec-2021	----	----		05-Dec-2021	14 days	10 days	✓

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass vial (sodium bisulfate) Wetland 4	E581.VH+F1	25-Nov-2021	05-Dec-2021	----	----		05-Dec-2021	14 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) DUP	E355-L	25-Nov-2021	01-Dec-2021	----	----		01-Dec-2021	28 days	6 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Wetland 4	E355-L	25-Nov-2021	01-Dec-2021	----	----		01-Dec-2021	28 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE DUP	E290	25-Nov-2021	----	----	----		29-Nov-2021	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Wetland 4	E290	25-Nov-2021	----	----	----		29-Nov-2021	14 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE DUP	E100	25-Nov-2021	----	----	----		29-Nov-2021	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Wetland 4	E100	25-Nov-2021	----	----	----		29-Nov-2021	28 days	4 days	✓
Physical Tests : pH by Meter										
HDPE Wetland 4	E108	25-Nov-2021	----	----	----		29-Nov-2021	0.25 hrs	88 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE DUP	E108	25-Nov-2021	----	----	----		29-Nov-2021	0.25 hrs	90 hrs	× EHTR-FM

Matrix: **Water**

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

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) DUP	E508	25-Nov-2021	----	----	----		02-Dec-2021	28 days	7 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) Wetland 4	E508	25-Nov-2021	----	----	----		02-Dec-2021	28 days	7 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) DUP	E420	25-Nov-2021	----	----	----		01-Dec-2021	180 days	6 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Wetland 4	E420	25-Nov-2021	----	----	----		01-Dec-2021	180 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) DUP	E611A	25-Nov-2021	05-Dec-2021	----	----		05-Dec-2021	14 days	10 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass vial (sodium bisulfate) Wetland 4	E611A	25-Nov-2021	05-Dec-2021	----	----		05-Dec-2021	14 days	10 days	✓

Legend & Qualifier Definitions

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

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

Quality Control Parameter Frequency Compliance

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

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	354641	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	357156	1	14	7.1	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	354499	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	359860	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	360934	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	354645	1	17	5.8	5.0	✓
Conductivity in Water	E100	354639	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	354655	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	354643	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	354648	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	354647	1	18	5.5	5.0	✓
pH by Meter	E108	354638	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	354644	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	357158	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	357867	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	355674	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	357157	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	357155	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	359859	1	4	25.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	354641	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	357156	1	14	7.1	5.0	✓
BC PHCs - EPH by GC-FID	E601A	360765	1	17	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	354499	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	359860	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	360934	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	354645	1	17	5.8	5.0	✓
Conductivity in Water	E100	354639	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	354655	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	354643	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	354648	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	354647	1	18	5.5	5.0	✓
pH by Meter	E108	354638	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	354644	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	357158	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	357867	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	355674	1	20	5.0	5.0	✓

Matrix: **Water**

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

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Total Nitrogen by Colourimetry	E366	357157	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	357155	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	359859	1	4	25.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	354641	1	8	12.5	5.0	✓
Ammonia by Fluorescence	E298	357156	1	14	7.1	5.0	✓
BC PHCs - EPH by GC-FID	E601A	360765	1	17	5.8	5.0	✓
Biochemical Oxygen Demand - 5 day	E550	354499	1	10	10.0	5.0	✓
BTEX by Headspace GC-MS	E611A	359860	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	360934	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	354645	1	17	5.8	5.0	✓
Conductivity in Water	E100	354639	1	19	5.2	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	354655	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	354643	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	354648	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	354647	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	354644	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	357158	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	357867	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	355674	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	357157	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	357155	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	359859	1	4	25.0	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	357156	1	14	7.1	5.0	✓
BTEX by Headspace GC-MS	E611A	359860	1	4	25.0	5.0	✓
Chemical Oxygen Demand by Colourimetry	E559	360934	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	354645	1	17	5.8	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U	354655	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	354643	1	17	5.8	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	354648	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	354647	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	354644	1	17	5.8	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	357158	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	357867	1	17	5.8	5.0	✓
Total Metals in Water by CRC ICPMS	E420	355674	1	20	5.0	5.0	✓
Total Nitrogen by Colourimetry	E366	357157	1	9	11.1	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	357155	1	15	6.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	359859	1	4	25.0	5.0	✓

Methodology References and Summaries

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

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 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.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	J. Environ. Monit., 2005, 7, 37-42 (mod)	Ammonia in water is analyzed by flow-injection analysis with fluorescence detection after reaction with orthophthaldialdehyde (OPA).
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Total Nitrogen by Colourimetry	E366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Total Nitrogen is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level)	E378-U Vancouver - Environmental	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a flow analyzer 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.
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
Biochemical Oxygen Demand - 5 day	E550 Vancouver - Environmental	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Chemical Oxygen Demand by Colourimetry	E559 Vancouver - Environmental	Water	APHA 5220 D (mod)	Samples are analyzed using the closed reflux colourimetric method.
VH and F1 by Headspace GC-FID	E581.VH+F1 Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHCs - EPH by GC-FID	E601A Vancouver - Environmental	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
VPH: VH-BTEX-Styrene	EC580A Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

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 Total Organic Carbon by Combustion	EP355 Vancouver - Environmental	Water		Preparation for Total Organic Carbon by Combustion
Digestion for Total Nitrogen in water	EP366 Vancouver - Environmental	Water	APHA 4500-P J (mod)	Samples are heated with a persulfate digestion reagent.
VOCs Preparation for Headspace Analysis	EP581 Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Vancouver - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **VA21C6525**	Page	: 1 of 14
Client	: Regional District of Kitimat-Stikine	Laboratory	: Vancouver - Environmental
Contact	: Hannah Shinton	Account Manager	: Amber Springer
Address	: # 300 - 4545 Lazelle Avenue Terrace BC Canada V8G 4E1	Address	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: Hazelton WMF Treated Leachate at Wetland 4	Date Samples Received	: 26-Nov-2021 21:30
PO	: ----	Date Analysis Commenced	: 28-Nov-2021
C-O-C number	: ----	Issue Date	: 09-Dec-2021 11:33
Sampler	: Hannah Shinton		
Site	:		
Quote number	: Q62338		
No. of samples received	: 2		
No. of samples analysed	: 2		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative 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.

Signatories	*Position*	*Laboratory Department*
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Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
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General Comments

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

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts 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.

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 354638)											
VA21C6525-001	Wetland 4	pH	----	E108	0.10	pH units	8.28	8.28	0.0966%	4%	----
Physical Tests (QC Lot: 354639)											
VA21C6525-001	Wetland 4	conductivity	----	E100	2.0	µS/cm	438	437	0.228%	10%	----
Physical Tests (QC Lot: 354641)											
VA21C6525-001	Wetland 4	alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	202	210	3.74%	20%	----
Anions and Nutrients (QC Lot: 354643)											
VA21C6509-001	Anonymous	fluoride	16984-48-8	E235.F	0.060	mg/L	<0.060	<0.060	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 354644)											
VA21C6509-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.59	0.59	0.008	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 354645)											
VA21C6509-001	Anonymous	chloride	16887-00-6	E235.Cl	0.50	mg/L	2.34	2.36	0.01	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 354647)											
VA21C6509-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0020	0.0013	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 354648)											
VA21C6509-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0101	0.0064	0.0037	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 354655)											
VA21C6516-001	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 357156)											
FJ2101348-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 357157)											
VA21C6525-001	Wetland 4	nitrogen, total	7727-37-9	E366	0.030	mg/L	0.827	0.818	1.06%	20%	----
Anions and Nutrients (QC Lot: 357158)											
FJ2101348-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.050	mg/L	0.059	0.063	0.004	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 357155)											
FJ2101348-001	Anonymous	carbon, total organic [TOC]	----	E355-L	0.50	mg/L	1.46	1.79	0.33	Diff <2x LOR	----
Total Metals (QC Lot: 355674)											
VA21C6457-004	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.857	0.854	0.256%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00012	0.00013	0.000002	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00090	0.00088	0.00002	Diff <2x LOR	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.0221	0.0212	4.10%	20%	----
		beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 355674) - continued											
VA21C6457-004	Anonymous	bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.016	0.017	0.0008	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000267	0.0000226	0.0000041	Diff <2x LOR	----
		calcium, total	7440-70-2	E420	0.050	mg/L	11.4	11.7	2.72%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000032	0.000028	0.000005	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00156	0.00127	0.00029	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00038	0.00035	0.00003	Diff <2x LOR	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.00411	0.00396	0.00015	Diff <2x LOR	----
		iron, total	7439-89-6	E420	0.010	mg/L	0.845	0.729	14.8%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	0.000338	0.000337	0.0000004	Diff <2x LOR	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	3.12	3.10	0.546%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.0238	0.0224	6.11%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000385	0.000404	0.000019	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00189	0.00170	0.00019	Diff <2x LOR	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	0.175	0.169	0.006	Diff <2x LOR	----
		potassium, total	7440-09-7	E420	0.050	mg/L	4.17	4.09	2.00%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00220	0.00202	8.64%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000094	0.000085	0.000009	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	4.24	3.77	11.7%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		sodium, total	17341-25-2	E420	0.050	mg/L	4.91	4.85	1.34%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0588	0.0628	6.50%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	3.88	3.97	0.09	Diff <2x LOR	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		titanium, total	7440-32-6	E420	0.00030	mg/L	0.0369	0.0356	3.69%	20%	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000036	0.000034	0.000002	Diff <2x LOR	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00237	0.00206	0.00030	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0113	0.0111	0.0003	Diff <2x LOR	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00063	0.00051	0.00012	Diff <2x LOR	----
Total Metals (QC Lot: 357867)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 357867) - continued											
FJ2101334-005	Anonymous	mercury, total	7439-97-6	E508	0.0000500	mg/L	<0.0000500	<0.0000500	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 354499)											
VA21C6526-001	Anonymous	biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Aggregate Organics (QC Lot: 360934)											
VA21C6458-008	Anonymous	chemical oxygen demand [COD]	----	E559	20	mg/L	23	23	0.3	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 359860)											
VA21C6525-001	Wetland 4	benzene	71-43-2	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611A	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611A	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Hydrocarbons (QC Lot: 359859)											
VA21C6525-001	Wetland 4	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----

Method Blank (MB) Report

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

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 354639)						
conductivity	----	E100	1	µS/cm	1.2	----
Physical Tests (QCLot: 354641)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 354643)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 354644)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 354645)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 354647)						
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 354648)						
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 354655)						
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 357156)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 357157)						
nitrogen, total	7727-37-9	E366	0.03	mg/L	<0.030	----
Anions and Nutrients (QCLot: 357158)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Organic / Inorganic Carbon (QCLot: 357155)						
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 355674)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 355674) - continued						
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	17341-25-2	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 357867)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 354499)						
biochemical oxygen demand [BOD]	----	E550	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 360934)						
chemical oxygen demand [COD]	----	E559	20	mg/L	<20	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 359860)						
benzene	71-43-2	E611A	0.5	µg/L	<0.50	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	<0.50	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	<0.50	----
styrene	100-42-5	E611A	0.5	µg/L	<0.50	----
toluene	108-88-3	E611A	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611A	0.3	µg/L	<0.30	----
Hydrocarbons (QCLot: 359859)						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
Hydrocarbons (QCLot: 360765)						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----

Laboratory Control Sample (LCS) Report

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

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 354638)									
pH	----	E108	----	pH units	7 pH units	99.7	98.0	102	----
Physical Tests (QCLot: 354639)									
conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
Physical Tests (QCLot: 354641)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 354643)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 354644)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 354645)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 354647)									
nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 354648)									
nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 354655)									
phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.03 mg/L	98.0	80.0	120	----
Anions and Nutrients (QCLot: 357156)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	101	85.0	115	----
Anions and Nutrients (QCLot: 357157)									
nitrogen, total	7727-37-9	E366	0.03	mg/L	0.5 mg/L	99.2	75.0	125	----
Anions and Nutrients (QCLot: 357158)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	102	75.0	125	----
Organic / Inorganic Carbon (QCLot: 357155)									
carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
Total Metals (QCLot: 355674)									
aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	111	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	107	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 355674) - continued									
bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	108	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	102	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	98.8	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	105	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	104	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	104	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	105	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	99.1	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	113	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	106	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	95.6	80.0	120	----
sodium, total	17341-25-2	E420	0.05	mg/L	50 mg/L	105	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	105	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	116	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	98.6	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100.0	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	97.5	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	99.6	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	102	80.0	120	----
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
Total Metals (QCLot: 357867)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Aggregate Organics (QCLot: 354499)									
biochemical oxygen demand [BOD]	----	E550	2	mg/L	198 mg/L	105	85.0	115	----
Aggregate Organics (QCLot: 360934)									
chemical oxygen demand [COD]	----	E559	20	mg/L	100 mg/L	107	85.0	115	----
Volatile Organic Compounds (QCLot: 359860)									
benzene	71-43-2	E611A	0.5	µg/L	100 µg/L	106	70.0	130	----
ethylbenzene	100-41-4	E611A	0.5	µg/L	100 µg/L	103	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.5	µg/L	100 µg/L	82.3	70.0	130	----
styrene	100-42-5	E611A	0.5	µg/L	100 µg/L	108	70.0	130	----
toluene	108-88-3	E611A	0.5	µg/L	100 µg/L	110	70.0	130	----
xylene, m+p-	179601-23-1	E611A	0.4	µg/L	200 µg/L	110	70.0	130	----
xylene, o-	95-47-6	E611A	0.3	µg/L	100 µg/L	105	70.0	130	----
Hydrocarbons (QCLot: 359859)									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	88.7	70.0	130	----
Hydrocarbons (QCLot: 360765)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	93.3	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	95.7	70.0	130	----

Matrix Spike (MS) Report

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

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 354643)										
VA21C6509-002	Anonymous	fluoride	16984-48-8	E235.F	0.969 mg/L	1 mg/L	96.9	75.0	125	----
Anions and Nutrients (QCLot: 354644)										
VA21C6509-002	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 354645)										
VA21C6509-002	Anonymous	chloride	16887-00-6	E235.Cl	99.0 mg/L	100 mg/L	99.0	75.0	125	----
Anions and Nutrients (QCLot: 354647)										
VA21C6509-002	Anonymous	nitrite (as N)	14797-65-0	E235.NO2-L	0.441 mg/L	0.5 mg/L	88.2	75.0	125	----
Anions and Nutrients (QCLot: 354648)										
VA21C6509-002	Anonymous	nitrate (as N)	14797-55-8	E235.NO3-L	2.51 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 354655)										
VA21C6516-002	Anonymous	phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.0282 mg/L	0.03 mg/L	93.9	70.0	130	----
Anions and Nutrients (QCLot: 357156)										
FJ2101348-002	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.105 mg/L	0.1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 357157)										
VA21C6525-002	DUP	nitrogen, total	7727-37-9	E366	ND mg/L	0.4 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 357158)										
FJ2101348-002	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	2.54 mg/L	2.5 mg/L	102	70.0	130	----
Organic / Inorganic Carbon (QCLot: 357155)										
FJ2101348-002	Anonymous	carbon, total organic [TOC]	----	E355-L	5.42 mg/L	5 mg/L	108	70.0	130	----
Total Metals (QCLot: 355674)										
VA21C6457-006	Anonymous	aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		antimony, total	7440-36-0	E420	0.0198 mg/L	0.02 mg/L	99.3	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		barium, total	7440-39-3	E420	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		beryllium, total	7440-41-7	E420	0.0424 mg/L	0.04 mg/L	106	70.0	130	----
		bismuth, total	7440-69-9	E420	0.00973 mg/L	0.01 mg/L	97.3	70.0	130	----
		boron, total	7440-42-8	E420	0.096 mg/L	0.1 mg/L	96.2	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00390 mg/L	0.004 mg/L	97.5	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 355674) - continued										
VA21C6457-006	Anonymous	calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		cesium, total	7440-46-2	E420	0.0102 mg/L	0.01 mg/L	102	70.0	130	----
		chromium, total	7440-47-3	E420	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		copper, total	7440-50-8	E420	0.0179 mg/L	0.02 mg/L	89.4	70.0	130	----
		iron, total	7439-89-6	E420	1.88 mg/L	2 mg/L	93.9	70.0	130	----
		lead, total	7439-92-1	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		lithium, total	7439-93-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----
		nickel, total	7440-02-0	E420	0.0375 mg/L	0.04 mg/L	93.8	70.0	130	----
		phosphorus, total	7723-14-0	E420	9.42 mg/L	10 mg/L	94.2	70.0	130	----
		potassium, total	7440-09-7	E420	3.96 mg/L	4 mg/L	98.9	70.0	130	----
		rubidium, total	7440-17-7	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		selenium, total	7782-49-2	E420	0.0414 mg/L	0.04 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	8.97 mg/L	10 mg/L	89.7	70.0	130	----
		silver, total	7440-22-4	E420	0.00386 mg/L	0.004 mg/L	96.6	70.0	130	----
		sodium, total	17341-25-2	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	20.0 mg/L	20 mg/L	100	70.0	130	----
		tellurium, total	13494-80-9	E420	0.0396 mg/L	0.04 mg/L	99.0	70.0	130	----
		thallium, total	7440-28-0	E420	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		thorium, total	7440-29-1	E420	0.0207 mg/L	0.02 mg/L	103	70.0	130	----
		tin, total	7440-31-5	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		titanium, total	7440-32-6	E420	0.0338 mg/L	0.04 mg/L	84.5	70.0	130	----
		tungsten, total	7440-33-7	E420	0.0189 mg/L	0.02 mg/L	94.5	70.0	130	----
		uranium, total	7440-61-1	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0980 mg/L	0.1 mg/L	98.0	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	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
Total Metals (QCLot: 357867)										
FJ2101334-006	Anonymous	mercury, total	7439-97-6	E508	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
Aggregate Organics (QCLot: 360934)										
VA21C6509-001	Anonymous	chemical oxygen demand [COD]	----	E559	ND mg/L	100 mg/L	ND	75.0	125	----
Volatile Organic Compounds (QCLot: 359860)										

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
Volatile Organic Compounds (QCLot: 359860) - continued										
VA21C6570-001	Anonymous	benzene	71-43-2	E611A	103 µg/L	100 µg/L	103	70.0	130	----
		ethylbenzene	100-41-4	E611A	99.8 µg/L	100 µg/L	99.8	70.0	130	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	83.4 µg/L	100 µg/L	83.4	70.0	130	----
		styrene	100-42-5	E611A	106 µg/L	100 µg/L	106	70.0	130	----
		toluene	108-88-3	E611A	106 µg/L	100 µg/L	106	70.0	130	----
		xylene, m+p-	179601-23-1	E611A	224 µg/L	200 µg/L	112	70.0	130	----
		xylene, o-	95-47-6	E611A	103 µg/L	100 µg/L	103	70.0	130	----
Hydrocarbons (QCLot: 359859)										
VA21C6930-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5300 µg/L	6310 µg/L	84.1	60.0	140	----

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Hannah Shinton
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazelle Avenue
City/Province:	Terrace/BC
Postal Code:	V8G4E1
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional District of Kitimat-Stikine
Contact:	Nicki Veikle

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: hshinton@rdks.bc.ca
Email 2: nveikle@rdks.bc.ca
Email 3: eblaney@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: anne-maries@rdks.bc.ca
Email 2: nveikle@rdks.bc.ca

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E1 - 100%] ☐ | Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:
Job #: Hazelton WMF Treated Leachate at Wetland 4
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):

ALS Contact: Sampler: H. Shinton

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Total Metals	Alkalinity	Chloride, Fluoride, Sulphate, Hardness	Total Nitrogen	Ammonia	Nitrate	Nitrite	TOC	Orthophosphorus	COD	pH	BOD & Conductivity	Total Kjeldahl Nitrogen	EPH	BTEX/VPH	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
					P				P			P		P			P	P	P			
	Wetland 4	25-Nov-21	14:00	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9
	DUP	25-Nov-21	12:00	Effluent	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			9

Environmental Division
Vancouver
Work Order Reference
VA21C6525

Telephone : +1 604 253 4188

Terrace Shipping
#1 Coolers
Carbouys
Ground ☐
Air ☑
SFX ☐

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO
Are samples for human consumption/ use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.6				6.5			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Hannah Shinton	Date: Nov. 26. 2021	Time:	Received by: Chris	Date: 26 Nov 21	Time: 1145	Received by: RJ	Date: NOV. 26	Time: 21:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX E

Site Photographs

Photo 1: BH-01, 19 January 2021

Photo 2: BH-02, 19 January 2021

Photo 3: BH-03, 19 January 2021

Photo 4: BH-04, 22 April 2021

Photo 5: BH-05, 22 October 2021

Photo 6: SGW-01, 21 April 2021

Photo 7: SGW-02, 20 January 2021

Photo 8: SGW-04, 22 April 2021

Photo 9: SWG-05, 21 April 2021

Photo 10: SW-01 (Downstream), 21 April 2021

Photo 11: SW-01 (Upstream) 22 October 2021

Photo 12: SW-02 (Downstream), 22 April 2021

Photo 13: SW-02 (Upstream), 22 October 2021

Photo 14: SW-05 (Downstream), 28 April 2021

Photo 15: SW-05 (Upstream) 22 October 2021

Photo 16: SW-07 (Downstream), 28 April 2021

Photo 17: SWG-07 (Upstream), 22 October 2021

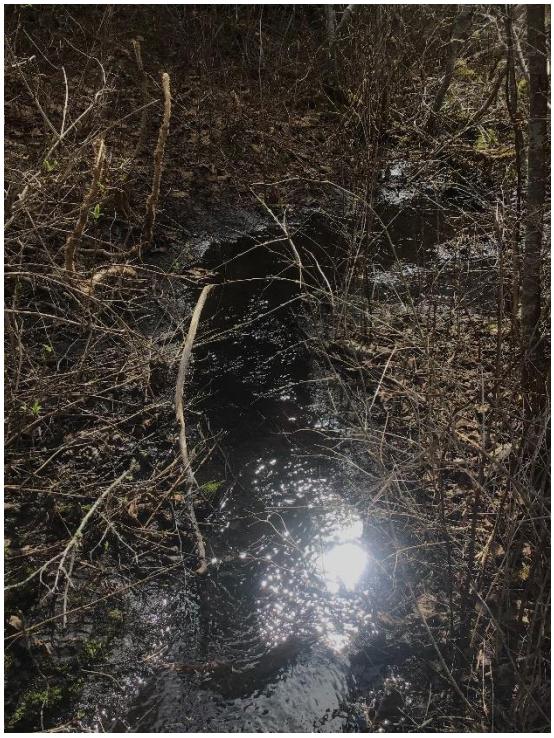

Photo 18: SW-09 (Downstream), 21 April 2021

Photo 19: SWG-09 (Upstream), 26 October 2021

golder.com

Regional District of
Kitimat-Stikine

Appendix B OC Ammendment

October 19, 2021

Tracking Number: 407972
Authorization Number: 17226

REGIONAL DISTRICT OF KITIMAT-STIKINE
300 4545 LAZELLE AVENUE
TERRACE, BC
V8G 4E1

Dear REGIONAL DISTRICT OF KITIMAT-STIKINE,

Your application for an Authorization amendment under the Environmental Management Act

In response to your letter dated October 18, 2021, and pursuant to Section 14(4) of the *Environmental Management Act*, the Director hereby consents to the following changes to Sections 11.3 and 11.4 of the Operational Certificate OC17226:

From Section 11.3:
11.3 **Groundwater Monitoring**

Location	Parameters	Frequency
E251512 BH-01 E251513 BH-02 E251514 BH-03 E252313 BH-4B E252314 BH-5B E309746 SGW-1 E309747 SGW-2 E309748 SGW-3 E309749 SGW-4 E309750 SGW-5	Lab: Dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH,	Quarterly → Annually[1,3]
	Field: Conductivity, temperature, pH, water elevation[4]	Monthly→Quarterly[1,3]

To Section 11.3:
11.3 **Groundwater Monitoring**

Location	Parameters	Frequency
E251512 BH-01 E251513 BH-02 E251514 BH-03 E252313 BH-4B E252314 BH-5B E309746 SGW-1 E309747 SGW-2 E309749 SGW-4 E309750 SGW-5	Lab: Dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH,	Quarterly → Annually[1,3]
	Field:	Monthly→Quarterly[1,3]

	Conductivity, temperature, pH, water elevation[4]	

From Section 11.4:

11.4 **Surface Water Monitoring**

Location	Parameters	Frequency
E309751 SW-01 E309752 SW-02 E287409 SW-05 E309754 SW-06 E287410 SW-07 E273812 SW-08 E310968 SW-09[1](property boundary)	Lab: Total metals, dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons
E310969 SW-10 (downstream of BH-03)	Field: Conductivity, temperature, pH, turbidity, flow rate, dissolved oxygen	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons

To Section 11.4:

11.4 **Surface Water Monitoring**

Location	Parameters	Frequency
E309751 SW-01 E309752 SW-02 E287409 SW-05 E287410 SW-07 E310968 SW-09[1](property boundary)	Lab: Total metals, dissolved metals, alkalinity, chloride, fluoride, sulphate, hardness, ammonia, nitrate, nitrite, total Kjeldahl nitrogen, TOC, COD, pH, EPH, BTEX/VPH	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons
	Field: Conductivity, temperature, pH, turbidity, flow rate, dissolved oxygen	Minimum annually[2] and once during Spring, Summer, Fall if discharging during these seasons

The change to Section 11.3 was made due to inaccessibility and surface water inundation.

The changes to Section 11.4 were made due to a lack to relationship of the sampling points to the landfill surface water runoff.

In addition, the following Reporting requirement is added:

Addition of Section 12.7

12.7 **Site-Wide Water Balance**

Complete a site-wide water balance and assessment report for surface and groundwater monitoring. The report must be submitted to the Director for review and approval by the Director by October 1, 2022.

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

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

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

Yours truly,

Karen Moores, P.Ag.
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Environmental Protection Division
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ENCL: None