Regional District of
Kitimat-Stikine

2018 CLOSED THORNHILL LANDFILL ANNUAL REPORT

June 2019

Prepared for:

British Columbia Ministry of
Environment & Climate Change
Strategy
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Thornhill Landfill Overview

The Thornhill Landfill (Landfill) is now undergoing closure. The Thornhill Transfer Station (the transfer station) opened in November 2016 on the site of the closed Landfill, and is owned and operated by the Regional District of Kitimat-Stikine (Regional District or RDKS). The transfer station is located about 10 km southeast of the City of Terrace; access is from Old Lakelse Lake Drive.

Most waste generated in the greater Terrace area is hauled to the transfer station, sorted and consolidated, and then hauled to Forceman Ridge Waste Management Facility for final disposal. This process is conducted in accordance with the Regional District Kitimat-Stikine Solid Waste Management Plan (1995). There is also a residential drop off area for garbage, organics, metal (including large appliances and propane tanks), and clean wood. Waste is no longer discharged at the Thornhill location.

Landfill operations are regulated by the Ministry of Environment and Climate Change Strategy's Operation Certificate MR-4057, most recently amended in June 2014.

Figure 1: Thornhill Transfer Station

The transfer station consists of a scale and scale house, a Z-wall for residential drop-off, a transfer station building for consolidation of commercial loads, and an area to accept and consolidate commercial loads of organics.

Environmental monitoring is being conducted in accordance to the operational certificate. The details of the Facility water quality monitoring program, including groundwater, surface water, and leachate results will be discussed in a document prepared by Golder Associates and can be found in Appendix A.

A landfill gas feasibility study for flaring was completed in September 2018 on the closed Thornhill Landfill.

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1.0 Introduction

This annual report covers the period from January to December 2018 and has been prepared to fulfill the requirements of the Thornhill Transfer Station's Operational Certificate MR-4057.

Issued by the Ministry of Environment and Climate Change Strategy and most recently amended in June 2014 the Operational Certificate does not yet reflect the changes to waste collection at the Thornhill Transfer Station. Waste is no longer discharged at the Landfill and septage is no longer accepted. Garbage and compost is collected, consolidated, and hauled to the Forceman Ridge Waste Management Facility. Metals (including white goods, scrap metals, and propane tanks) and clean wood including land clearing debris are collected and kept segregated. Clean wood is chipped and used as hog fuel for the Forceman Ridge compost facility and metal is sold as scrap.

This report meets the requirements in Section (9.4) of the Operational Certificate by providing the following information:

- Total volume or tonnage of waste collected, consolidated, and hauled to Forceman Ridge during 2018;
- Total volume or tonnage of organics collected and diverted during 2018;
- Total volume or tonnage of metals and clean wood collected and diverted during 2018;
- Occurrences or observations of wildlife attempting to access the facility; and
- The results and evaluation of all the monitoring programs has been undertaken by Golder Associates, shown in Appendix A.

2.0 Waste Disposal

The Thornhill Transfer Station serves as the consolidation location for most of the garbage and all the organics collected in the Terrace Area. There is also a residential drop off area at the transfer station with separate bins for garbage, clean wood, metal, and organics.

2.1 Solid Waste Disposal

Solid waste, with the exception of Controlled Waste hauled directly to Forceman Ridge, is hauled to the Thornhill Transfer Station, sorted, compacted, and hauled to the Forceman Ridge Facility. The annual totals from January through to December 2018 for municipal solid waste, organics, clean wood, and metal received at the Thornhill Transfer Station are shown in Table 1. Details on some of these materials is included below.

Table 1: Waste Discharge Qualities for 2018

Material	2018 Quantity (tonnes)	
Waste Discharge		
Garbage	6881.3	
Construction and Demolition	1330.1	
Diverted Materials		
Clean Wood		44
Organics		1561
Metal		54.9
Total		
Total Consolidated Landfill Waste	8211.4*	
Total Materials Diverted		1659.9

Note: * Volume of waste collected at Thornhill Transfer Station and hauled to Forceman Ridge.

2.1.1 Garbage

Garbage is defined as discharged materials or substances not including; Controlled Wastes (animal carcasses weighing more than 50 kg, asbestos, contaminated soils, land clearing or construction and demolition wastes over five cubic meters, clean soils, broken concrete, broken asphalt, ash from incinerators, or septage), Restricted Wastes (metal, organics, and recyclable materials) or Prohibited Waste (hazardous or radioactive waste, slaughter waste, smoldering or flammable material, explosive or highly combustible materials, broken concrete or asphalt 300 millimeters in diameter or greater, Extended Producer Responsibility (EPR) materials, tires, and cardboard and paper products, whether or not they fall within the definition of EPR materials). Garbage is disposed of in the landfill.

In 2018, 8211.4 tonnes of garbage was collected and consolidated at the Thornhill Transfer Station and hauled to the Forceman Ridge Waste Management Facility for landfilling.

2.1.2 Construction and Demolition

Construction and demolition material is mainly wood waste, and construction materials such as dry wall and insulation. It is defined as waste produced from the construction, renovation, and demolition of buildings and other structures, but does not include waste containing or contaminated with asbestos, creosote, polychlorinated biphenyl (PCB's), or any other Hazardous Waste.

In 2018, 1330.1 tonnes of construction and demolition waste was collected and consolidated at the Thornhill Transfer Station and hauled to the Forceman Ridge Waste Management Facility for landfilling.

3.0 Diverted Materials

Diverted materials are collected using several methods depending on the material type and/or the producer source; collected at the Thornhill Transfer Station, collected in curbside pick-up, collected by commercial haulers, or deposited at designated Extended Producer Responsibility Depots and private recycling facilities.

3.1.1 Metals

In 2018, a total of 54.9 tonnes of metal was collected at the transfer station, including propane tanks, white goods, and scrap metal. Ozone depleting substances are removed from all pertinent materials prior to collection by scrap metal recycler.

3.1.2 Clean Wood Waste

Clean wood waste is considered any wood product that has not be treated or painted. Clean wood is segregated, chipped, and used as hog fuel mixed with the organics at the Forceman Ridge Compost Facility.

In 2018, 44 tonnes total of clean wood waste was collected, diverted, and utilized in the Compost Facility.

3.1.3 Organic Waste

Organic waste is defined as vegetative matter, food processing waste, garden waste, kitchen scraps, food soiled paper, and waxed cardboard, and other organic waste that can be composted. Organic waste is collected curbside for residents, by commercial haulers for businesses, and can also be dropped off directly at the transfer station in designated bins. Organic waste is consolidated at the transfer station and hauled to the Forceman Ridge Compost Facility.

In 2018, 1561 tonnes of organic waste was collected, diverted, and processed in the Compost Facility.

4.0 Wildlife Occurrences and Observations

The Thornhill Transfer station is located in an area with bears, wolves, coyotes, several species of birds of prey, and many other species of mammals that may attempt access to the facility. To prevent wildlife from gaining access the entire facility is enclosed in an electrified fence. The residential collection area contains wildlife proof bins with lids to prevent bird and rodent access. Commercial garbage is

consolidated within the transfer station building, to which there is no bird access. Organics are consolidated in a large wildlife proof bin with lid.

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

During 2018, a small black bear was spotted grazing on clover in the within the fenced area of the closed landfill. The bear did not gain access to the transfer station area, or any waste. A fence inspection showed an access point. This area was immediately repaired; subsequent inspection showed no further access.

5.0 Environmental Monitoring Report

Environmental monitoring for the Thornhill Transfer Station was conducted by a Regional District of Kitimat-Stikine Environmental Technician, following Ministry of Environment and Climate Change Strategy, 2013 British Columbia Field Sampling Manual. All in-situ and laboratory data for groundwater, surface water, and leachate monitoring results has been analyzed and reviewed by Golder Associates. The complied data, interpretation, and recommendations can be found in Appendix A.

6.0 Landfill Gas Collection

A landfill gas collection feasibility study was completed in September 2018 which indicated there is potential for a successful gas flaring system. The Regional District is considering implementing a flaring system as well as a biocover system to reduce greenhouse gas emissions.

7.0 Landfill Closure Update

The landfill has been capped with a geomembrane cover, with a mixture of gravel and soil applied to shape. The shaped landfill is awaiting the finished compost from the Forceman Ridge facility, which will be applied to the entire site prior to seeding. Site drainage is directed into a two-series wetland for managing and treating any leachate from the closed section of landfill. Surface runoff from the transfer station is also directed to the wetlands.

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Appendix A

REPORT

Thornhill Landfill, Thornhill, BC

2018 Annual Environmental Effects Monitoring Report

Submitted to:

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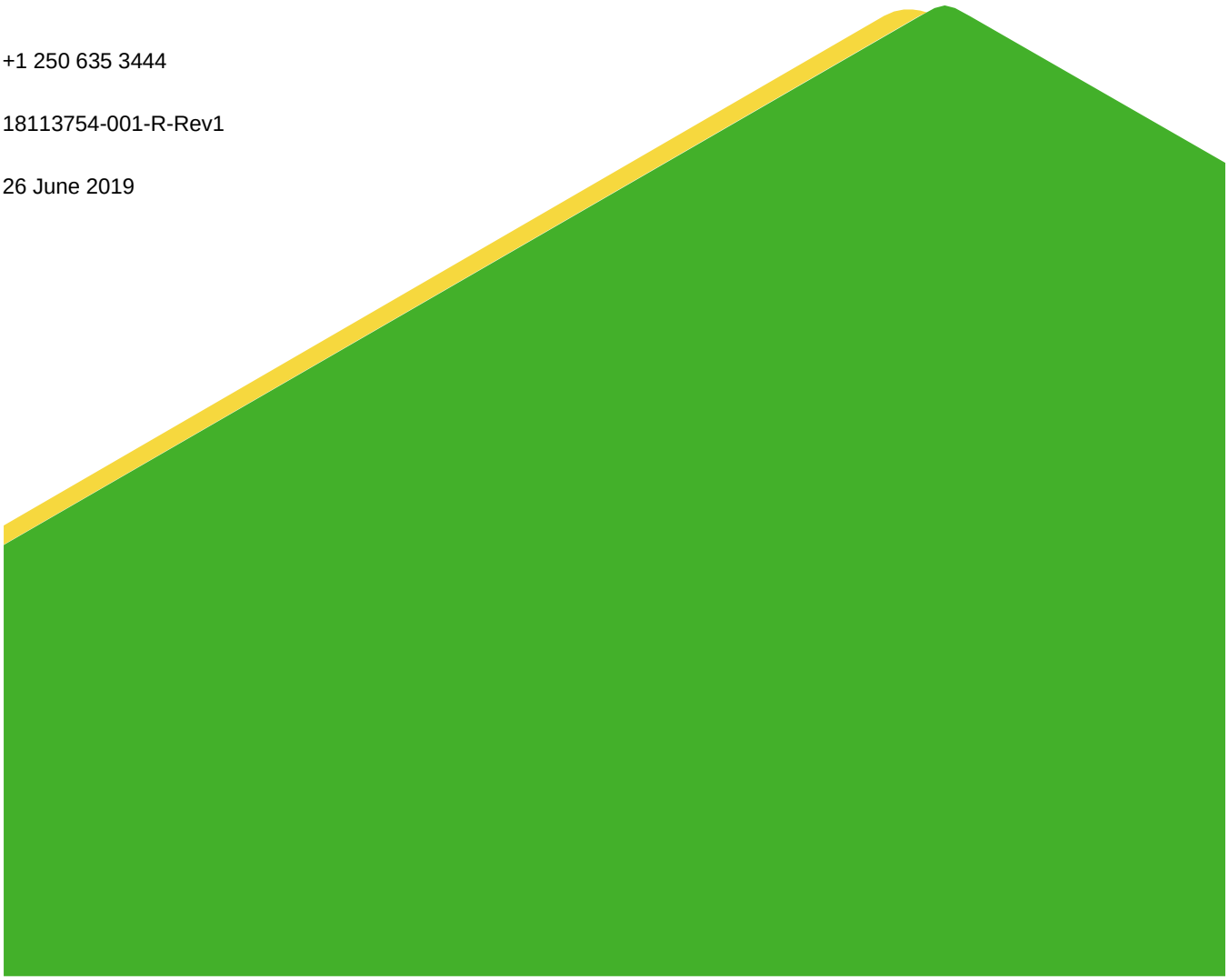

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Executive Summary

The 2018 monitoring program indicates that the 2018 results follow historic trends and confirm previous findings by SHA (2017).

The results of the surface water monitoring indicate that seepage from the leachate pond (SW-3) and surface water immediately downgradient of the Landfill (SW-21) exceeds the Contaminated Sites Regulations (CSR) and BC Water Quality Guidelines (BC WQG) for select constituents. However, concentrations at the downgradient location SW-6 (750 m from the Landfill) appear to be close to background conditions, suggesting that Landfill leachate has attenuated prior to reaching the Thornhill Creek water system.

Groundwater quality data is only available for one monitoring well located downgradient of the Landfill (BH96-2). The well is screened in silt and clay, which underlies the majority of the Landfill, and shows little impact of Landfill leachate. Concentrations of all parameters for BH96-2 were less than the BC CSR. Concentrations for total aluminum, iron, phosphorous, and dissolved cadmium and phosphorous were greater than the BC WQG. These parameters may be related to Landfill leachate; however, they more likely originate from natural sources in the clay unit underlying the majority of the Landfill. Chloride, which is a typical indicator of landfill leachate, is rising in groundwater over time, but is present at relatively low concentrations that are well below regulatory criteria.

Groundwater quality associated with the gravel unit that underlies the south corner of the Landfill could not be assessed due to the lack of monitoring wells in this area. Similarly, the water quality in the glacial till unit which underlies both the gravel unit and the silt and clay unit was also not evaluated due to the lack of available monitoring wells in this unit.

While recent water-level measurements are only available for one groundwater monitoring well, the general groundwater flow direction is inferred to be to the north based on historical data (SHA 1997) and topography.

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 (Golder) in January 2019. 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 Associates Ltd. 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 January 2019, 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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APPENDICES

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by the Regional District of Kitimat-Stikine (RDKS) to prepare the 2018 Annual Environmental Effects Monitoring (EEM) Report for the Thornhill Landfill (the "Site"). The Site is located approximately 10 km southeast of Terrace, British Columbia, on Old Lakelse Lake Road. Annual reporting is required by Clause 9 of the Landfill Permit No. MR-4057 dated 20 June 2014 (the Permit"). The Thornhill Transfer Station exists on the site of the closed Thornhill Landfill, established in the 1960s and closed in 2015/2016. The monitoring program relates to the closed landfill site.

1.1 Background

The Thornhill Transfer Station was established on the former Thornhill Landfill, which was first constructed in the 1960s, expanded in the late 1990s and closed in 2015/2016. The Thornhill Landfill was closed and capped over the period of 2015 through 2017, and final closure, including application of topsoil and revegetation, will occur in 2019.

EEM Programs are required for the Thornhill Landfill by the BC Ministry of Environment and Climate Change Strategy (ENV) as part of the operational certificate. As outlined in the 20 Jun 2014 ENV letter to the RDKS, the objective of the EEM Program for the Thornhill Transfer Station is to determine the potential effects of the Landfill on the receiving environment. The scope of work for the EEM Programs is to include:

- **Surface Water Monitoring**: Collection and analysis of four surface water samples from upstream and downstream of the Landfill and from the leachate seepage and leachate weir, conducted three times per year, in the spring, summer and fall.
- **Groundwater Monitoring**: The Landfill permit calls for the preparation of a groundwater monitoring plan and in the interim, for groundwater monitoring at two locations. The 2018 groundwater monitoring program consisted of the collection and analysis of groundwater samples from one monitoring well, conducted three times per year in the spring, summer and fall.
- **Quality Assurance/Quality Control (QAQC) Program**: The operational certificate holder (RDKS) is required to conduct a QAQC program to determine the acceptability of the data required by the permit.
- **Reporting**: An annual report is to be submitted to BC ENV no later than 30 June of the following year.

1.2 Objective and Scope of Work

The objective of this project was to conduct a desktop analysis of available information to provide the information required by the Permit (APPENDIX A). This includes a summary and interpretation of environmental monitoring conducted at selected monitoring locations to assess potential impacts that the Landfill may be having on the surrounding environment.

The RDKS completed the surface water monitoring and groundwater sampling and quality assurance and control (QAQC) during the 2018 monitoring year. Chemical analysis of surface water and groundwater samples was conducted by ALS Environmental Ltd. The RDKS provided Golder with historic and 2018 data related to sampling and monitoring at the Site. The purpose of this report is to present the following key information to satisfy the requirements presented in the Permit:

- Summary of the regulatory framework and operational permit EEM requirements.
- Methods of field investigations (as provided by RDKS).
- Tabulated surface water and groundwater field parameters and chemistry compared to applicable standards and guidelines.
- Figures showing distribution of key landfill parameters in surface water and groundwater, as well as time series plots for the key landfill parameters.
- Discussion of chemistry and temporal evolution, including both laboratory analyses and field parameters.
- Tabulated depth to groundwater.
- Discussion of the QAQC program.
- Conclusions and recommendations for the current EEM program.
- Appendices including laboratory certificate of analyses and photographs.

1.3 Previous Investigations

Previous studies and annual monitoring reporting have been carried out by Sperling Hansen Associates (SHA) until as recently as 2017 (SHA 2018). A hydrogeological and geotechnical investigation was carried out by SHA in 1997 prior to the expansion of the Landfill.

1.4 Site Description

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

- GeoBC's web-based mapping tool iMapBC http://maps.gov.bc.ca/ess/sv/imapbc/
- The Surficial Geology Map of the Skeena River and Bulkley River Area (Clague 1983)
- Google Earth
- SHA 1997 and 2017

The Site is located approximately 10 km southeast of Terrace, British Columbia, on Old Lakelse Lake Road (Figure 1). The Thornhill Landfill was closed over the period of 2015 through 2017, and a Transfer Station was constructed. Final closure, including application of topsoil and revegetation of the landfill, will occur in 2019. The Site accepts locally derived refuse, where it is stored until it is transferred to the Forceman Ridge Waste Management Facility, located approximately 30 km south of Terrace, British Columbia. A search of the BC water well atlas identified four domestic water wells located within 500 metres of the Landfill boundary. A list of water well records and locations are presented in APPENDIX B.

The site is located at the base of a local mountain with an approximate elevation of 900 to 1400 metres above sea level (masl). The area surrounding the Site is defined by a rolling topography. The Site slopes to the northwest, with an approximate ground surface elevation of 215 masl on the southeastern portion of the Site and 185 masl on the northwestern portion of the Site. Surface drainage generally drains towards the northwest. The surrounding area is generally sloped to the northwest. The nearest major surface water body to the Site is Thornhill Creek (approximately 600 m northwest of the Site), which drains into the Skeena River, located approximately 5 km southeast of the Site.

The regional surficial geology in the study area is described as being located near a contact of a glacial outwash gravel deposits and a glaciomarine silt and clay sequence, underlain by a glacial till (Clague 1983 and SHA 1997). Test pitting and drilling activities carried out by SHA in 1997 confirmed that the Site is underlain by a glaciomarine silt and clay unit that is up to 16m in thickness. The only portion of the Landfill that is not underlain by this unit is the southern tip of the Landfill encompassing an approximate area of 20 x 50 m (SHA 1997). This area is underlain by glacial outwash gravel. The clay unit underlying the Landfill was tested by SHA (1997) and yielded a reported average hydraulic conductivity $4.2x10^{-10}$ m/s based on four silt and clay samples.

Based on available information obtained during drilling and initial sampling of the monitoring wells and nearby domestic wells (SHA 1997), two groundwater flow regimes were inferred to be are present at the Site. A shallow groundwater flow system was described as being present in the silt and clay unit. Groundwater was reported to be flowing in a northwest direction and discharges into the Thornhill Creek surface water system. A deeper flow system of groundwater was identified by SHA (1997) in the gravel deposit on the southern edge of the Site. Groundwater flows was inferred by SHA (1997) to flow from the southeast to the northwest until it encounters the interface between the silt and clay and gravel unit. The flow reportedly develops a downward gradient along the contact and enters the glacial till layer that underlies the entire Site.

SHA (1997) inferred that silt and clay lenses extend into the gravel unit to the north along the entire length of the contact zone. Perched aquifers on these clay lenses were observed during drilling activities in 1997. Two monitoring wells that were installed by SHA (1997) are described as follows:

- BH96-3 – installed at the southern edge of the Landfill footprint where the upper silt and clay unit are in contact with the lower gravel unit. The well is screened in a clayey gravel zone.
- BH96-2 – installed in the silt and clay unit at the northern edge of the Site.

A third borehole (BH96-1) was drilled south of BH96-3 to determine the thickness of the gravel unit. Borehole logs for all three locations are provided in APPENDIX C.

2.0 GROUNDWATER AND SURFACE WATER MONITORING METHODOLOGY

2.1 Sampling Locations

Table 1 presents a list of historic and current sampling locations. Groundwater and surface water have been collected from 1996 to 2018. During the 2018 program, one groundwater monitoring well (BH96-2) and five surface water locations (SW-3, -1, -21, -17, and -6) were sampled. Historically, additional select surface water sampling locations have been sampled. Two nearby domestic water wells were sampled from 1996 to 2017; however, sampling of these domestic wells was discontinued following the 2017 sampling events due to access difficulties and because the water quality at these locations met applicable drinking water quality standards. Sampling locations are shown in Figure 2 and summarized below.

Table 1: Sampling Locations with Spatial and Hydrogeologic Information

Location	Sample Type	Easting *UTM*	Northing *UTM*	Elevation (approximate) *metre above sea level*	Available Sample Period	Inferred Groundwater Gradient
BH96-3 (Destroyed)	Monitoring Well	533314	6038203	202	1996 - 2015	Upgradient
BH96-2	**Monitoring Well**	**533226**	**6038410**	**175**	**1996 - 2018**	**Downgradient**
SW-3	**Surface Water**	**533198**	**6038389**	**-**	**1996 - 2018**	**Downgradient**
SW-1	**Surface Water**	**533702**	**6038575**	**-**	**1996 - 2018**	**Sidegradient**
SW-21	**Surface Water**	**533182**	**6038522**	**-**	**1996 - 2018**	**Downgradient**
SW-17	**Surface Water**	**533031**	**6038804**	**-**	**1996 - 2018**	**Downgradient**
SW-6	**Surface Water**	**532615**	**6039310**	**-**	**1996 - 2018**	**Downgradient**
SW-16	Surface Water	533122	6038801	-	2016 - 2017	Downgradient
SW-18	Surface Water	533006	6038901	-	2016 - 2017	Downgradient
SW-23	Surface Water	531755	6039631	-	2017	Downgradient
SW-22	Surface Water	533152	6038586	-	2016	Downgradient
Goodwin*	Domestic Water Well	-	-	-	1996 - 2017	Upgradient
Reinhart (Well Tag Number 38440)	Domestic Water Well	533636	6038033	-	1996 - 2017	Upgradient

Notes:

Bold indicates sampling locations that were sampled in 2018

Underlined indicates sampling locations that are required once per season (Spring (Mar – Apr), Summer (Jul – Aug), and Fall (Oct – Nov)) as per the Permit (APPENDIX A)

Locations and elevations are approximate

*Coordinates not available. Approximate Location 1.5 km southwest of Site

A description of each surface water sampling location is provided in Table 2 below.

Table 2: Description of Surface Water Sampling Locations

Location	Description
SW-3	**Historically sampled from Landfill leachate seep. Since 2017, seepage from the leachate seep is collected in a leachate pond. As part of the landfill closure in 2017, a leachate pond and stormwater retention pond were constructed, north of the landfill, to allow leachate to dilute before being discharged to the environment.**
SW-1	**Side gradient to the Landfill; Background location.**
SW-21	**Monitoring weir located 200 m downstream of stormwater retention pond.**
SW-17	**Located on Thornhill Creek, 100 m downstream of the confluence of Thornhill Creek and leachate outfall (originating from SW-21).**
SW-6	**Located on Thornhill Creek by Ziegler Bridge.**
SW-16	Located on Thornhill Creek, downstream of the Thornhill Creek and leachate outfall (originating from SW-21) confluence and 100 m upstream of SW-17.
SW-18	Located 100 m downstream from SW-17.
SW-23	Located on Thornhill Creek near the Old Lakelse Rd and Miller Rd intersection.
SW-22	Located 60 m downstream of SW-21.

Notes:

Bold indicates sampling locations that were sampled in 2018

Underlined indicates sampling locations that are required once per season (Spring (Mar – Apr), Summer (Jul – Aug), and Fall (Oct – Nov)) as per the Permit (APPENDIX A)

Deviations from Landfill Permit requirements

The following observations were made that deviated from the Landfill Permit:

- The Landfill permit calls for the development of a groundwater monitoring plan, with interim monitoring at two monitoring wells. During the 2018 monitoring year, monitoring was only carried out at one monitoring well location.
- SW-17 was sampled in 2018 although not required in the Landfill Permit

2.2 Groundwater Sampling

The 2018 groundwater monitoring program consisted of groundwater sampling at monitoring well BH96-2. BH96-3 was destroyed during the landfill capping activities in 2016 and was last sampled in 2015. This sampling location has not been replaced. Monitoring locations are shown in Figure 2.

Sampling was conducted seasonally (see Section 2.1) by RDKS field staff in March (Spring), July (Summer) and September (Fall) 2018, following established sampling procedures as laid out in the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* (BC ENV 2013). Prior to sampling, the depth to groundwater was measured using a water level probe, and the monitoring wells were purged. The monitoring wells were purged and sampled using dedicated Waterra™ tubing and footvalve with 0.016 m (5/8-inch diameter) polyethylene tubing. A maximum of three well volumes, based on the total height of the water column in the monitoring well, were removed prior to sampling.

Prior to any sampling activities, field instruments were calibrated to manufactures specifications in the field. During purging, a YSI Professional Plus multi-meter was used to collect measurements of in-situ water quality parameters (temperature, electrical conductivity, redox potential, dissolved oxygen, and pH). The field parameter data alongside with analytical results are presented in APPENDIX D. Purging was continued until relatively stable conditions were obtained and three well volumes were removed, indicating representative formation water was present. Purge water from the monitoring well sampling was collected during purging, transported and disposed of at a suitable location at the landfill.

Groundwater samples were collected in clean, laboratory-supplied sample bottles. Water samples for dissolved metals were field-filtered using a 0.45 µm in-line filter. As necessary, samples were preserved in the field using chemicals supplied by the laboratory. Standard sampling protocols, as laid out by the *British Columbia Field Sampling Manual* (BC ENV 2013) were followed during groundwater sampling to minimize the possibility of cross-contaminating the monitoring wells and the samples. The groundwater samples were submitted to ALS Environmental Ltd for analysis of the following physical parameters, as outlined in Table 3, in accordance of parameters required by the Permit. Analytical Results and Certificates of Analysis for 2018 are presented in APPENDIX D and APPENDIX E respectively.

Table 3: Analytical Parameters Selected for BH96-2 in 2018

Parameter	Season		
	Spring (Mar)	Summer (Jul)	Fall (Sep)
Dissolved metals including mercury	✓	✓	✓
Dissolved Hardness	✓	✓	✓
Total metals including mercury	✓	✓	✓
Alkalinity	✓	✓	✓
Chloride (Cl)	✓	✓	✓
Fluoride (F)	✓	✓	✓
Sulphate (SO_4)	✓	✓	✓
pH	×*	✓	✓
Conductivity	✓	✓	✓
Total Suspended Solids	✓	×	×
Total Dissolved Solids	✓	✓	✓
Chemical Oxygen Demand (COD)	✓	✓	✓
Ammonia (NH_3), Nitrate (NO_3), Nitrite (NO_2), Total Kjeldahl Nitrogen (TKN)	✓	✓	✓
Total Phosphorous	×	×	✓

Notes:
Underlined parameters indicate parameters required, in accordance with landfill Permit
× indicates parameter was not analysed in the laboratory
✓ indicates parameter was analysed
* Laboratory pH was required in accordance with the Landfill Permit; however, during the March field event, this parameter was not analyzed. Field pH was collected.

Laboratory analysis for pH was not conducted during the March sampling event. However, field pH, which is considered to be more representative of Site conditions, was measured.

Deviations from Landfill Permit requirements

The following samples deviated form the required sampling protocol as follows:

- Spring (March): The sample for BH96-2 was not submitted for pH and Total Phosphorous. Total Suspended Solids were analysed and are not required
- Summer (Jul): The sample for BH96-2 was not submitted for Total Phosphorous.

The omissions of pH and Total Phosphorous is assumed to have been caused by an oversight during sampling and the subsequent submission of samples to the laboratory.

The Landfill Permit requires that a groundwater monitoring program be developed and that in the interim, groundwater monitoring should be undertaken at downgradient monitoring well BH96-2 and upgradient monitoring well BH96-3. Monitoring well BH96-3 was destroyed during the Landfill capping activities in 2016 and was last sampled in 2015. This sampling location has not been replaced. The Fall sampling event was undertaken in September rather than in October-November as stipulated by the Landfill Permit.

2.3 Surface Water Sampling

The surface water monitoring program consisted of water sampling at locations to the northeast and north of the Landfill, as shown in Figure 2. Surface water samples were collected in March (Spring), July (Summer) and September (Fall) 2018, alongside the groundwater samples, by RDKS field staff following established sampling procedures as laid out in the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples* (BC ENV 2013).

The 2018 surface water sampling was conducted by RDKS field staff in accordance to the *British Columbia Field Sampling Manual (BC ENV 2013)*, as required by the landfill Permit. Prior to any sampling activities, field instruments were calibrated to manufactures specifications in the field. During sampling, a YSI Professional Plus multi-meter was used to collect measurements of in-situ water quality parameters (temperature, electrical conductivity, redox potential, dissolved oxygen, and pH). Field turbidity measurements were obtained using a calibrated LaMotte 2020we field turbidity meter. The field parameter data alongside with analytical results are presented in APPENDIX D.

Surface water samples were collected in clean, laboratory-supplied sample bottles. Water samples were collected by submerging bottles in water and directly filling them. Where submersion of bottles was not possible, due to the addition of preservatives or the need to filter samples, a sealed and disposable syringe was utilized. Water samples for dissolved metals were field-filtered using a 0.45 µm syringe plate filter. As necessary, samples were preserved in the field using chemicals supplied by the laboratory. Standard sampling protocols, as laid out by the *British Columbia Field Sampling Manual* (BC ENV 2013) were followed during surface water sampling to minimize the possibility of cross-contaminating the monitoring wells and the samples.

The surface water samples were submitted to ALS Environmental Ltd for analysis of the following physical parameters, as outlined in Table 4, in accordance of parameters presented in the Permit:

Table 4: Analytical Parameters selected for Surface Water Samples in 2018

Parameter	Season		
	Spring (Mar)	Summer (Jul)	Fall (Sep)
Dissolved metals including mercury	✓	✓	✓
Dissolved Hardness	✓	✓	✓
Total metals including mercury	✓	✓	✓
Total Hardness	✓	✓	✓
Alkalinity	✓	✓	✓
Chloride (Cl)	✓	✓	✓
Fluoride (F)	✓	✓	✓
Sulphate (SO_4)	✓	✓	✓
pH	✓	✓	✓
Conductivity	✓	✓	✓
Total Suspended Solids	✓	✓	✓
Biological Oxygen Demand (BOD)	✓	✓	✓
Chemical Oxygen Demand (COD)	✓	✓	✓
Ammonia (NH_3), Nitrate (NO_3), Nitrite (NO_2), Total Kjeldahl Nitrogen (TKN)	✓	✓	✓
Total Phosphorous	×	✓	✓
Ortho Phosphorous	×	✓	✓

Notes:
Underlined parameters indicate parameters required, in accordance with landfill Permit
× indicates parameter was not analysed
✓ indicates parameter was analysed

Deviations from Landfill Permit requirements

The following samples deviated form the required sampling protocol as follows:

- Samples are required to be sampled in October or November to correspond to Fall conditions. Surface water samples were collected in September.
- Spring (March): Surface water samples were not submitted for Total and Ortho Phosphorous. This omission is assumed to have been caused by an oversight during sampling and the subsequent submission of samples to the laboratory.

2.4 Quality Assurance and Control

To assess and document that the sampling and analytical data are interpretable, meaningful, and reproducible, conformance to the quality assurance / quality control (QA/QC) program laid out in the Landfill Permit was followed. Standard industry field procedures were used in both the collection (field program) and analysis (laboratory) of soil and groundwater samples. The following includes a brief summary of the QA/QC measures implemented by the RDKS field staff during the field program and by Golder during review of the data, as well as QA/QC measures implemented by the laboratory.

Quality Control (QC) measures used in the collection, preservation and shipment of samples included the following:

- Sampling methods were consistent with established field protocols and provincial/federal requirements (BC ENV 2013).
- Field notes were recorded during all stages of the investigation and are available upon request.
- Sample locations were recorded and marked in the field.
- Samples were stored in coolers and chilled with ice packs during transport to the analytical laboratory.
- Samples were transported to the laboratory using laboratory Chain-of-Custody procedures.
- Nitrile gloves were worn when handling sampling equipment and samples and were changed between samples.
- Dedicated Waterra™ tubing and footvalve were used to purge and sample monitoring wells.
- Dedicated syringes and plate filters were used during surface water sample collection.
- Dedicated filters were used to filter sample water for analysis of dissolved metals.

The Quality Assurance (QA) measures established for the field program in accordance with the Landfill Permit included:

- Submission of a field blank sample per each sampling event. A field blank sample is a sample of laboratory grade distilled and deionized water that is used assess potential sources of contamination that may have been introduced to the sample media during sampling (i.e. dusty conditions, sampling error). The field blank consists of the same bottle set and analysis as a regular sample. The blank is filled in the field near the sampling location using laboratory grade deionized and distilled water. The blank is submitted for the same analytical parameters as all other samples.
- Submission of field duplicate samples per each sampling event. A field duplicate sample is a second sample of a certain media (e.g., soil, water) from the same location that is submitted to the analytical lab under a separate label such that the laboratory has no prior knowledge of the corresponding sample.
- The relative percent difference (RPD) between field duplicate sample results was used to assess duplicate sample data. The RPD is a measure of the variability between two outcomes from the same procedure or process and is calculated by:

$$RPD\ (\%) = \left|\left(\frac{(x1 - x2)}{average\ (x1, x2)}\right)\right| x100$$

  where *x*1 is the original sample result and *x*2 is the blind field duplicate result; and

- When the concentration in a sample was less than five times the laboratory reporting limit (LRL), the difference factor (DF) was calculated. The DF is also a measure of the variability between two outcomes from the same procedure or process and is calculated by:

$$DF\ (-) = \left|\left(\frac{(x1 - x2)}{LRL}\right)\right|$$

  where *x*1 is the original sample result, *x*2 is the blind field duplicate result and LRL is the laboratory reporting limit.

In 2009, the BC Ministry of Environment updated the British Columbia Laboratory Manual which contains recommended Data Quality Objectives (DQOs) for laboratories duplicate RPDs (MoE 2009). It is recognized that these DQOs are intended for laboratory duplicates and do not include provisions for additional variability in field duplicates; however, these DQOs are considered a conservative screen for assessing the quality of field duplicates. The DQOs applied to this investigation are as follows:

- Groundwater: An RPD of less than 20% was applied for inorganics and 30% for organics.
- For parameters with concentrations less than five times the LRL, the difference factor should be less than two.

In general, an RPD greater than these targets may reflect “within sample” variability (which reflects the nature of the water chemistry distribution, or variation in the test procedures). In cases where the DQO is greater than the objective, further examination is conducted on a case-by-case basis.

The following criteria were considered acceptable for laboratory QA/QC samples:

- Analytical blanks should be below the detection limits used for the specific analysis.
- Laboratory duplicates should fall within the DQOs set by the laboratory.
- Analytical results for the reference materials or spiked standards should be within the targets specified by the laboratory.

ALS performed the chemical analysis of the groundwater samples for this investigation. ALS has achieved proficiency certification by the Canadian Association for Laboratory Accreditation Inc. (CALA) for the analyses performed. The analytical laboratory also incorporated and reported the results of their internal laboratory checks to the RDKS. These were used to assess the reliability, accuracy and reproducibility of the data. If laboratory QA/QC problems are encountered, the field samples and laboratory QA/QC samples are re-analyzed. Copies of the original laboratory certificates of analysis are provided in APPENDIX D and APPENDIX E.

The results of the QA/QC analysis are presented in Section 3.4.

Deviations from Landfill Permit requirements

During the 2018 QAQC program at the Site generally followed the requirements described in the Landfill Permit; however, the following deviations occurred in the sampling events with respect to duplicate and blank samples:

- Duplicate samples were submitted in July and September only, no duplicate sample was submitted during the March sampling event, and
- Only one trip blank, a pre-filled bottle set prepared by the laboratory, was submitted in July. No blank samples were submitted in March and September.

2.5 Regulatory Framework

In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the Ministry of Environment & Climate Change Strategy (ENV), pursuant to the Environmental Management Act (EMA, SBC 2003, Chapter 53 assented to 23 October 2003, updated to 10 April 2019). The key regulation under the EMA that relates to the assessment and remediation of contaminated sites is the Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M271/2004, as updated [includes amendments up to BC Reg. 13/2019, 24 January 2019]).

Drinking Water (Current and Future)

ENV Protocol 21 states "*Future drinking water use applies to all drinking water aquifers below a site whether or not current drinking water use applies*." Based on the available hydrogeological information of the underlying saturated geological materials gathered as part of previous investigations at the Sites, part of the underlying saturated geological materials underneath the Landfill would be considered an aquifer as defined in Protocol 21. Therefore, future drinking water use (DW) is considered applicable and the CSR drinking water standards are considered applicable to the Site.

Aquatic Life

The CSR groundwater standards for protection of freshwater aquatic life (AW-F) water bodies are considered applicable to the Site based on the proximity to several nearby creeks.

Livestock Watering

The Site is not used for agricultural purposes and is not located with the ALR; however, four registered water wells are located within 500 m (APPENDIX C). Based on the available information, the potential for local homesteads, and Protocol 21, CSR livestock watering (LW) water use is considered applicable at the Site.

Other Provincial Groundwater Standards Considerations

The CSR iron and manganese DW standards only apply at sites where specified CSR Schedule 2 activities were or are present (as defined in the footnotes of CSR water standards). Based on the former and current land uses of the Site, the CSR DW standards for iron and manganese do not apply to the Site.

Based on Technical Guidance 15 on Contaminated Sites, the quality of groundwater in monitoring well BH96-2 is not required to adhere to the BC Water Quality Guidelines (BC WQG) as this well is located more than 10 m from aquatic receiving environments. The water quality for this well was compared to BC WQG for reference purposes only.

All surface water samples were compared to BC WQG for the protection of aquatic life in freshwater (AW-F) and for reference purposes, were also compared to CSR standards.

3.0 GROUNDWATER AND SURFACE WATER RESULTS

Analytical Results are presented in APPENDIX D, Table D-1 through D-13. Certificates of Analysis for 2018 sampling events are presented in APPENDIX E. Historic analytical results for sampling locations no longer being sampled, as indicated in Section 2.1, Table 1, are presented in APPENDIX F, Table F-1 through F-14.

3.1 Groundwater Flow

Groundwater elevations were measured from the top of casing of BH96-2 and are provided alongside historic groundwater elevations following the installation of the monitoring wells (Table 5: Groundwater Elevations). Given that recent water-level measurements are only available for one groundwater monitoring well, the hydraulic gradient and groundwater flow direction can not be discerned. It may be inferred, based on historical groundwater flow data (SHA 1997) and topography, that groundwater flows to the north.

Table 5: Groundwater Elevations

Monitoring Well	Top of Casing Elevation *mASL*	Depth to Water *mASL (mTOC)*					
		Mar 2018	Jul 2018	Sep 2018	Jun 1996 [1]	Oct 1996 [1]	Jun 1997 [1]
BH96-2	175	-	165.63 (9.37)	165.49 (9.51)	165 (10)	166.3 (8.7)	165.5 (9.5)
BH96-3 (Destroyed)	202	-	-	-	189.1 (12.9)	190.4 (11.6)	190.2 (11.8)

Notes:
1 Indicates groundwater elevation data obtained from SHA (1997), and is provided for reference purposes
mASL = metres above sea level
mTOC = metres below top of casing

Water level elevations measured at BH96-2 in 2018 appear to be similar to the original measurements reported by SHA (1997).

3.2 Groundwater Quality

Based on groundwater flow directions inferred from the SHA (1997) report, there are no monitoring wells within the current groundwater monitoring network that represent upgradient groundwater conditions. The only monitoring well considered upgradient is BH96-3, which was destroyed during the Landfill capping activities. No side gradient monitoring well is available.

Analytical results for the downgradient monitoring well BH96-2 were compared to BC CSR and WQG. Concentrations of all parameters for BH96-2 were less than the BC CSR regulations. Table 6 presents a summary of parameters that were greater than the applicable BC WQG. Concentrations for total aluminum, iron, phosphorous and dissolved cadmium and phosphorous were greater than the applicable guidelines.

Table 6: Groundwater Exceedances of BC WQG

Parameter/Guideline		Total			Dissolved	
		Al	Fe	P	Cd	Phos
BCWQG AW - F (Long-term average)		0.05	-	0.005-0.015	0.00013 - 0.00026	0.005-0.015
BCWQG AW - F (Short-term maximum)		**0.1**	**1**	-	**0.00031 - 0.00079**	-
BCWQG DW		9.5	<0.3	0.01	0.005	0.01
BH96-2	Mar-18	**0.529**	0.796	0.112	0.00061	0.061
BH96-2	Jul-18	**0.411**	0.659	0.09	0.000392	0.059
BH96-2	Sep-18	**0.292**	0.332	0.093	0.000342	0.072

Notes:
All concentrations are given in mg/L
BC WQG = BC Water Quality Guidelines
AW – F = Aquatic Life – Freshwater
DW = Drinking Water
- = parameter did not exceed guideline
NA = Parameter not analyzed, Al = Aluminum, Fe = Iron, Phos = Phosphorous, Cd = Cadmium
Underlined indicates parameter exceeds BC WQG Long Term
Bold and grey highlight indicates parameter exceeds BC WQG Maximum
Red font indicates parameter exceeds BC WQG DW

3.3 Surface Water Quality

Based on the conceptual model of the surface water flow regime presented in Section 1.4 of this report, there are no surface water monitoring locations within the current monitoring network that represent upstream conditions. Surface water location SW-1 is located hydraulically side gradient to the Landfill, and is considered representative of background surface water conditions.

The analytical results for the surface water samples are tabulated and compared against the BC WQG for Freshwater Aquatic Life and Drinking Water. A summary of parameters that were greater than the BC WQG are shown in Table 7 and Table 8.

Table 7: Surface Water Exceedances of CSR

Parameter/Guideline			NH_3	Total	
				Fe	Mn
CSR AW - F			1.3 - 18.5	-	-
CSR AW - LW			-	-	-
CSR DW			-	6.5	1.5
SW-1	Side gradient	Mar-18	0.0056	0.02	2.64
SW-3	Downgradient		22	5.21	2.35
SW-21			3.91	0.027	0.295
SW-17			Dry	Dry	Dry
SW-6			0.0331	0.251	0.00334
SW-1	Side gradient	Jul-18	<0.0050	<0.010	0.00217
SW-3	Downgradient		41.7	1.8	1.98
SW-21			8.97	0.091	0.194
SW-17			0.0053	0.113	0.0171
SW-6			<0.0050	0.064	0.00994
SW-1	Side gradient	Sep-18	0.0137	0.00014	0.0628
SW-3	Downgradient		67.1	53	3.07
SW-21			4.15	0.418	0.224
SW-17			Dry	Dry	Dry
SW-6			0.015	0.227	0.0316

Notes:
All concentrations are given in mg/L
CSR = Contaminated Sites Regulations
- = parameter without regulation
NA = Parameter not analyzed, NH_3 = Ammonia, Al = Aluminum, As = Arsenic, Fe = Iron, Mn = Manganese, Phos = Phosphorous
Underlined indicates parameter exceeds BC WQG Long Term
Bold and grey highlight indicates parameter exceeds BC WQG Maximum
Red font indicates parameter exceeds BC WQG DW
Grey font indicates parameter did not exceeded regulation, parameter exceeded regulation during separate sampling event

Table 8: Surface Water Exceedances of BC WQG

Parameter/Guideline			NH_3	Total					Dissolved			
				Al	As	Fe	Mn	P	Al	Fe	Mn	P
BCWQG AW - F (Long-term average)			0.53 - 1.86	0.05	0.005	-	0.61 - 4.13	0.005-0.015	0.05	-	1.88 - 2.98	0.005-0.015
BCWQG AW - F (Short-term maximum)			**3.61 - 23.9**	**0.1**	-	**1**	**0.54 - 9.37**	-	**0.1**	**0.35**	**3.72 - 6.49**	-
BCWQG DW			-	9.5	0.01	<0.3	<0.05	0.01	9.5	<0.3	<0.05	0.01
SW-1	Side gradient	Mar-18	0.0056	0.0297	<0.00010	0.025	0.00154	NA	0.0023	0.02	2.64	<0.050
SW-3	Downgradient		**22**	**0.203**	0.00144	**5.21**	2.35	0.056	0.0023	0.02	2.64	<0.050
SW-21			**3.91**	**0.446**	0.00034	0.515	0.513	<0.050	0.0186	0.027	0.295	<0.050
SW-17			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW-6			0.0331	**0.615**	0.00034	0.713	0.115	<0.050	0.112	0.251	0.00334	<0.050
SW-1	Side gradient	Jul-18	<0.0050	0.0364	<0.00010	0.024	0.00345	0.0023	0.0239	<0.010	0.00217	<0.050
SW-3	Downgradient		**41.7**	**0.197**	0.00205	**1.8**	1.98	0.068	0.0094	0.062	1.92	<0.050
SW-21			**8.97**	**0.129**	0.00117	0.355	0.209	0.066	0.0338	0.091	0.194	<0.050
SW-17			0.0053	**0.124**	0.00019	0.245	0.0234	<0.050	0.0335	0.113	0.0171	<0.050
SW6			<0.0050	0.0668	0.00016	0.119	0.0116	<0.050	0.0253	0.064	0.00994	<0.050
SW-1	Side gradient	Sep-18	0.0137	0.094	0.00017	0.196	0.0536	0.0083	0.043	0.00014	0.0628	<0.050
SW-3	Downgradient		**67.1**	**0.122**	0.0142	**53**	3.07	0.356	0.0080	**50.4**	3.14	0.056
SW-21			**4.15**	**0.589**	0.00365	1.91	0.303	0.167	0.0346	**0.418**	0.224	<0.050
SW-17			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
SW-6			0.015	**0.306**	0.00047	0.516	0.0357	<0.050	0.0382	0.227	0.0316	<0.050

Notes:
All concentrations are given in mg/L
BC WQG = BC Water Quality Guidelines
AW – F = Aquatic Life – Freshwater
DW = Drinking Water
- = parameter without guideline
NA = Parameter not analyzed, NH_3 = Ammonia, Al = Aluminum, As = Arsenic, Fe = Iron, Mn = Manganese, Phos = Phosphorous
Underlined indicates parameter exceeds BC WQG Long Term
Bold and grey highlight indicates parameter exceeds BC WQG Maximum
Red font indicates parameter exceeds BC WQG DW
Grey font indicates parameter did not exceeded guidelines, parameter exceeded guideline during separate sampling event

Concentrations were greater than the BC WQG for the following parameters (Table 8)

- Ammonia (SW-3 and SW-21).
- Total aluminum (SW-3, SW-21 and SW-6), arsenic (SW-3), iron (SW-3 and SW-21), manganese (SW-3 and SW-21) and phosphorous (SW-3 and SW-21).
- Dissolved aluminum (SW-6), iron (SW-3 and SW-21), manganese (SW-1, SW-3 and SW-21) and phosphorous (SW-3).

3.4 Results of Quality Assurance/Quality Control Analysis

Field duplicates, which consist of two samples collected from the same sampling location, were collected for surface samples in July and September 2018 to assess variability introduced through sampling and handling procedures. The surface water duplicate samples were collected at surface water station SW-3 (July 2018) and SW-21 (September 2018). Data for the duplicate analyses are presented in APPENDIX D, Table D-13.

The relative percent difference (RPD) and the difference factor (DF) were calculated in APPENDIX D, Table D-13 for both surface water duplicate samples. The RPD is the absolute difference between the two values divided by the mean concentration and should be calculated for concentrations above five times the method detection limit. For samples with concentrations below this threshold, two times the detection limit value is considered the maximum acceptable difference between duplicates.

The surface water duplicate sample at SW-3 indicated the following calculated RPDs above the acceptable limit of 20%:

- Total Suspended Solids – 35% RPD (primary sample concentration 21 mg/L, duplicate sample concentration 14.8 mg/L
- Total Aluminum – 110.5% RPD (primary sample concentration 0.197 mg/L, duplicate sample concentration 0.0568 mg/L)
- Total Iron – 42% RPD (primary sample concentration 1.8 mg/L, duplicate sample concentration 1.18 mg/L)
- Total Zirconium – 56% RPD (primary sample concentration 0.000433 mg/L, duplicate sample concentration 0.000244 mg/L)
- Dissolved Iron – 25% RPD (primary sample concentration 0.062 mg/L, duplicate sample concentration 0.048 mg/L)

The surface water duplicate sample at SW-21 indicated the following calculated RPDs above the acceptable limit of 20%:

- Dissolved Selenium – 22% RPD (primary sample concentration 0.000386 mg/L, duplicate sample concentration 0.000309 mg/L)

The only parameters exceeding the QA/QC limits and the applicable standards are total aluminum and iron in SW-3. These exceeding parameters are likely indicative of sample heterogeneity and total suspended solids in each sample. For the remaining parameters, the results exceeding QA/QC limits are below applicable standards, and higher concentrations were generally reported in the primary sample. Therefore, the results are conservative, and are considered satisfactory for the purpose of this report.

In addition to the field duplicate samples, one trip blank was submitted in September 2018. None of the parameters exceeded the QA/QC criteria. In addition to the field QA/QC samples, internal quality control data provided by ALS was reviewed as a quality assurance of the analytical testing procedures. The laboratory quality control tests consisted of method blanks, replicate samples, and analytical spikes for water analysis, and are provided in the Certificate of Analyses included in APPENDIX E.

All laboratory RPDs were within the acceptable range indicating good reproducibility. The percent recovery for the matrix spike and spiked blank were all within the laboratory's internal QC limits. Similarly, no detections were noted for method blanks, laboratory control samples or standard samples.

The results of the laboratory quality control checks met the laboratory's internal criteria for acceptable results. From the QA/QC information provided, the precision and accuracy of the laboratory data is acceptable.

4.0 DISCUSSION

Several forms of graphical presentation were used to evaluate spatial and temporal water quality variations and are shown on Figures 3 through 5. The data set considered covers 1996 through 2018.

4.1 Leachate Indicator Parameters

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

- Biochemical oxygen demand (BOD)
- Total organic carbon (TOC)
- Chemical oxygen demand (COD)
- Total suspended solids (TSS)
- Ammonia nitrogen
- Nitrate
- Phosphorus (total)
- Alkalinity as $CaCO_3$
- pH
- Total hardness as $CaCO_3$
- Calcium
- Magnesium
- Potassium
- Sodium
- Chloride
- Sulphate
- Total iron

A subset of these parameters was chosen to evaluate the potential environmental impact of the Landfill, based on previous work by SHA (2017) and current analysis of the available data. These parameters are listed below:

- Conductivity (Figure 3-A)
- Ammonia (Figure 3-B)
- Total and Dissolved Iron (Figure 3-C)

- Total and Dissolved Manganese (Figure 3-D)
- Chemical Oxygen Demand (Figure 3-E)
- Chloride (Figure 3-F)
- Sulphate (Figure 3-G)

Concentrations for the above-mentioned parameters were plotted for SW-3, SW-21 and SW-6 in relation to their distance from the Landfill. Background data for each parameter from SW-1 is also provided. Based on the figures, it appears that leachate generated from the Landfill is collected and attenuated quickly past SW-21. A strong decrease in concentrations for all parameters is apparent between SW-3 and SW-21. Parameters at SW-6 are generally similar to, or slightly above, background concentrations.

Conductivity (Figure 3-A), Iron (Figure 3-C) and Chloride (Figure 3-F) are generally greater at SW-6 than background concentrations (SW-1). Other parameters appear to be attenuating to below background concentrations at SW-6.

Time series plots for the following parameters were generated to compare groundwater conditions at BH98-2 to leachate surface water quality at SW-3:

- Conductivity (Figure 4-A)
- Ammonia (Figure 4-B)
- Chloride (Figure 4-C)
- Sulphate (Figure 4-D)
- Total Iron (SW-3 only; Figure 4-E)
- Dissolved Iron (BH96-2 only; Figure 4-F)

In general, the figures indicate that parameters are relatively constant over the available sampling interval. Variations are apparent through the years, indicative of different sampling conditions (i.e. different levels of precipitation, sample handling and sampling procedures). A trendline for each parameter indicates that parameters are relatively constant over time. Sulphate (Figure 4-D) and total iron (Figure 4-E) for SW-3 show a minor increase over time whereas these parameters show a minor decrease over time in BH96-2 (Figure 4-F). Chloride, which is typically a good indicator of Landfill influence given that it is conservative in nature and not subject to attenuation along the groundwater flow path, is increasing in groundwater at BH96-2 and appears to be trending slightly downward for SW-3 (Figure 4-C).

Total Iron, Chloride and Sulphate were plotted against time for the furthest downgradient sampling location SW-6 (Figure 5). Chloride and Sulphate show relatively constant to slightly decreasing trends over time. Only total iron shows a minor increase over time.

4.2 Evaluation of Groundwater and Surface Water Quality

As described above, the overall spatial and temporal analysis suggests that the Landfill-generated leachate is attenuated and does not appear to be significantly impacting surface water quality beyond a distance of approximately 500 m from the Landfill. Concentrations at the downgradient location SW-6 (750 m from the Landfill) appear to be close to background conditions suggesting that Landfill leachate has attenuated enough by the time it reaches the Thornhill Creek water system.

Groundwater from the one downgradient monitoring well at the Site appears to show little impact from leachate generated by the Landfill. All parameters were below the applicable guidelines and regulations with the exception of total aluminum, iron, phosphorous and dissolved cadmium and phosphorous. These parameters may be related to Landfill leachate; however, these parameters could originate from natural sources in the clay unit underlying the majority of the Landfill. Chloride, which is a typical indicator of landfill leachate, is rising in groundwater over time, but is present at relatively low concentrations that are well below regulatory criteria.

The landfill was constructed at the boundary of a glacial gravel deposit with a glaciomarine silt and clay unit. Both units are underlain by a glacial till layer. The groundwater quality of water travelling through the gravel aquifer and the underlying glacial till aquifer could not be assessed due to no monitoring wells available or completed in these units.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2018 monitoring program indicates that leachate emanating from the Landfill and migrating at the ground surface appears to be attenuated before it reaches the Thornhill Creek water system. Groundwater quality data is only available for one monitoring well located downgradient of the Landfill. The well is screened in silt and clay, which underlies the majority of the Landfill, and shows little impact of Landfill leachate. Groundwater quality associated with the gravel unit that underlies the south corner of the Landfill could not be assessed due to the lack of monitoring wells in this area. Similarly, the water quality in the glacial till unit which underlies both the gravel unit and the silt and clay unit was also not evaluated due to the lack of available monitoring wells in this unit.

All analytical results obtained in 2018 follow historic trends and confirm previous findings by SHA (2017).

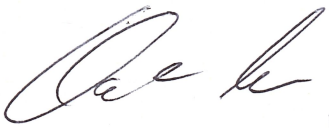
Golder presents the following recommendation for future work at the Thornhill Landfill, assuming the environmental monitoring at the closed Thornhill Landfill will continue as per the current Operation Certificate:

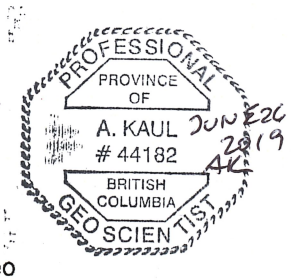
- The Landfill permit requires that the Permittee engage a qualified professional, experienced in hydrogeology, to design a groundwater monitoring program, and that two monitoring well locations should be sampled in the interim. It is recommended that this groundwater monitoring program be developed. It is anticipated that the program would include the installation of one to three additional monitoring wells to adequately establish groundwater quality and flow direction in all three stratigraphic units (silt and clay, gravel and glacial till units).
- Should new monitoring wells be installed, Golder recommends that a qualified surveying company be hired to obtain ground and top of casing elevations of all monitoring wells to accurately assess groundwater elevations and flow.

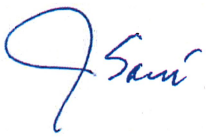
6.0 CLOSING COMMENTS

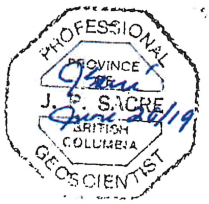
We trust that this report provides the information required at this time. If you have any questions, please feel free to contact the undersigned.

Golder Associates Ltd.









Alexander Kaul, PGeo
Geochemist

Jillian Sacré, MSc, PGeo
Principal, Senior Hydrogeologist

AK/JPS/lmk/syd

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7.0 REFERENCES

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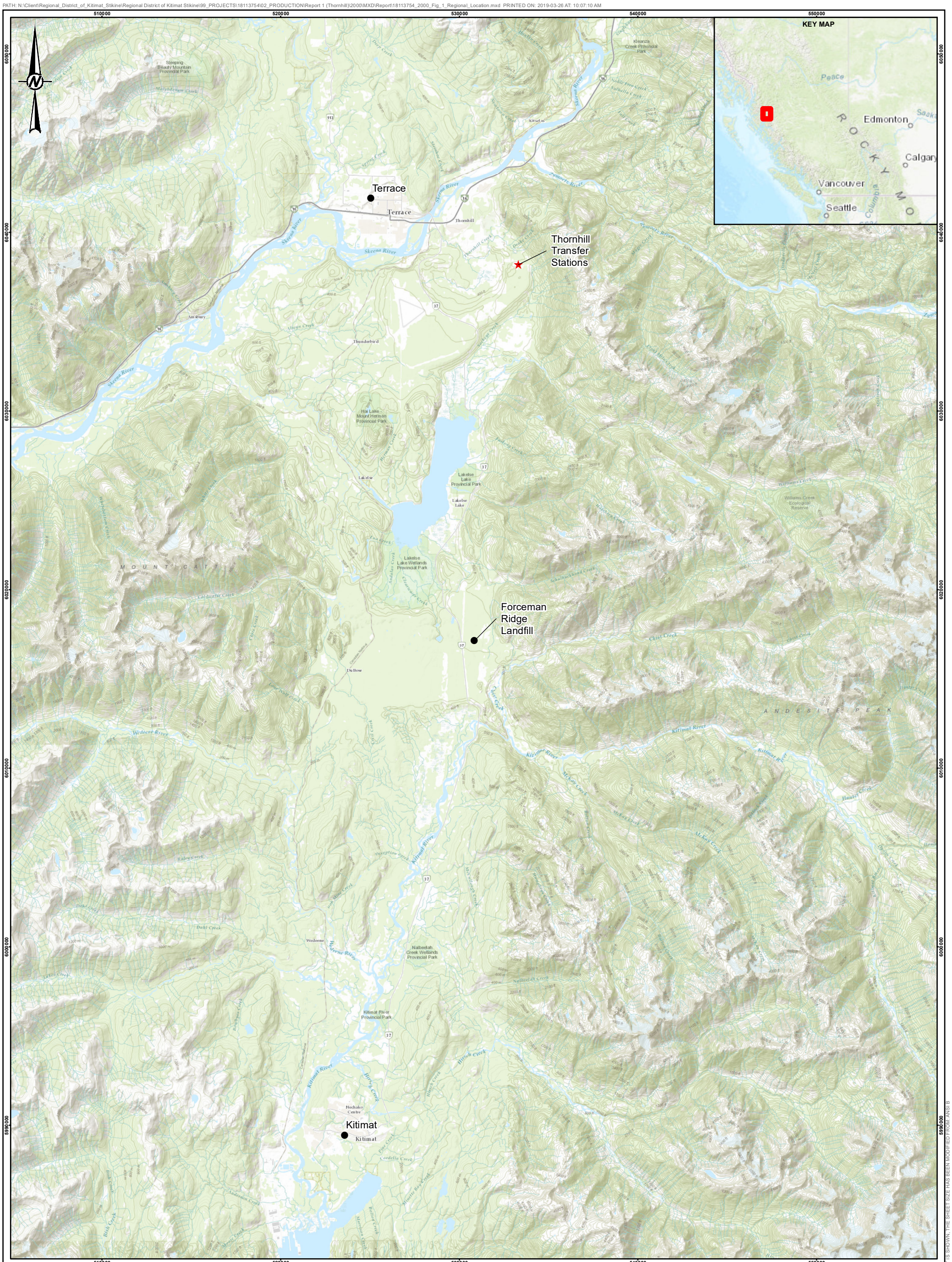

LEGEND

- ★ SITE LOCATION
- ● POINT OF INTEREST

0 3,000 6,000

1:201,334 METRES

NOTE(S)

REFERENCE(S)

1. BASE MAP: ESRIS (2019)

CLIENT

REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT

2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT

GOLDER

YYYY-MM-DD	2019-06-24
DESIGNED	AK
PREPARED	CB
REVIEWED	AK
APPROVED	JPS

TITLE

REGIONAL LOCATION MAP

PROJECT NO.	CONTROL	REV.	FIGURE
18113754	2000	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

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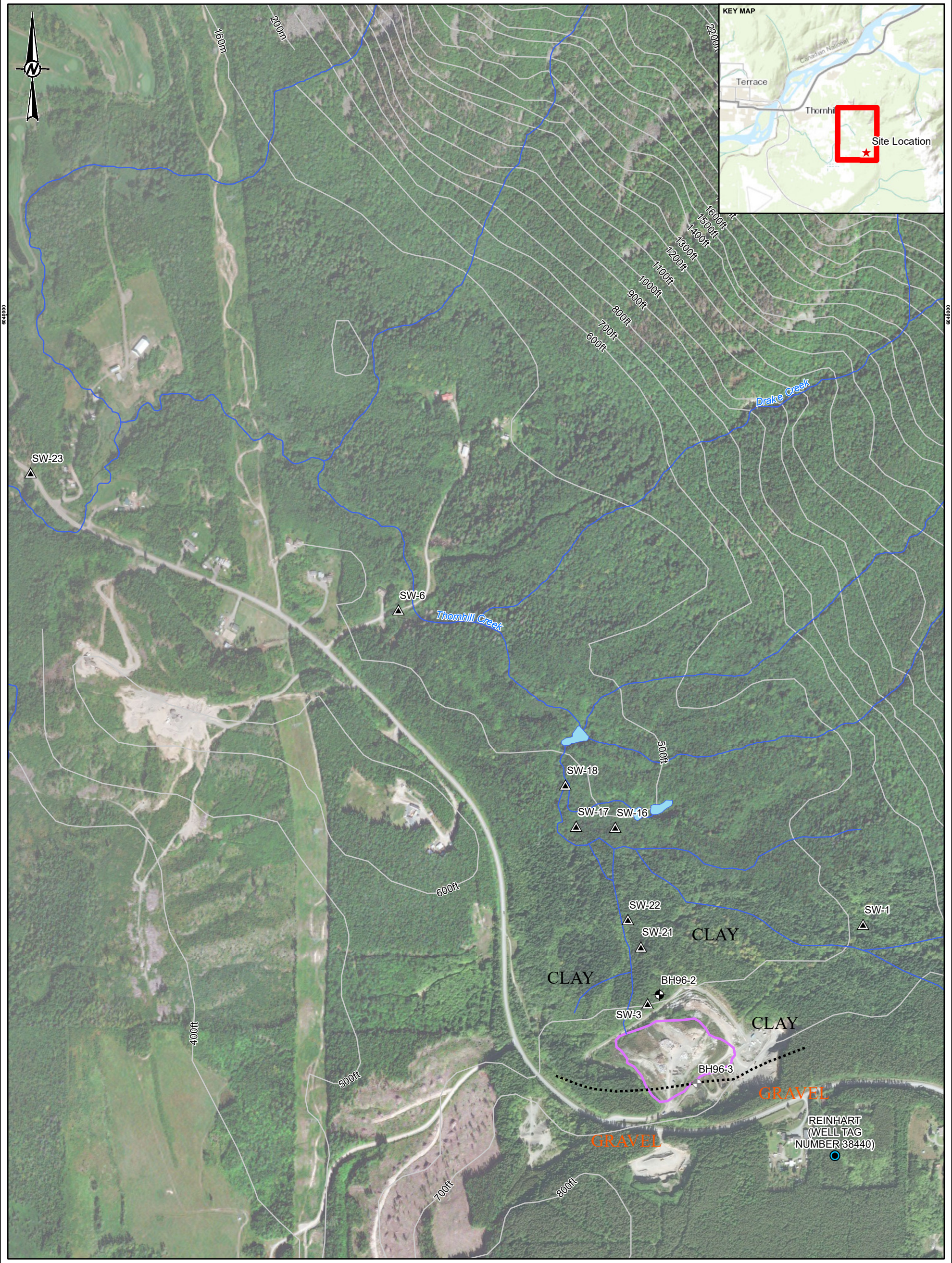

LEGEND

- WATERCOURSE
- CONTOUR
- WATERBODY
- LANDFILL FOOTPRINT
- DEFINES CHANGE IN SURFACE GEOLOGY

SAMPLE LOCATIONS

- MONITORING WELL
- MONITORING WELL (DESTROYED)
- SURFACE WATER
- DOMESTIC WATER WELL

0 170 340
1:8,500 METRES

REFERENCE(S)
1. BASE MAP: ESRIS (2019)
2. BASE DATA: CANVEC, GOVERNMENT OF CANADA (2019)

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
DESIGNED	AK
PREPARED	CB/CN
REVIEWED	AK
APPROVED	JPS

TITLE
SAMPLING LOCATIONS

PROJECT NO.	CONTROL	REV.	FIGURE
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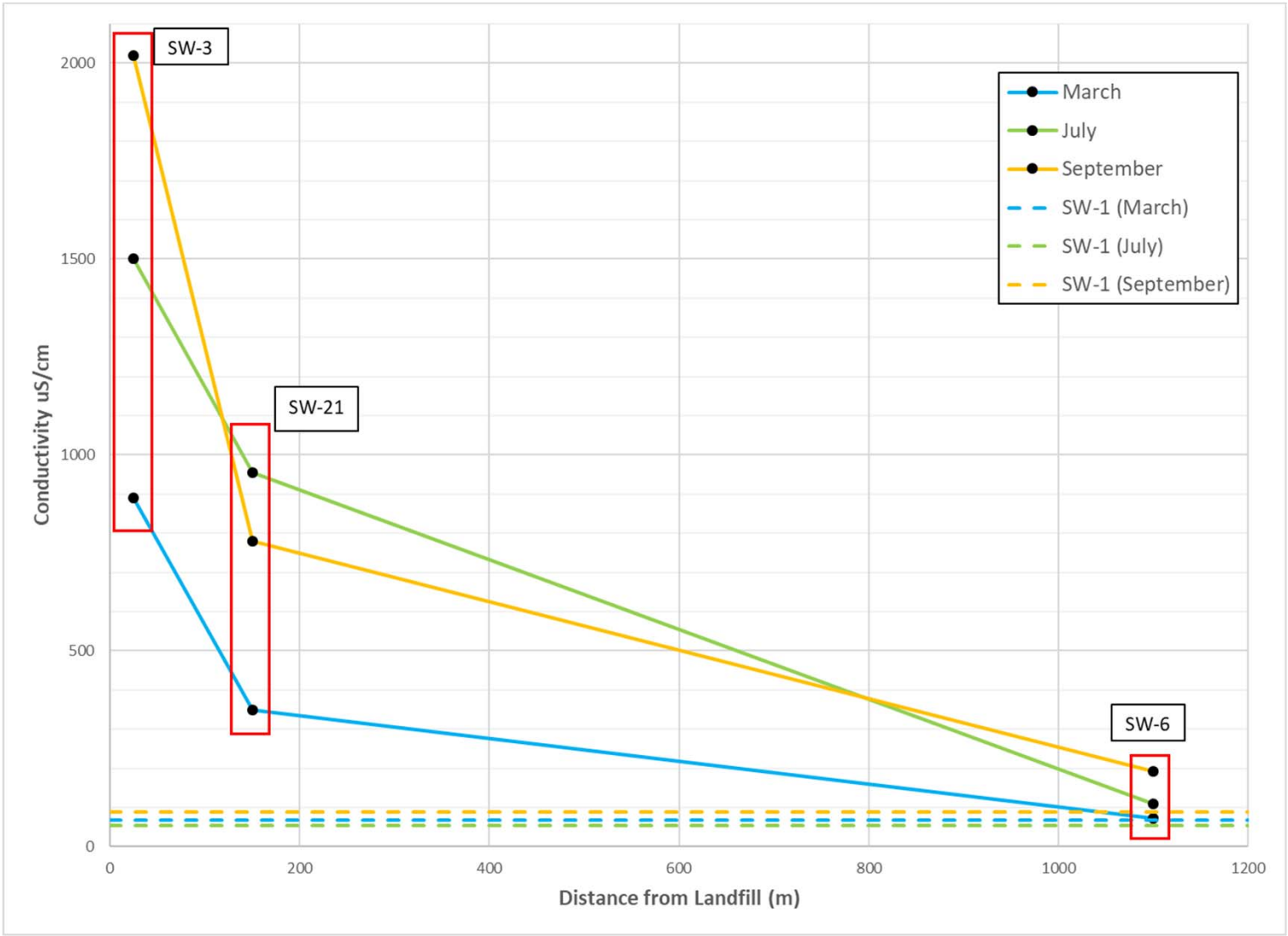

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
CONDUCTIVITY CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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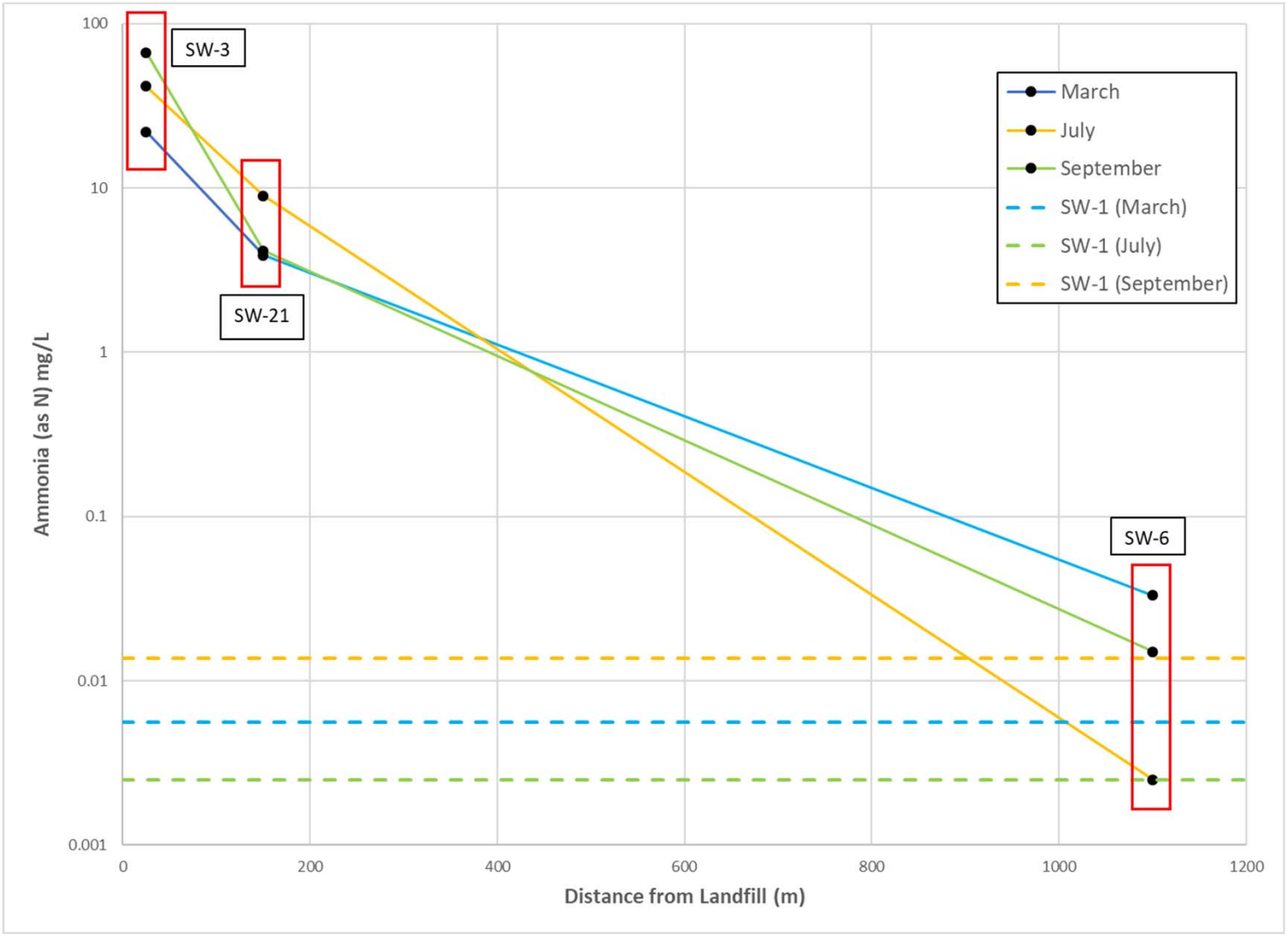

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
AMMONIA CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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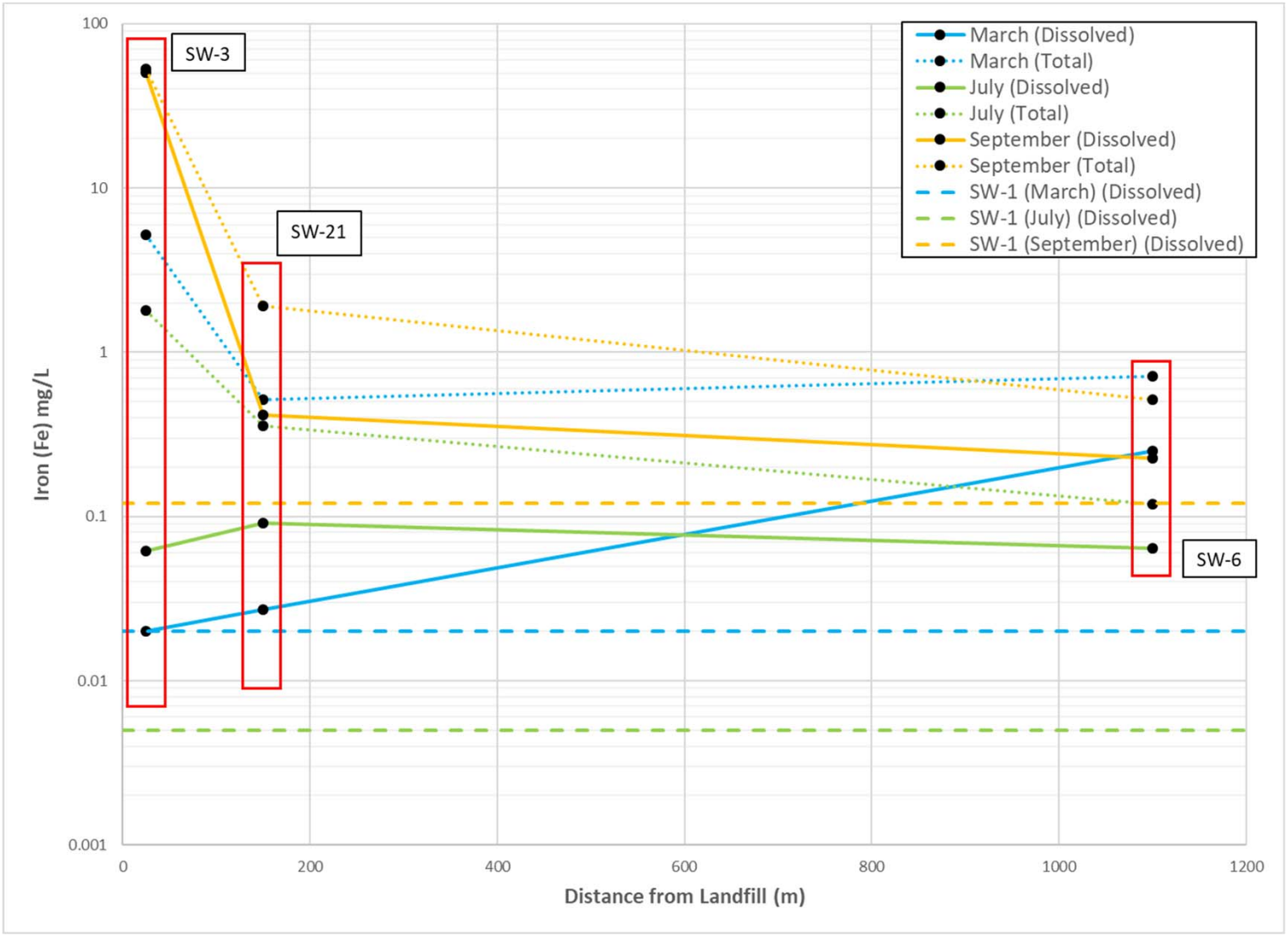

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REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
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CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
IRON CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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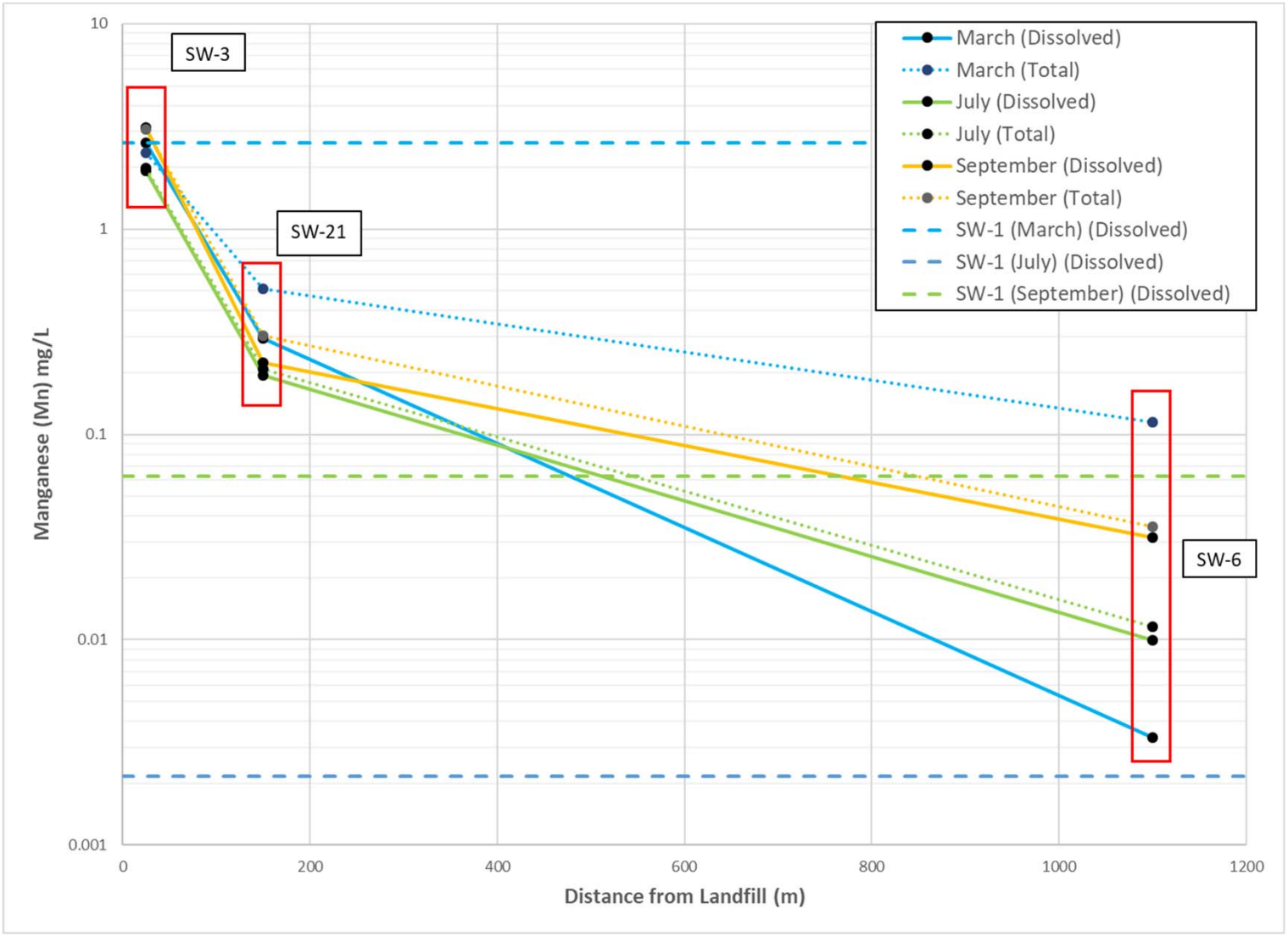

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REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
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CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
MANGANESE CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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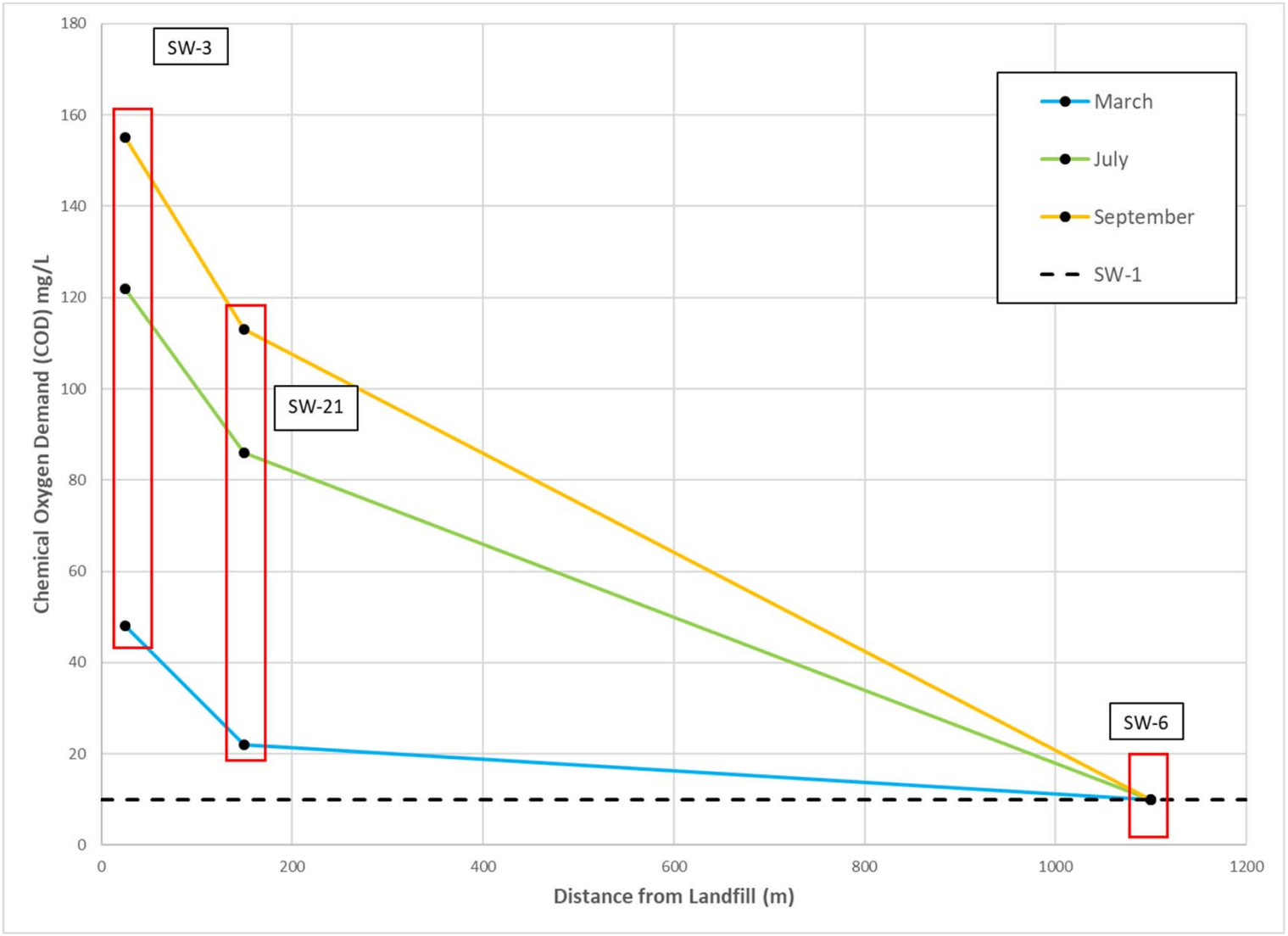

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REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
CHEMICAL OXYGEN DEMAND CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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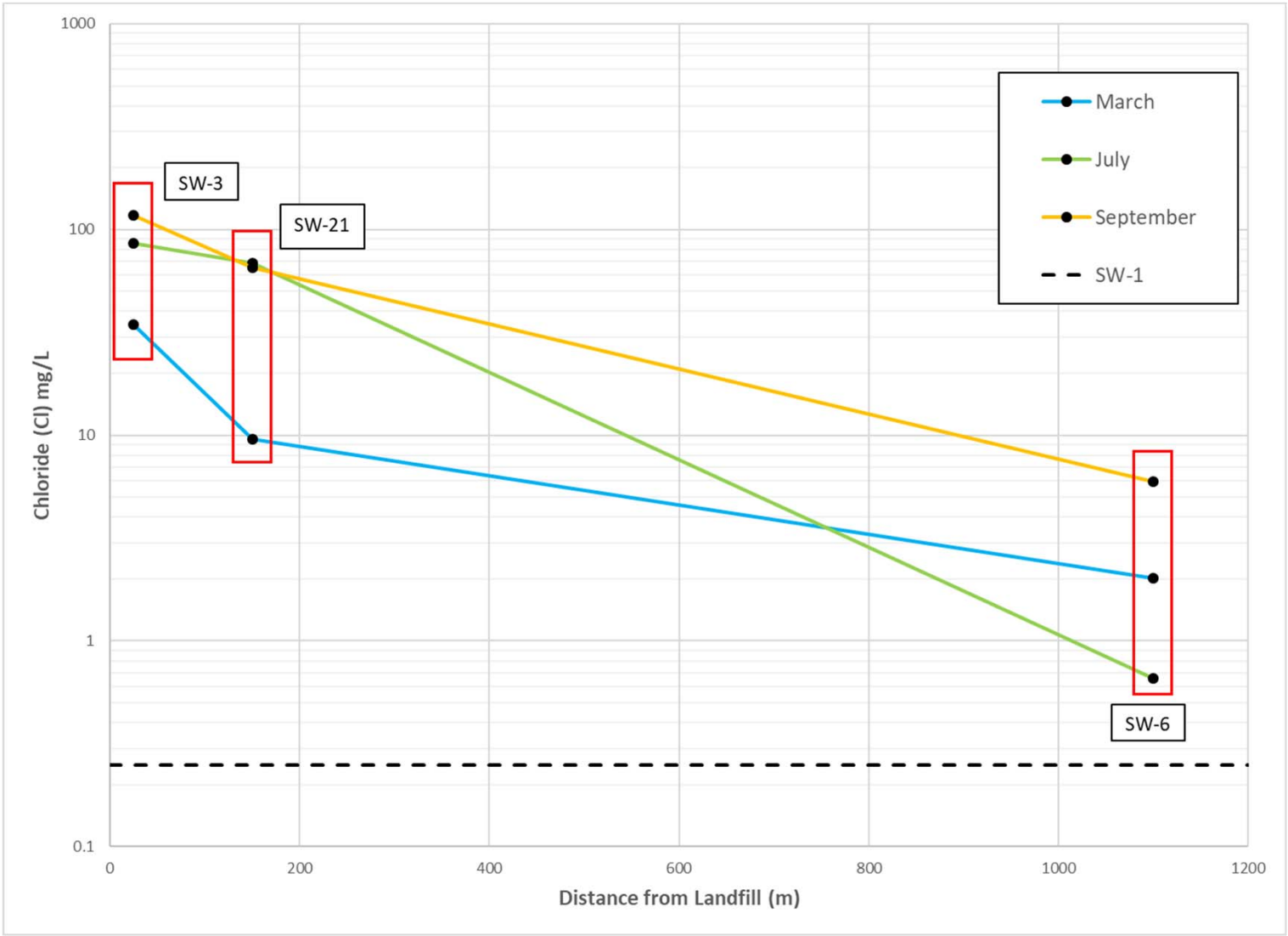

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
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PROJECT No.	CONTROL	Rev	FIGURE
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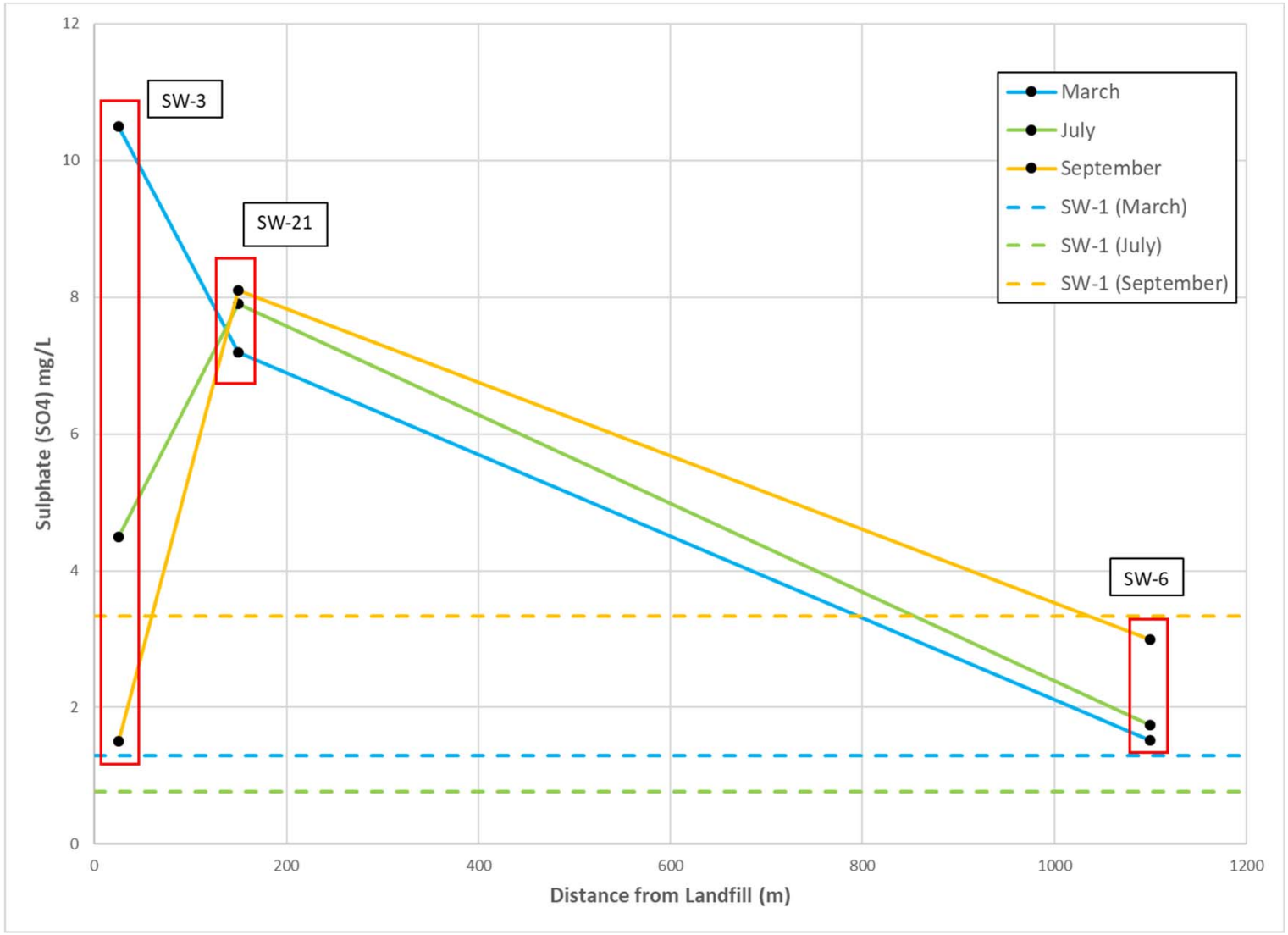

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REGIONAL DISTRICT OF KITIMAT-STIKINE

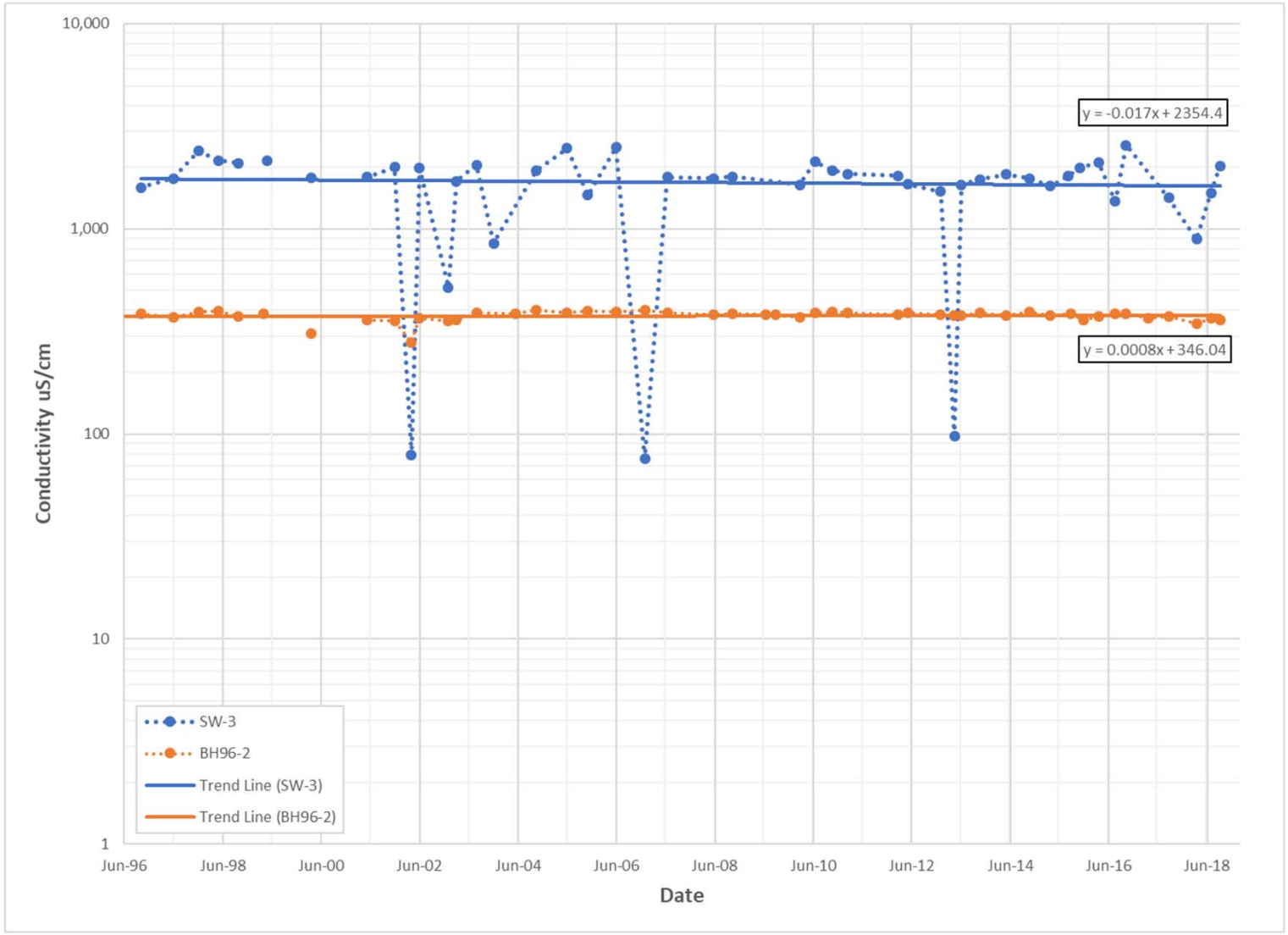
PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
SULPHATE CONCENTRATIONS DISTANCE PLOT

PROJECT No.	CONTROL	Rev	FIGURE
18113754	2000	0	3-G



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REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
CONDITIVITY CONCENTRATION TIME SERIES PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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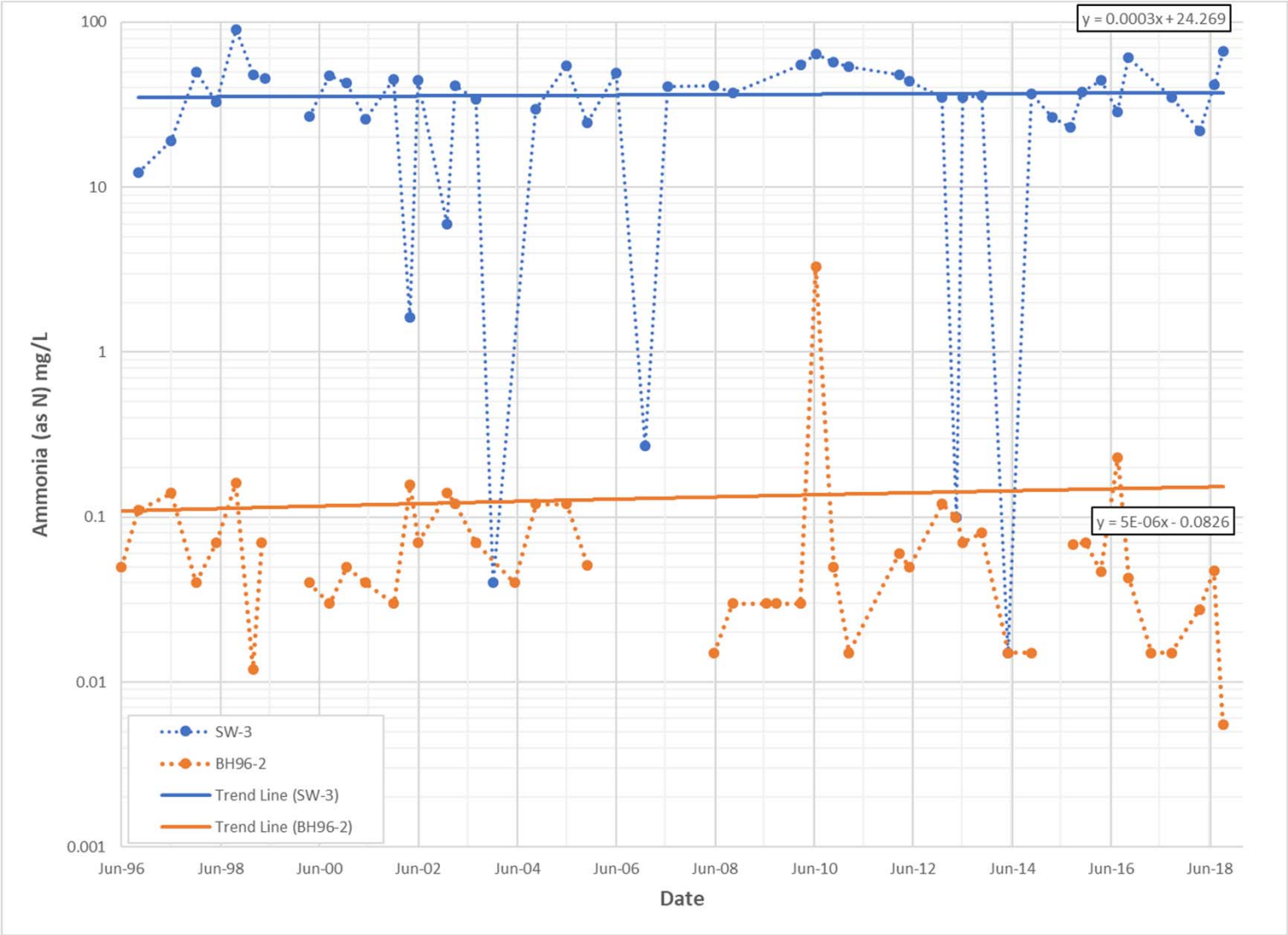

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
AMMONIA CONCENTRATION TIME SERIES PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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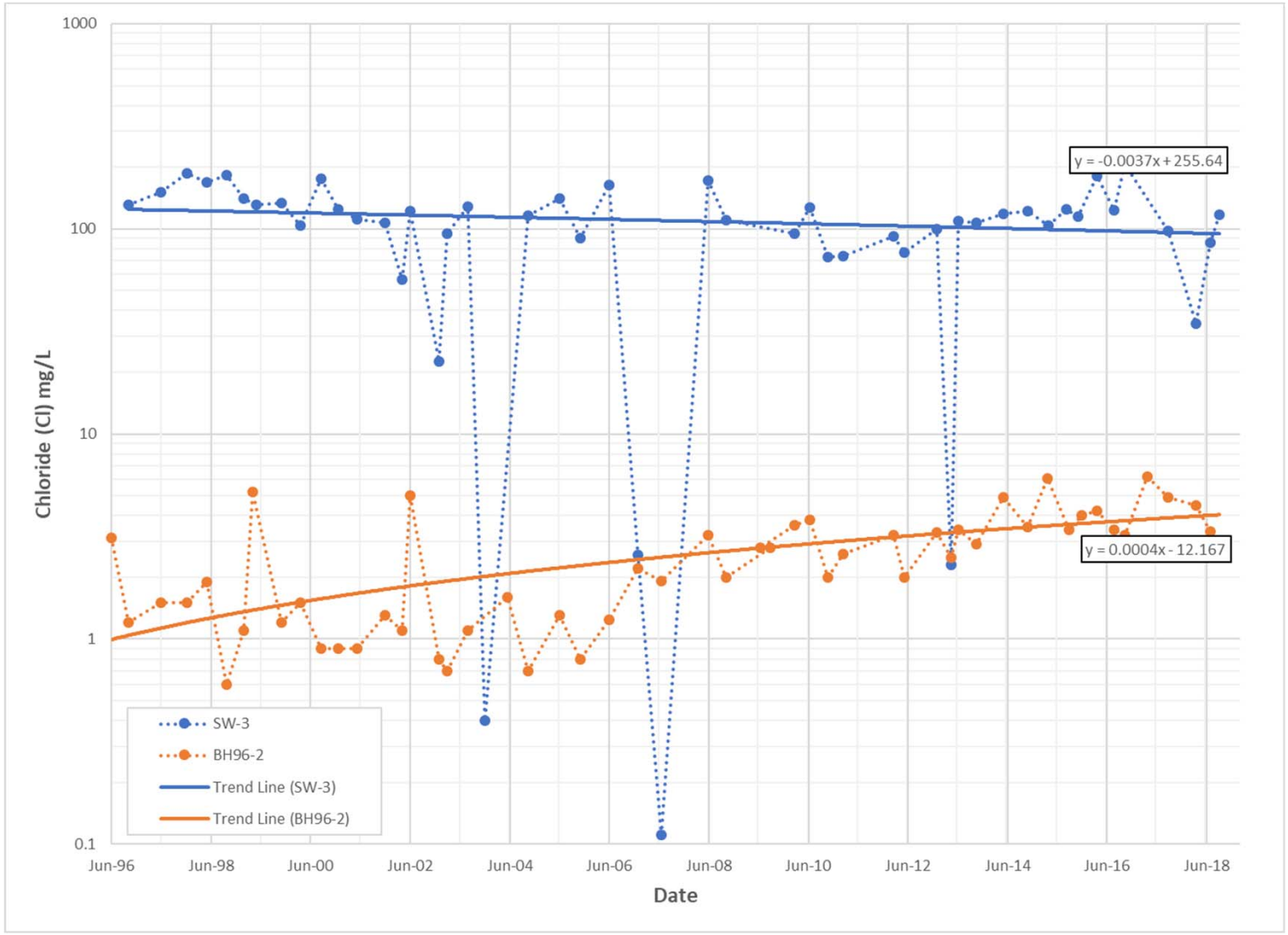

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
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APPROVED	JPS

TITLE
CHLORIDE CONCENTRATION TIME SERIES PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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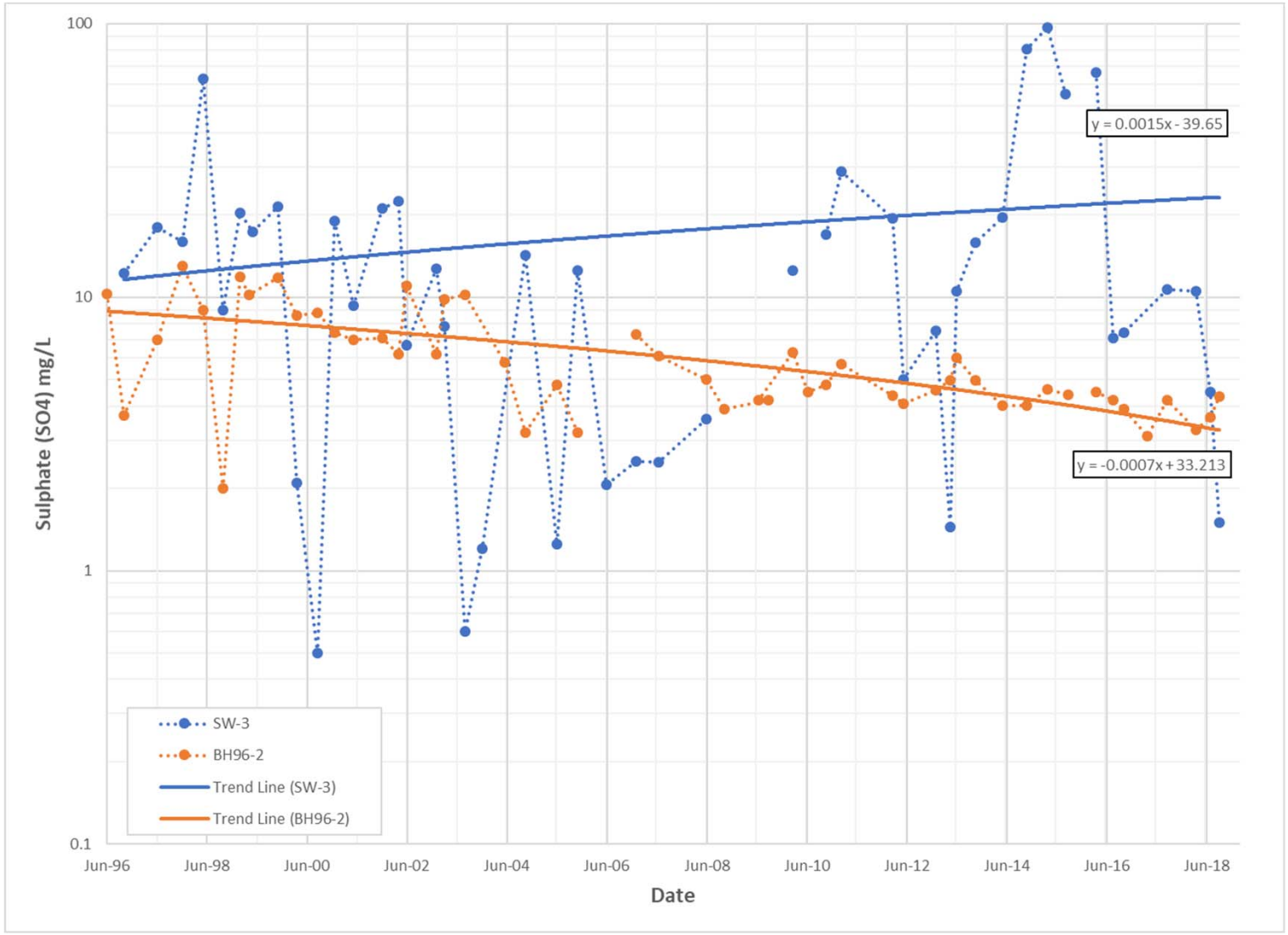

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REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
SULPHATE CONCENTRATION TIME SERIES PLOT

PROJECT No.	CONTROL	Rev	FIGURE
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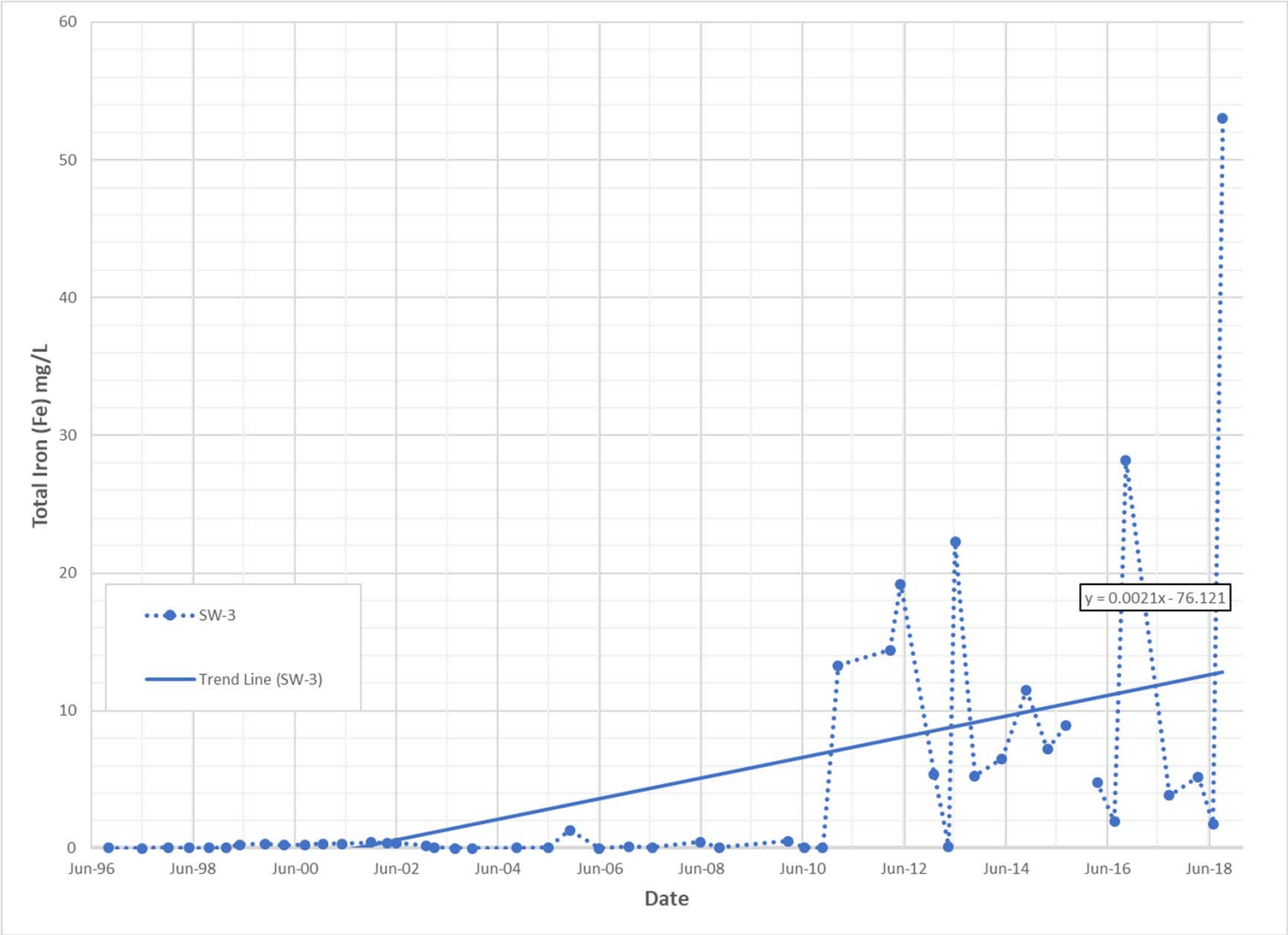

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
TOTAL IRON CONCENTRATION TIME SERIES PLOT (SW-3)

PROJECT No.	CONTROL	Rev	FIGURE
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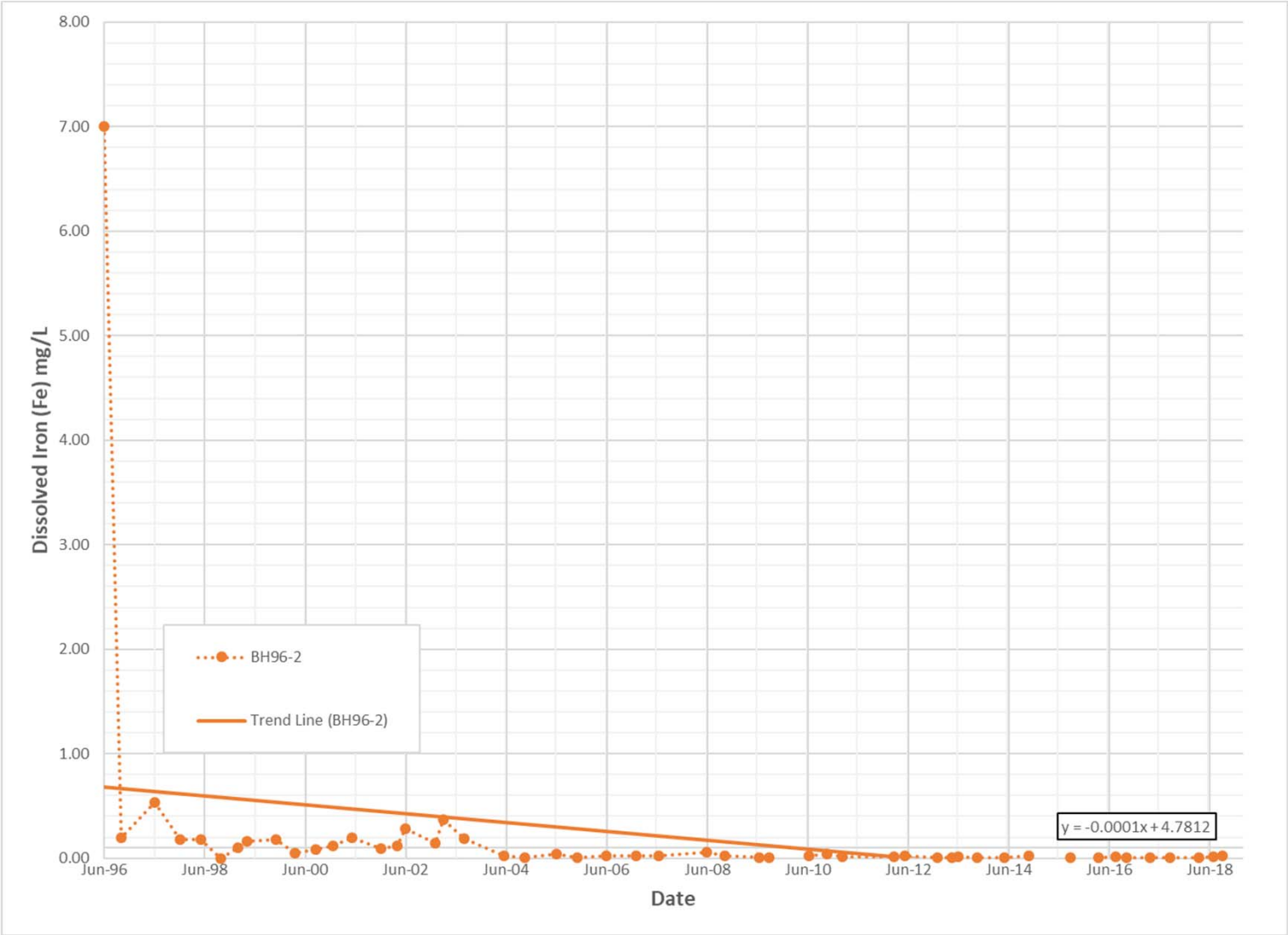

CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
DISSOLVED IRON CONCENTRATION TIME SERIES PLOT (BH96-2)

PROJECT No.	CONTROL	Rev	FIGURE
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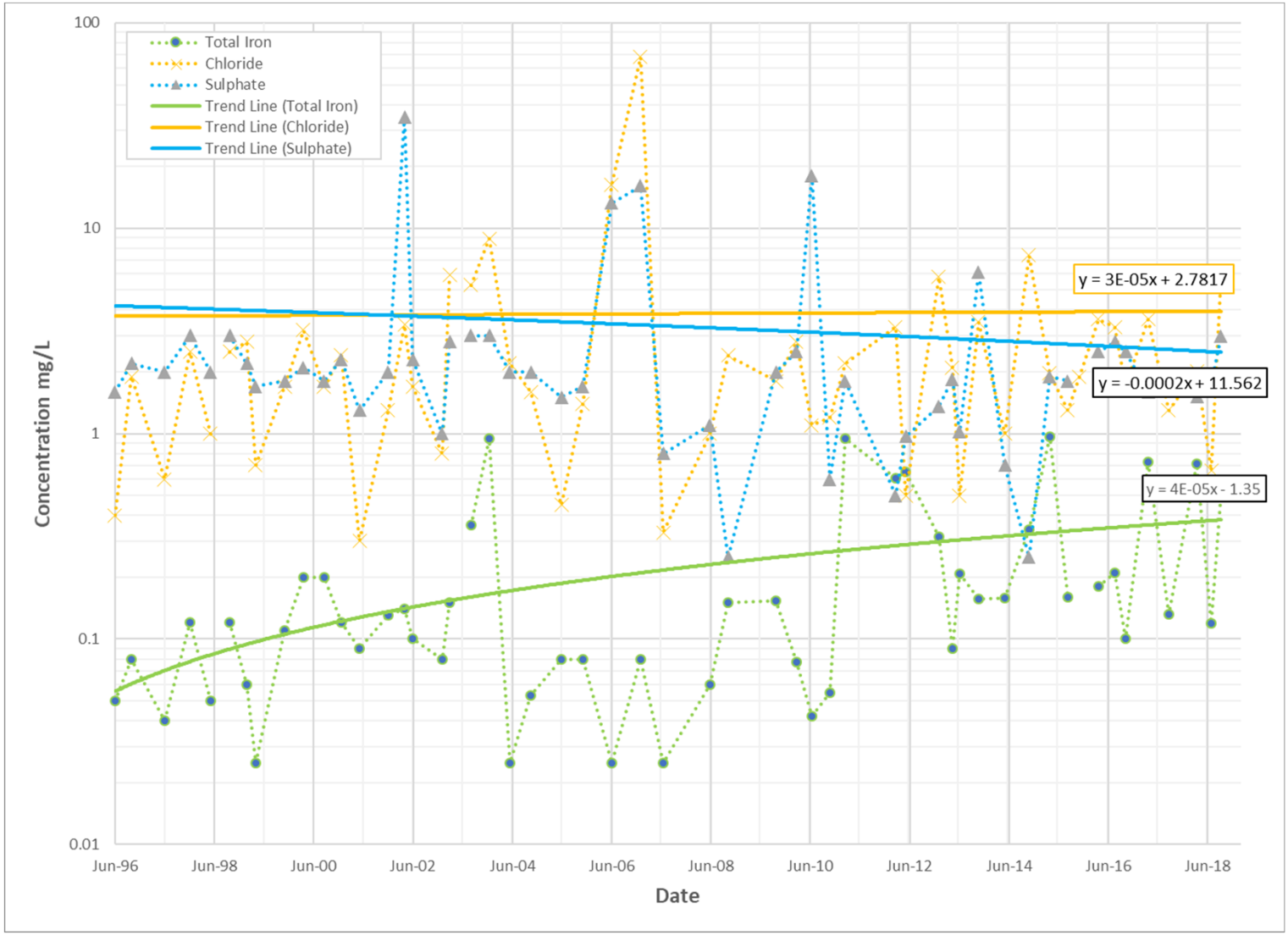


CLIENT
REGIONAL DISTRICT OF KITIMAT-STIKINE

PROJECT
2018 THORNHILL TRANSFER STATION ANNUAL MONITORING REPORT

CONSULTANT
GOLDER

YYYY-MM-DD	2019-06-24
PREPARED	AK
DESIGN	AK
REVIEW	AK
APPROVED	JPS

TITLE
CONCENTRATION OF SELECT PARAMETERS TIME SERIES PLOT (SW-6)

PROJECT No.	CONTROL	Rev	FIGURE
18113754	2000	0	5

APPENDIX A

Landfill Permit

BRITISH COLUMBIA

Date: June 20, 2014

Authorization Number: MR-4057

REGISTERED MAIL

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

Dear Operational Certificate Holder:

Enclosed is Operational Certificate MR-4057 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate.

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.

Ministry of Environment
Environmental Protection Division
Bag 5000
Smithers, BC V0J 2N0
Skeena Region
Telephone: (250) 847-7260
Facsimile: (250) 847-7591

Administration of this operational certificate will be carried out by staff from the Skeena Region. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Director, Environmental Protection, at Ministry of Environment, Regional Operations, Skeena Region, Bag 5000, Smithers, BC V0J 2N0.

Yours truly,

M. Love

Mark Love
for Director, *Environmental Management Act*
Skeena Region

Enclosure

cc: Environment Canada

MINISTRY OF ENVIRONMENT

OPERATIONAL CERTIFICATE

MR-4057

for the

THORNHILL LANDFILL

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

Regional District of Kitimat Stikine

300-4545 Lazelle Avenue

Terrace, British Columbia

V8G 4E1

is authorized to store, handle, treat and discharge municipal solid waste from Thornhill and surrounding areas at the Thornhill 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 described in Land and Water BC License No. 634224 as follows: that part of District Lot 518 and parts of Blocks B and C of District Lot 655, Plan 1304, all of Range 5, Coast District more particularly described as follows:

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

2. DESIGN, OPERATIONS and CLOSURE PLAN

The landfill and associated works shall be designed by qualified professionals [such as engineer(s) and/or geoscientist(s)] registered in the Province of British Columbia who have expertise in the field of landfill design. These details shall be incorporated into a "Design, Operations, and Closure Plan" (DOCP) and submitted to the Director for review

M Love

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Date Issued: June 20, 2014
Date Amended:
(most recent)

and approval prior to June 30, 2015. The predominant focus of the DOCP shall be on closure aspects, given the intentions to close the landfill in the near future. The landfill shall be operated and closed in accordance with the approved DOCP.

The DOCP shall include the following components:

1. Design and Operations (active landfill remaining life)

    - extent and location of each disposal area, clearly shown on a site plan;
    - quantities of wastes (solid and leachate) discharged annually;
    - works associated with each disposal area;
    - scaled site plan accurately showing legal survey, engineered final design footprint, and final design contours;
    - proposed litter control measures;
    - if applicable, proposed measures to meet the Landfill Gas Regulation and landfill gas health and safety requirements;
    - final lift height of compacted waste;
    - engineered final design footprint delineating the maximum extent of solid waste disposal allowable at the facility horizontally and vertically;
    - groundwater model developed by a qualified professional (experienced in groundwater hydrogeology) that:

        (i) outlines the inferred groundwater flow direction, rate, and shape of leachate plume, etc. beneath and around the landfill as influenced by landfill leachate;

        (ii) appropriately assesses the correct number and location of groundwater wells;

        (iii) estimates the loadings of Potential Contaminants of Concern (PCOC)'s from landfill leachate to the environment.

2. Leachate Management

    - proposed leachate management plan;

M. Love

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Date Issued: June 20, 2014
Date Amended:
(most recent)

- proposed leachate system design including an assessment of the effectiveness of the current collection system and recommendations for improvements;
- proposed leachate treatment

3. Closure

- proposed method, coverage (area) and timing of progressive closure;
- final maximum allowable slopes;
- proposed closure plan including:

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

ii) anticipated final total waste volume and tonnage in place;

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) a comprehensive long term monitoring plan including groundwater monitoring, surface water monitoring, landfill gas monitoring (if necessary), leachate monitoring, final cover monitoring, and erosion and settlement monitoring, for a minimum post-closure period of 25 years;

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

vii) 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

viii) an estimated cost to carry out closure and post-closure activities for a minimum period of 25 years.

M. Love

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Date Issued: June 20, 2014
Date Amended:
(most recent)

3. DISCHARGE OF MUNICIPAL SOLID WASTE

Municipal solid waste is authorized to be discharged to ground in accordance with the DOCP. The site reference number for this discharge is E208844. The authorization to discharge municipal solid waste will cease upon the commissioning of the Forceman Ridge landfill.

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 DOCP.

5. 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 DOCP. The site reference number for this discharge is E216685.

5.1 Location

Any open burning of selected wastes shall 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 shall be erected and maintained.

5.2 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 shall be limited to the period between two hours after sunrise on the day of ignition, and sunset on the following day. Each open burn shall 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 shall be notified in accordance with this authorization.

5.3 Nature of Wastes

Acceptable materials for burning may only include dry, unpainted, untreated demolition, construction and packing-related wood residue, clean stumps and brush, but shall exclude nuisance-causing combustibles such as glue-containing

wood, painted and treated wood, sawdust, yard wastes, mulch, wood chips, rubber, plastics, tars, insulation, roofing material, asphalt shingles, etc.

5.4 Favourable Weather for Smoke Dispersion

Open burning shall not proceed unless the recorded Environment Canada Ventilation Index Forecast for Terrace is good for the first day and good or fair for the second day.

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.env.gov.bc.ca/epd/epdpa/venting/venting.html

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

Open burning of wood residue shall 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 shall occur during periods of fire hazard or when burning is prohibited by other agencies.

5.5 Minimization of Smoke

Each burn shall be tended in a manner that ensures minimization of smoke emissions. Measures to minimize smoke shall 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.

5.6 Extinguishment Contingency Plan

Prior to burning, a contingency plan shall 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,

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

5.7 Extinguishment

All combustion shall be completely extinguished at the end of the authorized period as set out in Section 5.2

M. Love

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Date Issued: June 20, 2014
Date Amended:
(most recent)

6. GENERAL REQUIREMENTS

6.1. Prohibited Wastes

No wastes as defined by the Hazardous Waste Regulation shall be treated or disposed of at this site except as authorized by the Director.

6.2. Waste Asbestos

Notwithstanding Section 6.1 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.

6.3. 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 shall not include use as final cover material.

6.4. Waste Measurement

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

6.5 Groundwater and Surface Water Quality

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

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

6.5.1 Consequence of Exceedance

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

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

7.6 Electric Fencing

7.6.1 Design, Construction and Maintenance

Wherever required, electric fencing and gate systems at the landfill shall 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. The electric fence shall be operational for at least 2 years beyond the date of last putrescible waste acceptance.

7.6.2 Fence Type

Fencing may be either high tensile smooth wire or fence fabric (e.g., mesh-wire, page-wire, chainlink or the like). The configuration of a high tensile smooth wire fence shall consist of a minimum of eight strands, with four energized strands alternating with four grounded strands as follows: the bottom strand shall be a grounded (-) strand and shall not be more than 10 cm from the earth at any location; and thence starting from the bottom strand, the other seven strands shall 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 shall: be a minimum of 1.22 metre high; be constructed of a minimum wire thickness of 11 gauge, and have a maximum mesh size of 15 cm. The bottom of the fabric shall not be more than 10 cm from the earth at any location. Any uncharged fence fabric shall have a minimum of four strands of charged wires on an outrigger system, spaced as follows: the first strand shall not be higher than 25 cm from the earth; and each of the remaining three strands shall be spaced approximately 25 cm apart from adjacent charged strands.

7.6.3 Wire Tension

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

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

where: *Tension* is in lbs force

Temperature is in °C

7.6.4 Post Spacing

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

7.6.5 Grounding System

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

7.6.6 Period of Operation

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

7.6.7 Minimum Voltage

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

7.6.8 Gate(s)

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

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

7.6.9 Fence Inspections

The perimeter of the electric fencing shall 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. Post landfill closure, fence inspections may be reduced to once every two weeks. The results of voltage testing shall be recorded in a log book. Any results less than the minimum 6,000 volts shall be immediately investigated for the cause of the low voltage (e.g., low battery, litter, vegetation, loose or crossed wires, broken insulators, breaks in the grounding system, etc.). Corrective actions to restore proper voltage shall be immediately undertaken.

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

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

7.7 Dead Animal Disposal

Dead animals and animal parts shall 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 shall only be done in accordance with Canadian Food Inspection Agency requirements and procedures.

8. ENVIRONMENTAL EFFECTS MONITORING

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

Date Issued: June 20, 2014
Date Amended:
(most recent)

Mark Love, P.Ag.
For Director, *Environmental Management Act*

8.1 Surface Water Monitoring

The following surface water monitoring program shall be carried out:

Locations	Parameters	Frequency
SW-1 Thornhill Creek upstream E231882 SW-3 Leachate seepage E231883 SW-6 Thornhill Creek downstream E231884 SW-21 Leachate Weir E231886	Inorganics Dissolved metals, total metals, alkalinity (as $CaCO_3$), total and dissolved hardness (as $CaCO_3$), ammonia, fluoride, chloride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, ortho-phosphorus, total suspended solids, sulphate. Organics Biological oxygen demand (BOD_5), chemical oxygen demand (COD) Field Parameters Conductivity, pH, temperature, dissolved oxygen, turbidity	Once per Season: Spring (March- April) Summer(July –August) Fall (October – Nov.)

8.2. Groundwater Monitoring

For the purpose of supporting groundwater modeling and to detect any significant impacts on the environment from leachate in the groundwater, the Permittee shall engage a qualified professional, experienced in groundwater hydrogeology, to design a groundwater monitoring program. The groundwater monitoring program shall be submitted for the written approval by the Director on or before June 30, 2015, and shall be implemented by September 30, 2015 (implementation shall be considered to include installation of any additional wells specified in the final groundwater monitoring program design). The Director may specify, from time to time, that the groundwater monitoring program be revised and updated for his/her written approval. The program shall consider the use of existing and if necessary, new groundwater wells.

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

Locations	Parameters	Frequency
BH 96-2 E231889 HB 96-3 E231890	Inorganics Dissolved metals, total metals, alkalinity (as $CaCO_3$), dissolved hardness (as $CaCO_3$), ammonia, chloride, fluoride, conductivity, nitrate, nitrite, total kjeldahl nitrogen, pH, total phosphorus, total dissolved solids, sulphate. Organics Chemical oxygen demand (COD), Field Parameters Conductivity, pH, water elevation, temperature, dissolved oxygen	Once per Season: Spring (March- April) Summer(July –August) Fall (October – Nov.)

Date Issued: June 20, 2014
Date Amended:
(most recent)

Mark Love, P.Ag.
For Director, *Environmental Management Act*

8.3 Ground and Surface Water Monitoring Procedures

8.3.1 Sampling

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

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

8.3.2 Analyses

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

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

8.3.3 Quality Assurance/Quality Control (QA/QC)

The operational certificate holder is required to conduct the following Quality Assurance and Control Program to determine the acceptability of data required by this permit and Section 2(d) of the Environmental Data Quality Assurance Regulation.

a) Obtain and keep current, the laboratory precision, accuracy and blank quality control criteria for each laboratory analysed parameter from the analytical laboratory(ies).

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

c) Each duplicate sample shall be submitted to the laboratory; one of the pair identified as the regular sample, and the other, as a blind sample identified

by a fictitious site-name established solely to identify the duplicate sample.

d) For each parameter, report the results of the field duplicates in terms of the degree of variation as the relative percent difference.

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

9. REPORTING REQUIREMENTS

9.1. Reporting

Reports, drawings, data, studies and the like that are specified in this operational certificate shall be submitted in hardcopy and electronic formats unless otherwise specified by the Director.

9.2. Non-compliance Reporting

The Director shall be immediately notified of any non-compliance with the requirements of this operational certificate and take appropriate remedial action. Written confirmation of all non-compliance events, including available test results, is required by facsimile or email to Environmental Protection Staff within 24 hours of the original notification unless otherwise directed by the Director.

9.3. Non-compliance Follow-up

Upon request, the operational certificate holder shall submit to the Director a written report within 30 days of the non-compliance occurrence. The report shall include, but not necessarily be limited to, the following:

i) All relevant information and test results related to the non-compliance;

ii) an explanation of the most probable cause(s) of the non-compliance; and,

iii) remedial action planned and/or taken to prevent similar non-compliance(s) in the future.

9.4. Annual Report

An annual report shall be submitted to the Director on or before June 30 each year for the previous calendar year.

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Date Issued: June 20, 2014
Date Amended:
(most recent)

The annual report shall contain at a minimum:

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

ii) occurrences or observations of wildlife attempting to access the facility; and,

iii) the results of any monitoring programs undertaken by the operational certificate holder for this site. Trend analysis, as well as an evaluation of any identified impacts of the discharges on the receiving environment in the previous year shall be carried out by a qualified professional, if determined to be necessary by the Director.

10 CLOSURE REQUIREMENTS

10.1 Notification of Closure

The Permittee shall notify the Director in writing of intentions to close the landfill site.

10.2 Closure Plan

An updated closure plan shall be submitted to the Director upon request. The closure plan shall, at a minimum, include the following:

i) Proposed 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) rodent and nuisance wildlife control procedures;

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

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

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

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

10.3 Closure Funding

The Permittee shall ensure that sufficient funds will be available to provide for all closure and post-closure requirements as outlined in the closure plan required by Section 9.2, plus a reasonable contingency for any remediation which may be required.

10.4 Final Cover

The final cover system shall be designed by a qualified professional to match the intended end-use of the landfill site and to match the needs of any required environmental management systems (leachate minimization or recirculation, as the case may be, landfill gas collection and treatment, etc.). Generally, the final cover shall consist of a layer of 1 metre of low permeability ($<1 \times 10^{-5}$ cm/s) compacted soil followed by a layer of topsoil suitable for establishment of vegetation. Use of higher permeability soil must first be approved by the Director. The final cover shall be constructed with minimum and maximum slopes as specified by a qualified professional (see Section 2) to promote runoff and minimize erosion, with appropriate runon/runoff drainage controls, erosion controls, and gas venting controls. The site shall be seeded with a grass/legume mixture suited to the local climate.

10.5 Progressive Application of Final Cover

Completed portions of the landfill shall progressively receive final cover during the active life of the landfill. The maximum area of disposed refuse that has not yet received final cover shall not exceed 25% of the total final footprint area.

M. Love

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Final cover is to be applied according to the specifications identified in Section 9.4.

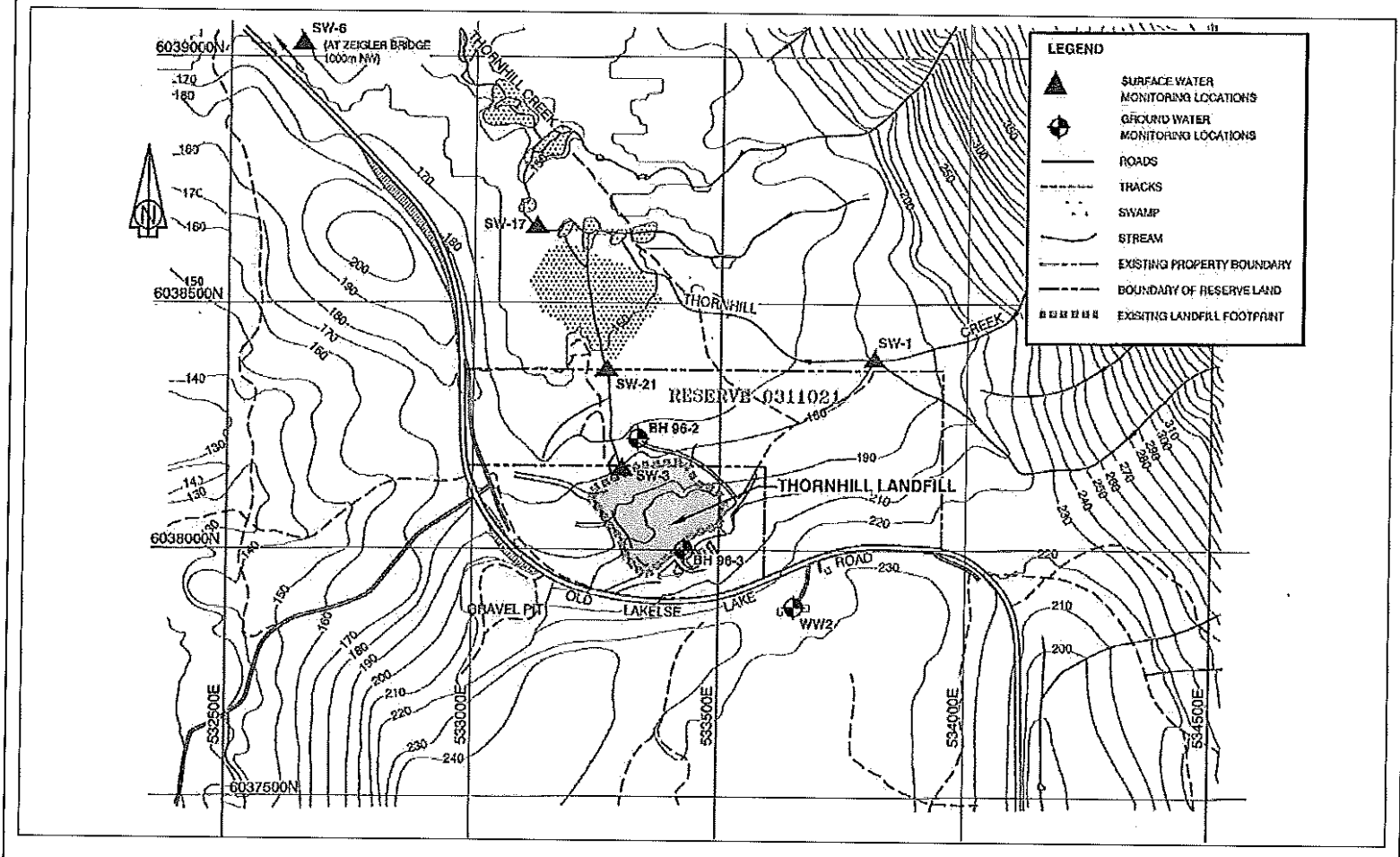
11. ENVIRONMENTAL IMPACT

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

Date Issued: June 20, 2014
Date Amended:
(most recent)

Mark Love, P.Ag.
For Director, *Environmental Management Act*

Site Plan A



OPERATIONAL CERTIFICATE: MR-4057
Date: June 20, 2014

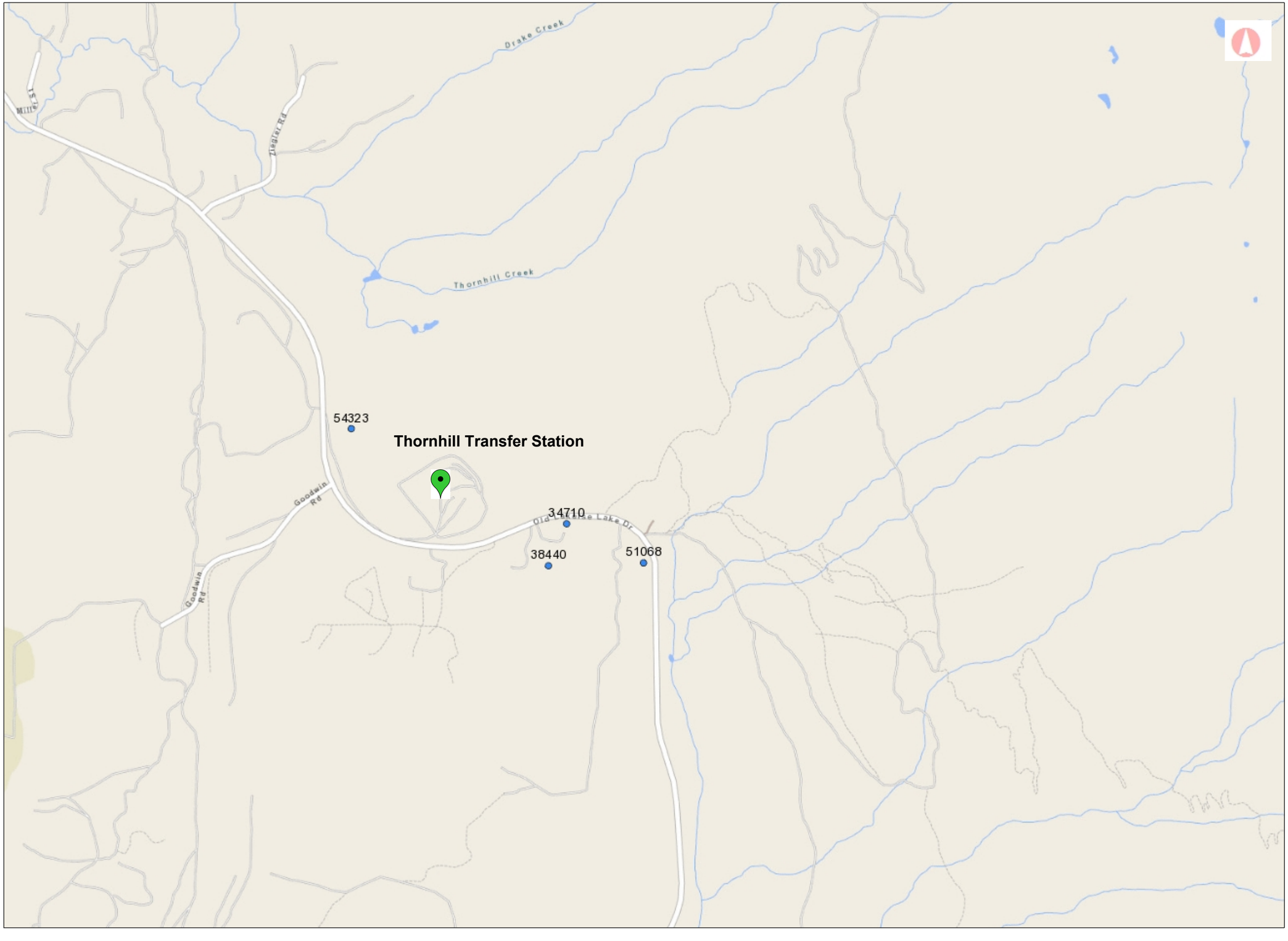
(Office Use Only)

M. Love

Mark Love, P. Ag.
for Director, Environmental Management Act
Skeena Region
(Office Use Only)

APPENDIX B

BC Water Atlas – Water Well Records



BRITISH COLUMBIA

iMapBC Mapping

Legend

- Water Wells - All

0 0.44 0.9 km

1: 21,557

Copyright/Disclaimer

Datum:	NAD83
Projection:	WGS_1984_Web_Mercator_Auxiliary_Sphere

Key Map of British Columbia

BRITISH COLUMBIA Groundwater Wells and Aquifers

Log in

Well Summary

Well Tag Number: 34710
Well Identification Plate Number:
Owner Name: JIM KARDAMY LAKIS
Licenced Status: UNLICENSED

Well Status: NEW
Well Class:
Well Subclass:
Intended Water Use: Unknown Well Use

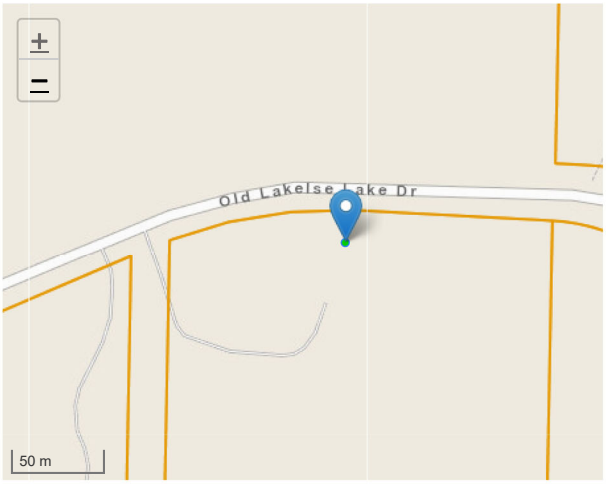
Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Aquifer Number: 572
Alternative specs submitted (if required): No

Location Information

Street Address:
Town/City:
Legal Description:

Lot	
Plan	
District Lot	518
Block	
Section	
Township	
Range	
Land District	14 COAST RANGE 5
Property Identification Description (PID)	

Description of Well Location:
BCGS Mapsheet Number: 103I048433



Leaflet | Powered by Esri | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 54.490089
Longitude: -128.479799
UTM Northing: 6038176
UTM Easting: 533697
Zone: 9
Location Accuracy Code: (50 m accuracy)
Digitized from 1:20,000 mapping

Well Activity

Construction Date (YYYY-MM-DD)	Alteration Date (YYYY-MM-DD)	Decommission Date (YYYY-MM-DD)	Drilling Company
1976-05-01			Skeena Valley Water Wells

Well Completion Data

Total Depth Drilled:
Finished Well Depth: 237 feet
Final Casing Stick Up:
Depth to Bedrock:
Ground Elevation: 0 feet
Elevation Determined By:

Static Water Level (BTOC): 214 feet
Estimated Well Yield: 12 GPM
Artesian Flow:
Artesian Pressure:

Well Cap:
Well Disinfected: No
Drilling Method: UNK
Orientation of Well: vertical

Lithology

From (feet)	To (feet)	Lithology Raw Data	Description	Material Description	Relative Hardness	Colour	Water-Bearing Estimated Flow	Observations
0	52	gravel to 3" with sand						
52	54	boulder						
54	122	gravel to 3" with sand						
122	123	boulder						
123	237.10	gravel to 3" with sand						

Casing Details

No casing information available.

Surface Seal and Backfill Details

Surface Seal Material: Other
Surface Seal Installation Method:
Surface Seal Thickness:
Surface Seal Length:
Backfill Material Above Surface Seal:
Backfill Depth:

Screen Details

No screen assembly information available.

Intake Method:
Type:
Material: Other
Opening:
Bottom:

Well Development

Developed By:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:

Well Decommissioning

Reason for Decommission:
Method of Decommission:
Decommission Details:
Sealant Material:
Backfill Material:

Comments

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

BRITISH COLUMBIA Groundwater Wells and Aquifers

Log in

Well Summary

Well Tag Number: 38440
Well Identification Plate Number:
Owner Name: HELMUT REINHART
Licenced Status: UNLICENSED

Well Status: NEW
Well Class:
Well Subclass:
Intended Water Use: Unknown Well Use

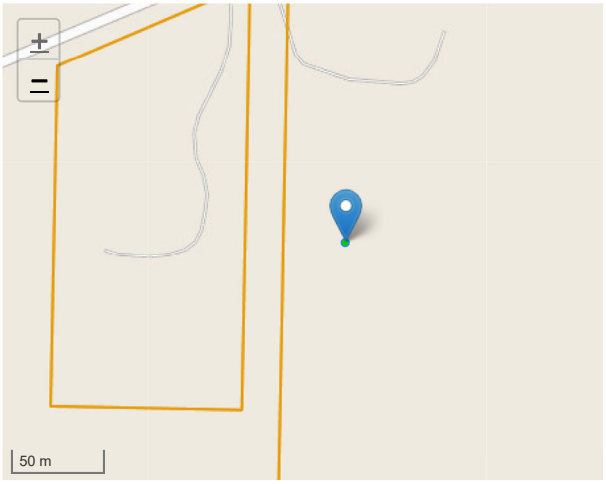
Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Aquifer Number: 572
Alternative specs submitted (if required): No

Location Information

Street Address:
Town/City:
Legal Description:

Lot	
Plan	
District Lot	518
Block	
Section	
Township	
Range	5
Land District	14 COAST RANGE 5
Property Identification Description (PID)	

Description of Well Location:
BCGS Mapsheet Number: 103I048433



Leaflet | Powered by Esri | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 54.488808
Longitude: -128.480757
UTM Northing: 6038033
UTM Easting: 533636
Zone: 9
Location Accuracy Code: (50 m accuracy)
Digitized from 1:20,000 mapping

Well Activity

Construction Date (YYYY-MM-DD)	Alteration Date (YYYY-MM-DD)	Decommission Date (YYYY-MM-DD)	Drilling Company
1977-10-25			Skeena Valley Water Wells

Well Completion Data

Total Depth Drilled:
Finished Well Depth: 270 feet
Final Casing Stick Up:
Depth to Bedrock:
Ground Elevation: 0 feet
Elevation Determined By:

Static Water Level (BTOC): 235 feet
Estimated Well Yield: 0
Artesian Flow:
Artesian Pressure:

Well Cap:
Well Disinfected: No
Drilling Method: UNK
Orientation of Well: vertical

Lithology

From (feet)	To (feet)	Lithology Raw Data	Description	Material Description	Relative Hardness	Colour	Water-Bearing Estimated Flow	Observations
0	85	gravel to 4" with medium to coarse sand						
0	0	loose material.						
85	100	med to coarse, sand loose material						
100	236	gravel to 4" with med to coarse sand,						
0	0	loose material, started to drive easier.						
236	270	gravel to 3" with medium to coarse sand,						
0	0	water bearing.						

Casing Details

No casing information available.

Surface Seal and Backfill Details

Surface Seal Material: Other
Surface Seal Installation Method:
Surface Seal Thickness:
Surface Seal Length:
Backfill Material Above Surface Seal:
Backfill Depth:

Screen Details

No screen assembly information available.

Intake Method:
Type:
Material: Other
Opening:
Bottom:

Well Development

Developed By:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:

Well Decommissioning

Reason for Decommission:
Method of Decommission:
Decommission Details:
Sealant Material:
Backfill Material:

Comments

LOTS OF WATER, HARD

Disclaimer

BRITISH COLUMBIA Groundwater Wells and Aquifers

Log in

Well Summary

Well Tag Number: 51068
Well Identification Plate Number:
Owner Name: COPPERVIEW ENTERPRIS
Licenced Status: UNLICENSED

Well Status: NEW
Well Class:
Well Subclass:
Intended Water Use: Private Domestic

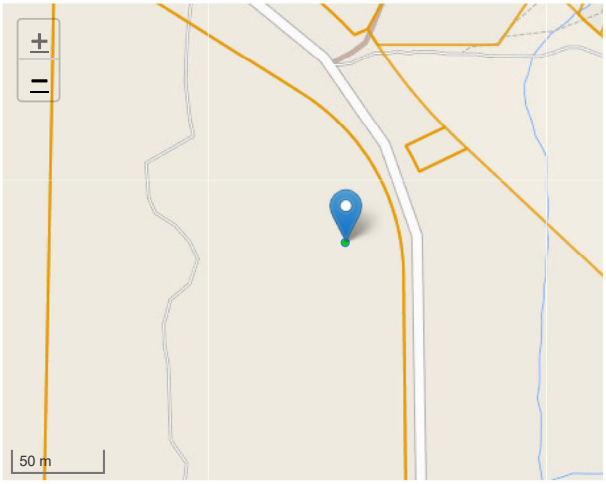
Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Aquifer Number: 572
Alternative specs submitted (if required): No

Location Information

Street Address:
Town/City: JACK PINE FLATS
Legal Description:

Lot	
Plan	
District Lot	518
Block	
Section	
Township	
Range	5
Land District	14 COAST RANGE 5
Property Identification Description (PID)	

Description of Well Location:
BCGS Mapsheet Number: 103I048433



Leaflet | Powered by Esri | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 54.488895
Longitude: -128.475754
UTM Northing: 6038045
UTM Easting: 533960
Zone: 9
Location Accuracy Code: (50 m accuracy)
Digitized from 1:20,000 mapping

Well Activity

Construction Date (YYYY-MM-DD)	Alteration Date (YYYY-MM-DD)	Decommission Date (YYYY-MM-DD)	Drilling Company
1982-09-28			Industrial Drillers

Well Completion Data

Total Depth Drilled:
Finished Well Depth: 360 feet
Final Casing Stick Up:
Depth to Bedrock: 270 feet
Ground Elevation: 0 feet
Elevation Determined By:

Static Water Level (BTOC):
Estimated Well Yield: 20 GPM
Artesian Flow:
Artesian Pressure:

Well Cap:
Well Disinfected: No
Drilling Method: UNK
Orientation of Well: vertical

Lithology

From (feet)	To (feet)	Lithology Raw Data	Description	Material Description	Relative Hardness	Colour	Water-Bearing Estimated Flow	Observations
0	40	silt						
40	225	silt, sand, gravel						
225	270	clay , sand, boulders						
270	360	bedrock						

Casing Details

No casing information available.

Surface Seal and Backfill Details

Surface Seal Material: Other
Surface Seal Installation Method:
Surface Seal Thickness:
Surface Seal Length:
Backfill Material Above Surface Seal:
Backfill Depth:

Screen Details

No screen assembly information available.

Intake Method:
Type:
Material: Other
Opening:
Bottom:

Well Development

Developed By:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:

Well Decommissioning

Reason for Decommission:
Method of Decommission:
Decommission Details:
Sealant Material:
Backfill Material:

Comments

DRY HOLE

Disclaimer

BRITISH COLUMBIA Groundwater Wells and Aquifers

Log in

Well Summary

Well Tag Number: 54323
Well Identification Plate Number:
Owner Name: WALTER BOURELLE
Licenced Status: UNLICENSED

Well Status: NEW
Well Class:
Well Subclass:
Intended Water Use: Private Domestic

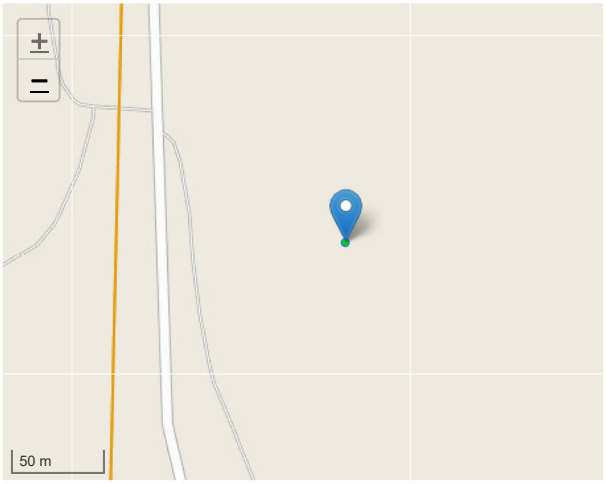
Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Aquifer Number: 572
Alternative specs submitted (if required): No

Location Information

Street Address: GARBAGE DUMP THORNHILL
Town/City: TERRACE
Legal Description:

Lot	
Plan	1304
District Lot	665
Block	
Section	
Township	
Range	
Land District	14 COAST RANGE 5
Property Identification Description (PID)	

Description of Well Location:
BCGS Mapsheet Number: 103I048433



Leaflet | Powered by Esri | Government of British Columbia, DataBC, GeoBC

Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 54.492996
Longitude: -128.491125
UTM Northing: 6038494
UTM Easting: 532961
Zone: 9
Location Accuracy Code: (50 m accuracy)
Digitized from 1:20,000 mapping

Well Activity

Construction Date (YYYY-MM-DD)	Alteration Date (YYYY-MM-DD)	Decommission Date (YYYY-MM-DD)	Drilling Company
1984-12-14			Industrial Drillers

Well Completion Data

Total Depth Drilled:
Finished Well Depth: 200 feet
Final Casing Stick Up:
Depth to Bedrock:
Ground Elevation: 0 feet
Elevation Determined By:

Static Water Level (BTOC):
Estimated Well Yield:
Artesian Flow:
Artesian Pressure:

Well Cap:
Well Disinfected: No
Drilling Method:
Orientation of Well: vertical

Lithology

From (feet)	To (feet)	Lithology Raw Data	Description	Material Description	Relative Hardness	Colour	Water-Bearing Estimated Flow	Observations
0	122	clay, rocks, boulders						
122	200	clay gravel layers, some sand						

Casing Details

No casing information available.

Surface Seal and Backfill Details

Surface Seal Material:
Surface Seal Installation Method:
Surface Seal Thickness:
Surface Seal Length:
Backfill Material Above Surface Seal:
Backfill Depth:

Screen Details

No screen assembly information available.

Intake Method:
Type:
Material:
Opening:
Bottom:

Well Development

Developed By:
Development Total Duration:

Well Yield

Estimation Method:
Estimation Rate:
Estimation Duration:

Well Decommissioning

Reason for Decommission:
Method of Decommission:
Decommission Details:
Sealant Material:
Backfill Material:

Comments

DRY HOLE

Disclaimer

APPENDIX C

Borehole Logs

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-1
PAGE 1 OF 4

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 11 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	T.O.P. = 0.75 m above ground WATER LEVEL	COMMENTS
		Coarse SAND. Dark grey-brown. Some gravel. Trace cobbles. Loose. Moist.			hole dry to 62.50 m below ground	AIR ROTARY DRILLING Drilling Contractor: Double D Drilling, Terrace, BC
2.00						
4.00						
6.00						
7.62						
8.00		GRAVEL and Coarse SAND Grey-brown. Trace cobbles. Loose. Damp.				
9.14						
10.00		GRAVEL and Coarse SAND. Grey. Some cobbles. Trace silt. Loose. Dry.				
12.00						
14.00						
15.24						
16.00		GRAVEL and Coarse SAND. Grey-brown. Some cobbles. Trace silt. Loose. Damp.				
18.00						
18.29						
		GRAVEL. Some sand. Some cobbles. Loose. Dry.				
20.00						

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-1

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 11 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER
		GRAVEL. Some sand. Some cobbles. Loose. Dry.		
22.00				
22.86		GRAVEL and Coarse SAND. Some cobbles. Trace silt. Loose. Damp.		
24.00				
24.38		GRAVEL. Some sand. Some cobbles. Loose. Dry.		
26.00				
27.43		GRAVEL and Coarse SAND. Some cobbles. Trace silt. Loose. Damp.		
28.00				
30.00				
32.00		Coarse gravely SAND Loose Moist		
34.00				
36.00				
38.00				
39.62				
40.00				

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-1

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 11 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER
		Medium and Coarse SAND. Dark grey-brown. Loose. Moist.		
42.00				
44.00				
46.00				
46.64		Medium SAND Dark grey-brown. Loose. Moist.		
48.00				
48.76		Silty SAND Grey-brown. Trace gravel. Trace clay. Loose. Moist.		
50.00				
51.82				
52.00		SAND and GRAVEL Trace silt. Trace clay. Loose. Moist.		
53.64				
54.00		Fine silty SAND Some clay. Loose. Moist.		
56.00				
57.92				
58.00		Gravely Coarse Medium SAND Trace silt. Loose. Moist.		
60.00				

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-1
PAGE 4 OF 4

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 11 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER
		Gravely Coarse-Medium SAND. Trace silt. Loose. Moist.		
62.00				
62.8		BOTTOM OF HOLE AT 62.80 m		
64.00				
66.00				
68.00				
70.00				
72.00				
74.00				
76.00				
78.00				
80.00				

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-2

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 12 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	T.O.P = 1.02 m above ground WATER LEVEL	COMMENTS
0.91		SAND and GRAVEL FILL		S1			AIR ROTARY DRILLING
2.00		CLAY Brown. Occasional rounded gravel. Soft. Moist. Stiff below 1.52 m.					DRILLING CONTRACTOR DOUBLE D DRILLING, TERRACE, BC
4.27 / 4.00		CLAY Grey-brown. Occasional red-brown mottling. Stiff. Moist.					
6.00							
8.00							
10.00						▽ 10.00 m 13/06/96	
12.00							
				S2			
14.00							
16.15 / 16.00		BOTTOM OF HOLE AT 16.15 m					
18.00							
20.00							

BOREHOLE LOG

PROJECT: PRJ96020

BOREHOLE: BH96-3

Thornhill Landfill
Hydrogeotechnical Study
For R.D. Kitimat-Stikine

DATE: 12 June 1996
GEOLOGIST: Bryony Hansen
ELEVATION: n/a

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	T.O.P. = 1.18 m above ground / WATER LEVEL	COMMENTS
		GRAVEL FILL Dark grey-brown. Some silt. Loose. Moist.					AIR ROTARY DRILLING
1.52							
2.00		SAND and GRAVEL FILL. Dark grey-brown. Some silt. Some clay. Occasional pieces of wood, plastic, glass and cloth. Loose. Moist. Leachate odour.					
2.44							
4.00		CLAY FILL Dark grey-brown. Some gravel. Some pieces of wood and glass. Stiff. Moist.		S1			
4.57							
6.00		CLAY Dark grey-brown. Some gravel. Some sand. Stiff. Moist.					
8.00							
9.14							
10.00		Clayey GRAVEL. Brown. Loose. Wet. Saturated below 11.58 m. Strong diesel odour below 10.36 m.		S2			S2 submitted for analysis of hydro carbon content
12.00						▽ 12.94 m 13/06/96	
13.72							
14.00		BOTTOM OF HOLE AT 13.72 m					
16.00		Drilling Contractor: Double D Drilling, Terrace, B.C.					
18.00							
20.00							

APPENDIX D

Analytical Results

Table D-1: Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location					Thornhill Landfill																													
Monitoring Well					BH96-2																													
Sample ID	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Jun-96	1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	19-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03	1-Mar-03	1-Aug-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08	10-Oct-08
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-	FDA	FD
Field Observations																																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																																		
Conductivity	-	-	-	uS/cm	-	384	372	392	396	376	-	385	-	309	-	-	359	357	279	368	356	359	414	390	387	401	389	398	394	402	391	381	387	387
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	89	90	77.8	75.7	81.3	96.4	81.6	70	72	60	54	67	73	70	68	68	69	85	-	89	77	108	86	110	78	73	72	88	86	94
pH	-	-	-	-	-	8.1	8.0	7.5	7.9	8.1	-	-	-	8.0	8.0	-	8.0	7.8	6.7	8.0	8.0	7.9	8.1	8.3	7.7	8.1	7.8	8.1	7.8	7.8	7.9	8.0	8.3	8.4
Total Suspended Solids	-	-	-	mg/L	60,000	9,450	4,200	5,010	88	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	784	-	-	-	-	-	-
Total Dissolved Solids	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)		-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	<0.1	0.11	0.14	0.04	0.07	0.161	0.012	0.07	-	0.04	0.03	0.05	0.04	0.03	0.157	0.07	0.14	0.12	0.136	0.07	0.04	0.12	0.12	0.051	-	-	-	<0.03	0.03	0.09
Bromide (Br)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	1500	-	-	mg/L	3.1	1.2	1.5	1.5	1.9	0.6	1.1	5.2	1.2	1.5	0.9	0.9	0.9	1.3	1.1	5	0.8	0.7	1.9	1.1	1.6	0.7	1.3	0.8	1.24	2.2	1.92	3.2	2	2
Fluoride (F)	2.0-3.0 (ai)	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.13	0.1	0.09	0.09	0.08	0.11	<0.05	0.13	0.13	-	0.11	0.16	-	<0.05	-	0.14	0.09	0.16	0.16	-	-
Nitrate (as N)	400	100	10	mg/L	-	0.135	0.085	0.468	0.314	0.116	0.66	0.2	0.37	-	0.25	0.15	0.16	0.16	0.18	<0.05	0.15	0.49	0.42	0.61	0.22	0.058	0.24	0.123	0.21	0.37	0.00016	0.18	-	-
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	-	0.039	0.010	0.057	0.013	0.02	<0.005	<0.002	<0.002	-	<0.002	0.03	0.004	0.004	0.18	0.009	0.008	0.006	0.011	0.002	0.003	0.003	0.003	0.007	0.01	0.01	<0.002	<0.01	0.013	0.016
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	10.3	3.7	7.0	13.0	9	2	11.9	10.2	11.8	8.6	8.8	7.4	7	7.1	6.2	11	6.2	9.8	9.6	10.2	5.8	3.2	4.8	3.2	-	7.29	6.08	5	3.9	3.7
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	-	-	-	<5	<5	-	<10	<10	<10	<10	<10	<10	< 10	<10	<10	<10	<10	<6	<10	<10	<10	4.8	-	<10	<10	<10	<6	<10	<10
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	-	-	-	<20	41	11	32	-	<25	<25	<25	<25	30	<25	<25	68	216	23	26	<25	<10	130	16	39	<20	52	<30	<10	15
Total Metals																																		
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	0.02	-	-	-	<0.01	<0.01	<0.01	<0.003	0.009	0.007	<0.001	0.003	0.003	0.008	0.004	0.003	0.1	0.008	0.019	-	0.004	<0.001	<0.003	0.0019	0.003	<0.001	<0.001	<0.001	<0.02	0.0008	0.0007
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	0.00	0.00605	0.00461	-	0.0046	0.0036	0.0033	0.0029	0.0031	0.0025	0.0027	0.002	0.0029	0.0025	0.0023	-	0.0027	0.0019	0.00271	0.0022	0.00252	0.0023	0.0027	0.0025	0.0026	0.00253	0.00252
Vanadium	-	0.1	0.02	mg/L	0.01	<0.03	-	<0.03	<0.03	<0.03	<0.003	0.011	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.003	0.002	0.002	-	0.001	< 0.001	0.00059	0.0007	0.00075	< 0.001	<0.001	<0.001	<0.002	0.0007	0.0007
Zinc	0.075 - 2.4	2	3	mg/L	0.02	<0.005	0.006	0.007	<0.005	<0.005	<0.002	<0.005	0.005	<0.005	<0.005	<0.005	0.005	< 0.005	0.009	<0.005	<0.005	0.008	-	<0.005	< 0.005	<0.0001	0.001	0.0001	< 0.005	<0.005	<0.005	0.014	0.0004	0.0004
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.010	-	-	-
Dissolved Metals																																		
Aluminum	-	5	9.5	mg/L	**5.00**	1.09	4.54	0.24	0.203	0.025	0.18	0.22	0.24	0.055	0.078	0.095	0.29	0.085	0.11	0.31	0.19	0.67	-	0.15	0.032	0.0046	0.08	0.0114	0.01	0.013	0.012	0.023	0.0288	0.0308
Antimony	0.09	0.006	0.006	mg/L	0.022	-	<0.2	0.00	0.0006	0.0002	0.027	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.0001	<0.0001	<0.0001	-	<0.001	< 0.001	0.000137	0.0002	0.000175	< 0.001	<0.001	<0.001	<0.0006	0.00023	0.00019
Arsenic	0.05	0.025	0.01	mg/L	<0.001	0.0051	<0.2	0.00	0.0038	0.0038	<0.04	0.003	0.002	0.002	0.002	0.003	0.002	0.003	0.003	0.002	0.003	0.002	-	0.002	0.001	0.0043	0.0025	0.0044	0.002	0.001	0.002	0.0023	0.0029	0.00298
Barium	10	-	1	mg/L	<0.1	0.03	0.04	0.03	0.03	0.03	0.027	0.02	0.023	0.02	0.016	0.022	0.025	0.019	0.021	0.023	0.021	0.031	-	0.029	0.022	0.0262	0.02	0.0228	0.019	0.02	0.021	0.039	0.0188	0.0182
Beryllium	0.0015	0.1	0.008	mg/L	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00001	<0.00001
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	-	<0.00005	<0.00005
Boron	12	5	5	mg/L	-	0.3	-	-	-	-	0.169	0.19	0.15	0.15	0.18	0.14	0.19	0.14	0.17	0.2	0.15	0.18	-	0.19	0.19	0.152	0.17	0.148	0.15	0.15	0.15	0.162	0.165	0.155
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	<0.001	<0.0002	<0.002	<0.002	<0.0002	0.0002	<0.0001	<0.0002	0.0003	0.0003	<0.0002	<0.0002	0.0005	< 0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002	< 0.0002	0.00003	0.00007	0.00002	< 0.0002	<0.0002	<0.0002	0.00006	0.000037	0.000053
Calcium	-	1000	-	mg/L	21	18	15	14	14	16	14	13	12	11	11	11	11	11	10	11	11	13	-	14	12	17	13	18	13	12	12	12	12	13
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	<0.02	0.002	<0.01	<0.001	<0.001	<0.001	0.004	<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	<0.0002	0.0005	0.0002	< 0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001
Cobalt	0.04	1	0.001	mg/L	<0.02	<0.02	<0.01	<0.01	<0.001	<0.01	<0.003	<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	0.000042	< 0.0002	0.000018	< 0.001	<0.001	<0.001	0.0001	0.000038	0.000044
Copper	0.02 - 0.09	0.3	1.5	mg/L	0.01	0.002	<0.01	0.00	0.002	0.004	0.015	0.002	0.008	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	0.003	-	0.001	0.002	0.00024	0.0007	0.00022	< 0.001	0.001	<0.001	0.0095	0.0007	0.00068
Iron	-	-	6.5	mg/L	7.00	0.2	0.53	0.18	0.18	-	0.098	0.16	0.18	0.05	0.08	0.12	0.2	0.09	0.12	0.28	0.14	0.37	-	0.19	< 0.05	<0.005	0.04	0.005	< 0.05	<0.05	<0.05	0.06	0.026	0.029
Lead	0.04 - 0.16	0.1	0.01	mg/L	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.02	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00001	< 0.0002	0.00001	< 0.001	<0.001	<0.001	0.0002	0.000032	0.000035
Lithium	-	5	0.008	mg/L	-	0.11	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	0.001	0.002	-	0.001	0.001	0.00132	0.0016	0.00132	0.001	0.002	<0.005	0.0013	0.0013	0.0014
Magnesium	-	-	-	mg/L	11.5	10.8	10.0	10.0	11.4	13.9	11.2	9.4	10.3	7.9	6.4	9.6	10.9	10.4	10.2	10.0	9.9	12.7	-	13.1	11.2	15.8	13.0	16.2	11.2	10.2	10.4	10.2	9.9	11.6
Manganese	-	-	1.5	mg/L	0.28	0.134	0.116	0.044	0.058	0.005	0.01	0.048	0.008	0.004	0.015	0.013	0.042	0.017	0.014	0.006	0.058	0.072	-	0.01	< 0.001	0.0172	0.042	0.0057	0.026	0.0160	0.0330	0.0151	0.0010	0.00205
Mercury	0.00025	0.002	0.001	mg/L	-	<0.00005	<0.00005	0.00001	<0.00001	<0.00001	0.00011	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.00002	<0.00002	<0.00006	-	-
Molybdenum	10	0.05	0.25	mg/L	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.005	0.008	0.007	0.008	0.008	0.007	0.006	0.007	0.006	0.0043	0.0042	0.007	-	0.0055	0.0052	0.00365	0.0038	0.0034	0.0044	0.0052	0.0062	0.0062	0.0052	0.00502
Nickel	0.25 - 1.5	1	0.08	mg/L	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05	<0.008	0.002	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.002	<0.001	0.004	-	0.001	0.001	0.00037	0.001	0.00024	< 0.001	<0.001	<0.001	0.001	0.000048	0.00042
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.13	0.1	0.23	0.18	0.19	0.19	0.2	0.18	0.17	-	0.23	< 0.15	<0.1	0.11	0.1	< 0.15	<0.15	<0.15	-	0.069	0.067
Potassium	-	-	-	mg/L	5	-	-	-	-	-	10.8	8.3	9.07	7.93	6.86	8.83	8.67	9.19	8.1	8.86	9.32	9.93	-	11.1	9.2	11	9.19	11	9.1	8.7	9.6	-	9.08	9.6
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	-	<0.001	< 0.001	<0.0002	< 0.0002	0.0002	< 0.001	<0.001	<0.001	0.0011	0.0001	0.00006
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	4.61	9.08	7.79	7.43	7.78	7.56	7.54	7.06	-	-	9.2	8.4	-	9.63	-	3.5	3.2	3.2	-	3.09	3.47
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.01	<0.0001	<0.001	<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	< 0.00025	<0.00002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.000005	<0.000005
Sodium	-	-	200	mg/L	52	61	-	-	-	-	59.2	48.7	52.4	41.3	34.5	51.7	52	51.6	50.9	52.3	54.2	55.1	-	61.1	55.3	46.9	51	48.8	52.4	51.9	55	49.3	52.4	50.9
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	0.12	0.13	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.12	0.14	-	0.16	0.13	0.168	0.143	0.165	0.14	0.13	0.13	-	0.136	0.148
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	<0.001	<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	0.000006	< 0.00002	0.000007	< 0.0001	<0.0001	<0.0001	<0.0001	0.000005	0.000005
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00001	< 0.0002	-	<0.001	<0.001	<0.001	-	0.00002	0.00002
Titanium	1	-	-	mg/L	0.02	-	-	<0.01	<0.01	<0.01	<0.003	0.009	0.007	<0.001	0.003	0.003	0.008	0.004	0.003	0.1	0.008	0.019	-	0.004	< 0.001	<0.003	0.0019	0.003	< 0.001	<0.001	<0.001	<0.02	0.0008	0.0007
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	0.00	0.00605	0.00461	-	0.0046	0.0036	0.0033	0.0029	0.0031	0.0025	0.0027	0.002	0.0029	0.0025	0.0023	-	0.0027	0.0019	0.00271	0.0022	0.00252	0.0023	0.0027	0.0025	0.0026	0.00253	0.00252
Vanadium	-	0.1	0.02	mg/L	0.01	<0.03	-	<0.03	<0.03	<0.03	<0.003	0.011	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.003	0.002	0.002	-	0.001	< 0.001	0.00059	0.0007	0.00075	< 0.001	<0.001	<0.001	<0.002	0.0007	0.0007
Zinc	0.075 - 2.4	2	3	mg/L	0.02	<0.005	0.006	0.007	<0.005	<0.005	<0.002	<0.005	0.005	<0.005	<0.005	<0.005	0.005	< 0.005	0.009	<0.005	<0.005	0.008	-	<0.005	< 0.005	<0.0001	0.001	0.0001	< 0.005	<0.005	<0.005	0.014	0.0004	0.0004
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.010	-	-	-

NOTES

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

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)

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

Table D-1: Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units																									
Monitoring Well																													
Sample ID					BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L2070518-1	L2124909-8	L2163155-1
Sample Date					26-Aug-09	15-Jun-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	28-Mar-15	29-Aug-15	29-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																													
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	7.6
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	8.0
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	355.0	256.7
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	4.0
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	386.4	213.5
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.37	9.51
Conventional Parameters																													
Conductivity	-	-	-	uS/cm	383	383	371	390	392	391	383	390	382	377	377	391	378	392	377	386	361	373	384	387	365	373	345	365	360
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	92	92	75	70	76	82	70	82	75	77	77	73	90	76	131	83	-	75	103	90	120	102	133	105	79.6
pH	-	-	-	-	7.8	7.8	7.4	7.7	8.2	8.0	7.9	7.8	8.1	8.0	8.0	8.0	7.9	7.9	8.1	8.0	8.0	7.2	8.0	8.1	8.1	8.2	-	8.28	8.38
Total Suspended Solids	-	-	-	mg/L	-	-	-	-	-	-	-	-	34	-	46	17	32	16	14	24	12	28	11	15	20	17	15.4	-	-
Total Dissolved Solids	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	-	229
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	179	194	190
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	0.03	0.03	0.03	3.3	0.05	<0.03	0.06	0.05	0.12	0.1	0.07	0.08	<0.03	<0.03	ND	0.068	0.07	0.047	0.23	0.043	<0.03	<0.03	0.0276	0.0473	0.0055
Bromide (Br)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	1500	-	-	mg/L	2.8	2.8	3.6	3.8	2	2.6	3.2	2	3.3	2.5	3.4	2.9	4.9	3.5	6.1	3.4	4	4.2	3.4	3.2	6.2	4.9	4.47	3.36	2.66
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	0.21	0.21	0.17	0.16	0.14	0.13	0.16	0.16	0.15	0.15	0.14	0.14	0.14	0.15	0.16	0.15	0.15	0.16	0.15	0.15	0.16	0.15	0.172	0.165	0.17
Nitrate (as N)	400	100	10	mg/L	0.2	0.2	0.23	0.26	0.16	8	0.29	0.2	0.13	0.12	<0.1	4.53	0.552	0.496	0.8	0.62	0.96	0.53	0.31	0.26	0.13	0.65	0.762	0.581	0.508
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	ND	ND	ND	ND	ND	<0.01	<0.01	<0.01	-	0.012	<0.01	<0.01	<0.01	<0.01	ND	0.027	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	0.0068	0.0024	<0.0010
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.379	0.396	0.277
Total Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0962
Sulfate (SO4)	128 - 429	1000	500	mg/L	4.2	4.2	6.3	4.5	4.8	5.7	4.36	4.08	4.57	4.95	6.02	4.97	4.01	4.02	4.6	4.4	-	4.5	4.2	3.9	3.1	4.2	3.28	3.65	4.34
Biological Oxygen Demand (BOD)	-	-	-	mg/L	ND	ND	<4	<4	<4	<4	<4	<4	ND	ND	4.6	<4	<4	<4	ND	<0.0001	4.1	<4.0	<4.0	<4.0	<4.0	<4.0	-	-	-
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	ND	<30	<30	<30	36	<30	<30	38	ND	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Metals																													
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.529	0.411	0.292
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00017	0.00016	0.00016
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00265	0.00273	0.00239
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0239	0.0232	0.0237
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.119	0.148	0.147
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00155	0.00121	0.000812
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	17.2	13.5
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000053	0.00004	0.000023
Chromium	0.01	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00105	0.00057	0.00034
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00034	0.00035	0.00019
Copper	0.02 - 0.09	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00457	0.00502	0.00293
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.796	0.659	0.332
Lead	0.04 - 0.16	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000387	0.000381	0.000256
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0017	0.002	0.0019
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.5	15.6	11.4
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0674	0.077	0.0298
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00364	0.00423	0.00481
Nickel	0.25 - 1.5	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00194	0.00179	0.00113
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.112	0.09	0.093
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.19	9.7	10.1
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0008	0.00071	0.00059
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000057	<0.000050	0.000072
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	4.86	4.29
Silver	0.0005 - 0.015	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00001	<0.000010	<0.000010
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	44	50.9
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.209	0.181	0.152
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	1.39	1.44
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00022	0.00073	0.00011
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0155	0.0117	0.00697
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00011	<0.00010	<0.00010
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00184	0.00202	0.00198
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00208	0.00158	0.00119
Zinc	0.075 - 38.1	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0214	0.0193	0.0105
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000116	0.000082	0.000095
Dissolved Metals																													
Aluminum	-	5	9.5	mg/L	0.003	0.003	0.02	0.025	0.025	0.022	0.019	0.0061	0.0042	0.0068	0.021	0.015	0.0244	0.0132	0.012	0.007	-	0.01	0.009	0.008	0.019	0.0106	0.0153	0.0141	0.0266
Antimony	0.09	-	0.006	mg/L	ND	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	0.0018	0.000159	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	0.0002	-	0.0001	0.0002	0.0003	0.0001	<0.00020	0.00011	0.00011	0.00012
Arsenic	0.05	0.025	0.01	mg/L	0.0023	0.0023	0.0018	0.0017	0.0017	0.0017	0.0018	0.00274	0.00286	0.00228	0.00239	0.00209	0.00183	0.00219	0.0019	0.0024	-	0.0024	0.0033	0.0024	0.002	0.00222	0.00247	0.00258	0.00212
Barium	10	-	1	mg/L	0.075	0.075	0.023	0.083	0.052	0.019	0.016	0.0473	0.0169	0.0169	0.0169	0.0156	0.0165	0.0173	0.019	0.019	-	0.019	0.019	0.021	0.021	0.0186	0.0227	0.0202	0.0194
Beryllium	0.0015	0.1	0.008	mg/L	ND	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	mg/L	ND	ND	ND	ND	ND	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	12	5	5	mg/L	0.169	0.169	0.175	0.188	0.201	0.19	0.17	0.158	0.144	0.186	0.163	0.149	0.152	0.181	0.13	0.19	-	0.167	0.159	0.178	0.152	0.127	0.116	0.139	0.139
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	0.00007	0.00007	0.00017	0.00033	0.0001	0.00011	0.0002	0.000069	0.000051	0.000132	0.00024	0.000194	0.00025	0.000168	0.00078	0.00036	-	0.00202	0.00029	0.00028	0.00028	0.00018	0.00061	0.000392	0.000342
Calcium	-	1000	-	mg/L	14	14	13	-	-	13	11	13	13	12	13	13	13	12	23	14	-	16	16	15	21	17.1	20.6	17.2	13.5
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	0.01	0.05	0.05	mg/L	ND	ND	ND	ND	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00010	<0.00010	0.00011
Cobalt	0.04	1	0.001	mg/L	ND	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000048	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	<0.00005	-	0.00006	0.00009	<0.00005	0.00006	<0.00010	<0.00010	<0.00010	<0.00010
Copper	0.02 - 0.09	0.3	1.5	mg/L	0.0053	0.0053	0.0043	0.0047	0.0148	0.0018	0.0017	0.00852	0.00028	0.00028	0.0007	0.00131	0.00131	0.00093	0.0054	0.0014	-	0.002	0.0009	0.0007	0.0009	0.00116	0.00118	0.00224	0.00117
Iron	-	-	6.5	mg/L	0.008	0.008	ND	0.021	0.036	0.013	0.01	0.0229	<0.005	<0.005	0.0136	0.0059	0.0051	0.02	ND	<0.010	-	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	0.017	0.022
Lead	0.04 - 0.16	0.1	0.01	mg/L	ND	ND	0.0002	ND	0.0019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.000050	<0.000050	<0.000050
Lithium	-	5	0.008	mg/L	ND	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00156	<0.005	<0.005	<0.005	<0.005	0.0016	0.0015	-	0.0017	0.0018	0.0016	0.0019	0.00155	0.0013	0.0017	0.0016
Magnesium	-	-	-	mg/L	12.0	12.0	10.6	10.4	10.0	11.8	9.5	12.2	12.0	10.5	11.1	11.0	11.0	11.0	18	11.1	-	13.8	15.7	12.6	16.7	14.3	19.9	15.2	11.1
Manganese	-	-	1.5	mg/L	ND	ND	0.01	ND	0.006	0.004	0.005	0.0322	0.0547	0.0246	0.016	0.0039	0.0033	0.0151	0.0212	0.0038	-	0.0482	0.0882	0.0016	0.0025	0.00196	0.00228	0.0303	0.00184
Mercury	0.00025	0.002	0.001	mg/L	ND	ND	ND	ND	ND	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	0.0000157
Molybdenum	10	0.05	0.25	mg/L	0.006	0.006	0.007	0.006	0.006	0.006	0.006	0.0049	0.0046	0.00591	0.0053	0.005	0.0052	0.0051	0.0037	0.0057	-	0.0056	0.0052	0.0054	0.0038	0.00429	0.00381	0.00419	0.00494
Nickel	0.25 - 1.5	1	0.08	mg/L	ND	ND	ND	ND	0.003	<0.001	<0.001	<0.001	<0.001	0.00066	<0.001	0.0012	0.0012	ND	0.0017	0.0006	-	0.0013	0.0007	0.0006	0.0006	<0.00040	0.00077	0.00063	<0.00050
Phosphorus	-	-	-	mg/L	-	-	-	-	-	0.079	0.088	0.054	0.044	0.059	0.069	0.101	0.073	0.063	0.19	0.1	-	0.08	0.05	0.05	<0.05	0.062	0.061	0.059	0.072
Potassium	-	-	-	mg/L	10.3	10.3	9.95	10.1	9.85	11.3	9.39	10	9.88	9.88	10	10.1	9.11	9.73	8	11.1	-	10.4	12.2	10	8.22	9.23	8.98	10.2	9.75
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00053	0.00055	0.00045
Selenium	0.02	0.03	0.01	mg/L	0.0001	0.0001	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	<0.000050	<0.000050
Silicon	-	-	-	mg/L	3.93	3.93	3.91	3.92	3.61	4.19	3.53	3.65	3.54	3.79	3.82	3.91	3.65	3.96	4.5	4.1	-	4.5	4.2	4.1	4.5	4.6	4.63	4.07	3.94
Silver	0.0005 - 0.015	-	0.02	mg/L	ND	ND	ND	ND	ND	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00014	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-	-	200	mg/L	52.9	52.9	56.6	52.8	56.8	63.7	53.2	51.1	49	54.5	54.6	57.1	50.1	53.3	24.9	56.8	-	53.5	58.7	50.1	30.5	41.2	29	43.4	49.1
Strontium	-	-	2.5	mg/L	0.16	0.16	0.147	0.142	0.141	0.156	0.135	0.159	0.159	0.149	0.155	0.144	0.154	0.149	0.198	0.16	-	0.166	0.173	0.166	0.194	0.173	0.205	0.186	0.143
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	<1	-	2	<1	<1	<1	<3.0	0.77	1.25	1.46
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	0.003	-	-	mg/L	ND	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	0.000003	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	mg/L	ND	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0001	-	<0.0002	<0.0002	<0.0002	<0.0002	0.00022	<0.00010	0.00103	<0.00010
Titanium	1	-	-	mg/L	ND	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	-	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.00030	0.00032	0.00121
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00011	0.00010	0.00011
Uranium	0.085	0.2	0.02	mg/L	0.0026	0.0026	0.0028	0.0027	0.0024	<0.0001	<0.0001	0.00218	0.00216	0.00244	0.00227	0.00193	0.00216	0.00233	0.00164	<0.005	-	0.00222	0.00213	0.00229	0.00191	0.00196	0.000966	0.00206	0.00192
Vanadium	-	0.1	0.02	mg/L	ND	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00074	<0.005	<0.005	<0.005	<0.005	ND	0.00231	-	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00054	<0.00050	0.00058
Zinc	0.075 - 2.4	2	3	mg/L	0.039	0.039	0.017	0.023	0.026	<0.005	<0.005	0.007	<0.005	0.0016	<0.005	<0.005	<0.005	<0.005	0.005	<0.001	-	0.009	0.005	<0.004	<0.004	<0.0040	0.0042	0.0073	0.0023
Zirconium	-	-	-	mg/L	ND	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	0.004	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000060	<0.000060	0.000115

NOTES

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

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)

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

Table D-2: Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill																															
Monitoring Well								BH96-2																															
Sample ID								BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								1-Jun-96	1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	19-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03		1-Aug-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08		26-Aug-09	15-Jun-09
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-	FDA	FD	-	-
Field Observations																																							
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																																							
Conductivity	-		-		-		uS/cm	-	384	372	392	396	376	-	385	-	309	-	-	359	357	279	368	356	359	414	390	387	401	389	398	394	402	391	381	386.5	386.5	383	383
Hardness (Dissolved as CaCO3)	-		-		-		mg/L	-	90	77.8	75.7	81.3	96.4	81.6	70	72	60	54	67	73	70	68	68	69	85	-	89	77	108	85.6	110	78	73	72	87.8	85.8	93.5	92.2	92.2
pH	6.5-9.0		-		6.5 - 8.5		-	-	8.05	7.97	7.54	7.91	8.12	-	-	-	7.96	7.97	-	7.99	7.75	6.7	7.99	7.99	7.91	8.1	8.26	7.72	8.1	7.79	8.1	7.83	7.82	7.86	8	8.3	8.4	7.8	7.8
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	60000	9450	4200	5010	88	123	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	784	-	-	-	-	-	-	-	-
Total Dissolved Solids	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, (as N)	0.46 - 1.86	pH/T*	2.4 - 23.9	pH/T*	-		mg/L	<0.1	0.11	0.14	0.04	0.07	0.161	0.012	0.07	-	0.04	0.03	0.05	0.04	0.03	0.157	0.07	0.14	0.12	0.136	0.07	0.04	0.12	0.12	0.051	-	-	-	<0.03	0.03	0.09	0.03	0.03
Bromide (Br)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	150		600		<250	AO	mg/L	3.1	1.2	1.5	1.5	1.9	0.6	1.1	5.2	1.2	1.5	0.9	0.9	0.9	1.3	1.1	5	0.8	0.7	1.9	1.1	1.6	0.7	1.3	0.8	1.24	2.2	1.92	3.2	2	2	2.8	2.8
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	-	-	-	-	-	-	0.13	0.1	0.09	0.09	0.08	0.11	<0.05	0.13	0.13	-	0.11	0.16	-	<0.05	-	0.14	0.09	0.16	0.16	-	-	0.21	0.21
Nitrate (as N)	3		32.8		10		mg/L	-	0.135	0.085	0.468	0.314	0.116	0.66	0.2	0.37	-	0.25	0.15	0.16	0.16	0.18	<0.05	0.15	0.49	0.42	0.61	0.22	0.058	0.24	0.123	0.21	0.37	0.00016	0.18	-	-	0.2	0.2
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	-	0.039	0.01	0.057	0.013	0.02	<0.005	<0.002	<0.002	-	<0.002	0.03	0.004	0.004	0.18	0.009	0.008	0.006	0.011	0.002	0.003	0.003	0.003	0.007	0.01	0.01	<0.002	<0.01	0.013	0.016	ND	ND
Nitrate + Nitrite (as N)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	10.3	3.7	7	13	9	2	11.9	10.2	11.8	8.6	8.8	7.4	7	7.1	6.2	11	6.2	9.8	9.6	10.2	5.8	3.2	4.8	3.2	-	7.29	6.08	5	3.9	3.7	4.2	4.2
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	-	-	-	<5	<5	-	<10	<10	<10	<10	<10	<10	< 10	<10	<10	<10	<10	<6	<10	<10	<10	4.8	-	<10	<10	<10	<6	<10	<10	ND	ND
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	-	-	-	<20	41	11	32	-	<25	<25	<25	<25	30	<25	<25	68	216	23	26	<25	<10	130	16	39	<20	52	<30	<10	15	-	ND
Total Metals																																							
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	$0.001^{\text{Cr VI}}$ $0.0089^{\text{Cr III}}$		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-		1		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	0.96 - 1.19	H	1.42 - 2.01	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.025 - 0.15	H	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																																							
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	5	1.09	4.54	0.244	0.203	0.025	0.18	0.22	0.24	0.055	0.078	0.095	0.29	0.085	0.11	0.31	0.19	0.67	-	0.15	0.032	0.0046	0.08	0.0114	0.01	0.013	0.012	0.023	0.0288	0.0308	0.003	0.003
Antimony	0.009		-		-		mg/L	0.022	-	<0.2	0.001	0.0006	0.0002	0.027	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.001	< 0.001	0.000137	0.0002	0.000175	< 0.001	<0.001	<0.001	<0.0006	0.00023	0.00019	ND	ND
Arsenic	0.005		-		0.01		mg/L	<0.001	0.0051	<0.2	0.003	0.0038	0.0038	<0.04	0.003	0.002	0.002	0.002	0.003	0.002	0.003	0.003	0.002	0.003	0.002	-	0.002	0.001	0.0043	0.0025	0.0044	0.002	0.001	0.002	0.0023	0.0029	0.00298	0.0023	0.0023
Barium	1		-		-		mg/L	<0.1	0.03	0.04	0.03	0.03	0.03	0.027	0.02	0.023	0.02	0.016	0.022	0.025	0.019	0.021	0.023	0.021	0.031	-	0.029	0.022	0.0262	0.02	0.0228	0.019	0.02	0.021	0.039	0.0188	0.0182	0.075	0.075
Beryllium	0.00013		-		-		mg/L	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.01	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00001	<0.00001	ND	ND
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	-	<0.000005	<0.000005	ND	ND
Boron	1.2		-		5		mg/L	-	0.3	-	-	-	-	0.169	0.19	0.15	0.15	0.18	0.14	0.19	0.14	0.17	0.2	0.15	0.18	-	0.19	0.19	0.152	0.17	0.148	0.15	0.15	0.15	0.162	0.165	0.155	0.169	0.169
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	<0.001	<0.0002	<0.002	<0.002	<0.0002	0.0002	<0.0001	<0.0002	0.0003	0.0003	<0.0002	<0.0002	0.0005	< 0.0002	<0.0002	<0.0002	<0.0002	<0.0002	-	<0.0002	< 0.0002	0.00003	0.00007	0.00002	< 0.0002	<0.0002	<0.0002	0.00006	0.000037	0.000053	0.00007	0.00007
Calcium	-		-		-		mg/L	21	18.2	14.6	13.8	13.7	15.7	14.2	12.5	11.7	10.7	10.9	10.9	11	10.7	10.2	10.8	11.2	13.1	-	14.2	12.2	17.3	12.8	18.1	12.8	12.2	11.6	11.9	11.6	13	14.4	14.4
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	$0.001^{\text{Cr VI}}$ $0.0089^{\text{Cr III}}$	V	-		-		mg/L	<0.02	0.002	<0.01	<0.001	<0.001	<0.001	0.004	<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	<0.0002	0.0005	0.0002	< 0.001	<0.001	<0.001	<0.001	<0.0001	<0.0001	ND	ND
Cobalt	0.004		0.11		-		mg/L	<0.02	<0.02	<0.01	<0.01	<0.001	<0.01	<0.003	<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	0.000042	< 0.0002	0.000018	< 0.001	<0.001	<0.001	0.0001	0.000038	0.000044	ND	ND
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.01	0.002	<0.01	0.002	0.002	0.004	0.015	0.002	0.008	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	0.003	-	0.001	0.002	0.00024	0.0007	0.00022	< 0.001	0.001	<0.001	0.0095	0.0007	0.00068	0.0053	0.0053
Iron	-		0.35		<0.3	AO	mg/L	7	0.2	0.53	0.18	0.18	-	0.098	0.16	0.18	0.05	0.08	0.12	0.2	0.09	0.12	0.28	0.14	0.37	-	0.19	< 0.05	<0.005	0.04	0.005	< 0.05	<0.05	<0.05	0.06	0.026	0.029	0.008	0.008
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.02	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00001	< 0.0002	0.00001	< 0.001	<0.001	<0.001	0.0002	0.000032	0.000035	ND	ND
Lithium	-		-		-		mg/L	-	0.11	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	0.001	0.002	-	0.001	0.001	0.00132	0.0016	0.00132	0.001	0.002	<0.005	0.0013	0.0013	0.0014	ND	ND
Magnesium	-		-		-		mg/L	11.5	10.8	10	10	11.4	13.9	11.2	9.37	10.3	7.94	6.43	9.58	10.9	10.4	10.2	9.98	9.9	12.7	-	13.1	11.2	15.8	13	16.2	11.2	10.2	10.4	10.2	9.91	11.6	12	12
Manganese	0.84 - 1.19	H	1.14 - 2.01	H	<0.05	AO	mg/L	0.28	0.134	0.116	0.044	0.058	0.005	0.01	0.048	0.008	0.004	0.015	0.013	0.042	0.017	0.014	0.006	0.058	0.072	-	0.01	< 0.001	0.0172	0.042	0.00567	0.026	0.016	0.033	0.0151	0.00097	0.00205	ND	ND
Mercury	0.0001		-		0.001		mg/L	-	<0.00005	<0.00005	0.00001	<0.00001	<0.00001	0.00011	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.0002	<0.00002	<0.00006	-	-	ND	ND
Molybdenum	2		-		0.25		mg/L	<0.01	<0.03	<0.03	<0.03	<0.03	<0.03	0.005	0.008	0.007	0.008	0.008	0.007	0.006	0.007	0.006	0.0043	0.0042	0.007	-	0.0055	0.0052	0.00365	0.0038	0.0034	0.0044	0.0052	0.0062	0.0062	0.0052	0.00502	0.006	0.006
Nickel	0.025-0.15	H	-		-		mg/L	<0.01	<0.02	<0.02	<0.02	<0.02	<0.05	<0.008	0.002	<0.001	<0.001	<0.001	<0.001	0.001	0.002	0.001	0.002	<0.001	0.004	-	0.001	0.001	0.00037	0.001	0.00024	< 0.001	<0.001	<0.001	0.001	0.000048	0.00042	ND	ND
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	0.13	0.1	0.23	0.18	0.19	0.19	0.2	0.18	0.17	-	0.23	< 0.15	<0.1	0.11	0.1	< 0.15	<0.15	<0.15	-	0.069	0.067	-	-
Potassium	-		-		-		mg/L	5	-	-	-	-	-	10.8	8.3	9.07	7.93	6.86	8.83	8.67	9.19	8.1	8.86	9.32	9.93	-	11.1	9.2	11	9.19	11	9.1	8.7	9.6	-	9.08	9.6	10.3	10.3
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	-	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	-	<0.001	< 0.001	<0.0002	< 0.0002	0.0002	< 0.001	<0.001	<0.001	0.0011	0.0001	0.00006	0.0001	0.0001
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	4.61	9.08	7.79	7.43	7.78	7.56	7.54	7.06	`	-	9.2	8.4	-	9.63	-	3.5	3.2	3.2	-	3.09	3.47	3.93	3.93
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.01	<0.0001	<0.001	<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	< 0.00025	<0.00002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.000005	<0.000005	ND	ND
Sodium	-		-		<200	AO	mg/L	52	61	-	-	-	-	59.2	48.7	52.4	41.3	34.5	51.7	52	51.6	50.9	52.3	54.2	55.1	-	61.1	55.3	46.9	51	48.8	52.4	51.9	55	49.3	52.4	50.9	52.9	52.9
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	0.12	0.13	0.13	0.13	0.13	0.12	0.12	0.12	0.14	-	0.16	0.13	0.168	0.143	0.165	0.14	0.13	0.13	-	0.136	0.148	0.16	0.16
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	-	<0.001	<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	0.000006	< 0.00002	0.000007	< 0.0001	<0.0001	<0.0001	<0.0001	0.000005	0.000005	ND	ND
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	< 0.001	<0.00001	< 0.0002	-	< 0.001	<0.001	<0.001	-	0.00002	0.00002	ND	ND
Titanium	-		-		-		mg/L	0.02	-	-	<0.01	<0.01	<0.01	<0.003	0.009	0.007	<0.001	0.003	0.003	0.008	0.004	0.003	0.1	0.008	0.019	-	0.004	< 0.001	<0.003	0.0019	0.003	< 0.001	<0.001	<0.001	<0.02	0.0006	0.0007	ND	ND
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	-	0.0003	0.00605	0.00461	-	0.0046	0.0036	0.0033	0.0029	0.0031	0.0025	0.0027	0.002	0.0029	0.0025	0.0023	-	0.0027	0.0019	0.00271	0.0022	0.00252	0.0023	0.0027	0.0025	0.0026	0.00253	0.00252	0.0026	0.0026
Vanadium	-		-		-		mg/L	0.01	<0.03	-	<0.03	<0.03	<0.03	<0.003	0.011	0.001	0.002	0.001	0.001	0.002	0.001	0.001	0.003	0.002	0.002	-	0.001	< 0.001	0.00059	0.0007	0.00075	< 0.001	<0.001	<0.001	<0.002	0.0007	0.0007	ND	ND
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	0.02	<0.005	0.006	0.007	<0.005	<0.005	<0.002	<0.005	0.005	<0.005	<0.005	<0.005	0.005	< 0.005	0.009	<0.005	<0.005	0.008	-	<0.005	< 0.005	<0.0001	0.001	0.0001	< 0.005	<0.005	<0.005	0.014	0.0004	0.0004	0.039	0.039
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.010	-	-	-	ND	ND

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

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

British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG), updated from time to time, for the protection of freshwater aquatic life (AW-F).

H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with temperature
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-2: Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2	BH96-2
Monitoring Well	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample ID	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory ID	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date	-		-		-		-	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	28-Mar-15	29-Aug-15	29-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
QA/QC	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L2070518-1	L2124909-8	L2163155-1
Field Observations																													
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.82	7.64
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.7	8
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	355	256.7
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	4
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	386.4	213.5
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.37	9.51
Conventional Parameters																													
Conductivity	-		-		-		uS/cm	371	390	392	391	383	390	382	377	377	391	378	392	377	386	361	373	384	387	365	373	345	365	360
Hardness (Dissolved as CaCO3)	-		-		-		mg/L	74.9	70	76.3	81.7	70.1	82	74.7	76.9	76.5	73.3	89.6	75.9	131	82.7	-	75	103	90.2	120	102	133	105	79.6
pH	6.5-9.0		-		6.5 - 8.5		-	7.4	7.7	8.2	8	7.9	7.8	8.1	8	8	8	7.9	7.9	8.1	8	8	7.2	8	8.1	8.1	8.2	-	8.28	8.38
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)		-		mg/L	-	-	-	-	-	-	34	-	46	17	32	16	14	24	12	28	11	15	20	17	15.4	-	-
Total Dissolved Solids	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	-	229
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	179	194	190
Ammonia, (as N)	0.46 - 1.86	pH/T*	2.4 - 23.9	pH/T*	-		mg/L	0.03	3.3	0.05	<0.03	0.06	0.05	0.12	0.1	0.07	0.08	<0.03	<0.03	ND	0.068	0.07	0.047	0.23	0.043	<0.03	<0.03	0.0276	0.0473	0.0055
Bromide (Br)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	150		600		<250	AO	mg/L	3.6	3.8	2	2.6	3.2	2	3.3	2.5	3.4	2.9	4.9	3.5	6.1	3.4	4	4.2	3.4	3.2	6.2	4.9	4.47	3.36	2.66
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	0.17	0.16	0.14	0.13	0.16	0.16	0.15	0.15	0.14	0.14	0.14	0.15	0.16	0.15	0.15	0.16	0.15	0.15	0.16	0.15	0.172	0.165	0.17
Nitrate (as N)	3		32.8		10		mg/L	0.23	0.26	0.16	8	0.29	0.2	0.13	0.12	<0.1	4.53	0.552	0.496	0.8	0.62	0.96	0.53	0.31	0.26	0.13	0.65	0.762	0.581	0.508
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	ND	ND	ND	<0.01	<0.01	<0.01	-	0.012	<0.01	<0.01	<0.01	<0.01	ND	0.027	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	0.0068	0.0024	<0.0010
Nitrate + Nitrite (as N)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.379	0.396	0.277
Total Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0662
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	6.3	4.5	4.8	5.7	4.36	4.08	4.57	4.95	6.02	4.97	4.01	4.02	4.6	4.4	-	4.5	4.2	3.9	3.1	4.2	3.28	3.65	4.34
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<4	<4	<4	<4	<4	<4	ND	ND	4.6	<4	<4	<4	<4	ND	<0.0001	4.1	<4.0	<4.0	<4.0	<4.0	<4.0	-	-	-
Chemical Oxygen Demand (COD)	-		-		-		mg/L	<30	<30	<30	36	<30	<30	38	ND	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Metals																													
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.529**	**0.411**	**0.292**
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00017	0.00016	0.00016
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00265	0.00273	0.00239
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0239	0.0232	0.0237
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.119	0.148	0.147
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00155	0.00121	0.000812
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	17.2	13.5
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000053	0.00004	0.000023
Chromium	0.001 Cr VI 0.0089 Cr III		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00105	0.00057	0.00034
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00034	0.00035	0.00019
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00457	0.00502	0.00293
Iron	-		1		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.796	0.604	0.332
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000387	0.000381	0.000256
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0017	0.002	0.0019
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.5	15.6	11.4
Manganese	0.96 - 1.19	H	1.42 - 2.01	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0674	0.077	0.0298
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00364	0.00423	0.00481
Nickel	0.025 - 0.15	H	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00194	0.00179	0.00113
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.112	0.09	0.093
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.19	9.7	10.1
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0008	0.00071	0.00059
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000057	<0.000050	0.000072
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	4.86	4.29
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00001	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	44	50.9
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.209	0.181	0.152
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	1.39	1.44
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00022	0.00073	0.00011
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0155	0.0117	0.00697
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00011	<0.00010	<0.00010
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00184	0.00202	0.00198
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00208	0.00158	0.00119
Zinc	0.0075 - 0.0398	H	0.033 - 0.0663	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0214	0.0193	0.0105
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000116	0.000082	0.000095
Dissolved Metals																													
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	0.02	0.025	0.025	0.022	0.019	0.0061	0.0042	0.0068	0.021	0.015	0.0244	0.0132	0.012	0.007	-	0.01	0.009	0.008	0.019	0.0106	0.0153	0.0141	0.0266
Antimony	0.009		-		-		mg/L	ND	ND	ND	<0.0005	<0.0005	<0.0005	0.0018	0.000159	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	0.0002	-	0.0001	0.0002	0.0003	0.0001	<0.00020	0.00011	0.00011	0.00012
Arsenic	0.005		-		0.01		mg/L	0.0018	0.0017	0.0017	0.0017	0.0018	0.00274	0.00286	0.00228	0.00239	0.00209	0.00183	0.00219	0.0019	0.0024	-	0.0024	0.0033	0.0024	0.002	0.00222	0.00247	0.00258	0.00212
Barium	1		-		-		mg/L	0.023	0.083	0.052	0.019	0.016	0.0473	0.0169	0.0169	0.0169	0.0156	0.0165	0.0173	0.019	0.019	-	0.019	0.019	0.021	0.021	0.0186	0.0227	0.0202	0.0194
Beryllium	0.00013		-		-		mg/L	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	ND	ND	ND	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	1.2		-		5		mg/L	0.175	0.188	0.201	0.19	0.17	0.158	0.144	0.186	0.163	0.149	0.152	0.152	0.181	0.13	0.19	-	0.167	0.159	0.178	0.152	0.127	0.116	0.139	0.139
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	0.00017	0.00033	0.0001	0.00011	0.0002	0.000069	0.000051	0.000132	0.00024	0.000194	0.00025	0.000168	0.00078	0.00036	-	0.00202	0.00029	0.00028	0.00028	0.00018	0.00061	0.000392	0.000342
Calcium	-		-		-		mg/L	13.1	-	-	13.2	11.3	13	13.1	12.3	12.8	13.4	13.3	12.3	22.5	13.5	-	16.4	15.6	15.3	20.6	17.1	20.6	17.2	13.5
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	0.001 Cr VI 0.0089 Cr III	V	-		-		mg/L	ND	ND	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00010	<0.00010	0.00011
Cobalt	0.004		0.11		-		mg/L	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000048	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	<0.00005	-	0.00006	0.00009	<0.00005	0.00006	<0.00010	<0.00010	<0.00010	<0.00010
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.0043	0.0047	0.0148	0.0018	0.0017	0.00852	0.00028	0.00028	0.0007	0.00131	0.00131	0.00093	0.0054	0.0014	-	0.002	0.0009	0.0007	0.0009	0.00116	0.00118	0.00224	0.00117
Iron	-		0.35		<0.3	AO	mg/L	ND	0.021	0.036	0.013	0.01	0.0229	<0.005	<0.005	0.0136	0.0059	0.0051	0.02	ND	<0.010	-	<0.010	0.014	<0.010	<0.010	<0.010	<0.010	0.017	0.022
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	0.0002	ND	0.0019	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.000050	<0.000050	<0.000050
Lithium	-		-		-		mg/L	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00156	<0.005	<0.005	<0.005	<0.005	0.0016	0.0015	-	0.0017	0.0018	0.0016	0.0019	0.00155	0.0013	0.0017	0.0016
Magnesium	-		-		-		mg/L	10.6	10.4	9.97	11.8	9.46	12.2	12	10.5	11.1	11	11	11	18	11.1	-	13.8	15.7	12.6	16.7	14.3	19.9	15.2	11.1
Manganese	0.84 - 1.19	H	1.14 - 2.01	H	<0.05	AO	mg/L	0.01	ND	0.006	0.004	0.005	0.0322	0.0547	0.0246	0.016	0.0039	0.0033	0.0151	0.0212	0.0038	-	0.0482	0.0862	0.0016	0.0025	0.00196	0.00228	0.0303	0.00184
Mercury	0.0001		-		0.001		mg/L	ND	ND	ND	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	0.0000157
Molybdenum	2		-		0.25		mg/L	0.007	0.006	0.006	0.006	0.006	0.0049	0.0046	0.00591	0.0053	0.005	0.0052	0.0051	0.0037	0.0057	-	0.0056	0.0052	0.0054	0.0038	0.00429	0.00381	0.00419	0.00494
Nickel	0.025-0.15	H	-		-		mg/L	ND	ND	0.003	<0.001	<0.001	<0.001	<0.001	0.00066	<0.001	0.0012	0.0012	ND	0.0017	0.0006	-	0.0013	0.0007	0.0006	0.0006	<0.00040	0.00077	0.00063	<0.00050
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	0.079	0.088	0.054	0.044	0.059	0.069	0.101	0.073	0.053	0.19	0.1	-	0.08	0.05	0.05	<0.05	0.062	0.061	0.052	0.072
Potassium	-		-		-		mg/L	9.95	10.1	9.85	11.3	9.39	10	9.88	9.88	10	10.1	9.11	9.73	8	11.1	-	10.4	12.2	10	8.22	9.23	8.98	10.2	9.75
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00053	0.00055	0.00045
Selenium	0.002		-		0.01	MAC	mg/L	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	<0.000050	<0.000050
Silicon	-		-		-		mg/L	3.91	3.92	3.61	4.19	3.53	3.65	3.54	3.79	3.82	3.91	3.65	3.96	4.5	4.1	-	4.5	4.2	4.1	4.5	4.6	4.63	4.07	3.94
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	ND	ND	ND	<0.000005	<0.000005	<0.000005	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	<0.000002	0.00014	<0.00005	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	56.6	52.8	56.8	63.7	53.2	51.1	49	54.5	54.6	57.1	50.1	53.3	24.9	56.8	-	53.5	58.7	50.1	30.5	41.2	29	43.4	49.1
Strontium	-		-		-		mg/L	0.147	0.142	0.141	0.156	0.135	0.159	0.159	0.149	0.155	0.144	0.154	0.149	0.198	0.16	-	0.166	0.173	0.166	0.194	0.173	0.205	0.186	0.143
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	ND	<1	-	2	<1	<1	<1	<3.0	0.77	1.25	1.46
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	0.000003	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0001	-	<0.0002	<0.0002	<0.0002	<0.0002	0.00022	<0.00010	0.00103	<0.00010
Titanium	-		-		-		mg/L	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	-	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.00030	0.00032	0.00121
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00011	0.0001	0.00011
Uranium	0.0085		-		-		mg/L	0.0028	0.0027	0.0024	<0.0001	<0.0001	0.00218	0.00216	0.00244	0.00227	0.00193	0.00216	0.00233	0.00164	<0.005	-	0.00222	0.00213	0.00229	0.00191	0.00196	0.000966	0.00208	0.00192
Vanadium	-		-		-		mg/L	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00074	<0.005	<0.005	<0.005	<0.005	ND	0.00231	-	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00054	<0.00050	0.00058
Zinc	0.0075 - 0.0398	H	0.033 - 0.0663	H	<5.0	AO	mg/L	0.017	0.023	0.026	<0.005	<0.005	0.007	<0.005	0.0016	<0.005	<0.005	<0.005	<0.005	0.005	<0.001	-	0.009	0.005	<0.004	<0.004	<0.0040	0.0042	0.0073	0.0023
Zirconium	-		-		-		mg/L	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	0.004	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0000660	<0.0000660	0.000115

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BcWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

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

British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG), updated from time to time, for the protection of freshwater aquatic life (AW-F).
H = standard is hardness dependent; pH = standard is pH dependent; CI = standard is chloride dependent; T = standard varies with temperature
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QA/QC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-3: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location					SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
Site Name	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample ID					1-Oct-96	1-Jun-97	4-Dec-97	4-May-98		24-Sep-98	27-Jan-99	30-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00	7-May-01	1-Dec-01
Laboratory ID					-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-
Sample Date																		
QAQC																		
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	uS/cm	1,590	1,760	2,400	2,160	2,140	2,090	-	2,160	-	1,780	-	-	1,790	2,000
Hardness (Total as CaCO3)	-	-	-	mg/L	439	460	618	603	696	651	640	611	549	480	529	493	534	551
pH	-	-	-	pH	8.01	7.81	7.71	7.93	7.91	7.89	-	-	-	7.27	7.21	7.42	7.61	7.06
Total Suspended Solids	-	-	-	mg/L	199	10	408	183	-	515	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	12.2	19.1	49.9	32.8	31.8	90.0	48.0	45.8	-	26.8	47.4	42.6	25.8	45.0
Chloride (Cl)	1500	-	-	mg/L	131	151	187	168	177	183	140	131	134	104	176	125	111	107
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.37	<0.1	<0.1	<0.25	< 0.05
Nitrate (as N)	400	100	10	mg/L	9.88	15.5	7.38	10.6	13.7	7.31	2.54	2.3	0.12	-	<0.05	0.31	1.8	0.13
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	0.383	0.262	0.273	0.81	0.795	0.585	0.205	0.245	0.076	-	<0.002	0.038	0.18	0.011
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	12.2	18	16	63	68	9	20.3	17.4	21.4	2.1	<1	19	9.3	21.1
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	27	61	84	116	<5	-	<10	<10	<10	<10	<10	<10	< 10
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	95	299	164	136	184	375	104	-	84	88	72	62	86
Total Metals																		
Aluminum	-	5	9.5	mg/L	0.04	<0.05	0.018	0.019	<0.05	0.08	0.05	0.024	0.019	0.27	0.012	0.042	0.026	0.011
Antimony	0.09	-	0.006	mg/L	-	<0.2	<0.001	0.0003	<0.05	<0.001	0.035	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Arsenic	0.05	0.025	0.01	mg/L	0.0002	<0.2	0.003	0.0006	0.0006	0.002	0.14	0.002	0.002	0.001	0.001	0.001	<0.001	0.001
Barium	10	-	1	mg/L	0.18	0.17	0.35	0.35	0.374	0.42	0.37	0.34	0.32	0.26	0.26	0.028	0.28	0.43
Beryllium	0.0015	0.1	0.008	mg/L	<0.005	<0.005	<0.005	<0.005	0.003	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	1.8	-	-	-	3.03	-	2.16	2.29	1.48	1.51	2.14	1.86	1.47	1.62
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	<0.0002	<0.002	<0.0002	<0.0002	<0.005	0.0003	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	< 0.0002
Calcium	-	1000	-	mg/L	127	129	175	166	202	183	187	183	160	142	163	137	150	162
Cesium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	0.002	<0.01	0.003	0.003	0.0034	0.002	0.008	0.002	0.002	0.004	0.002	0.002	0.001	0.003
Cobalt	0.04	1	0.001	mg/L	<0.02	<0.01	<0.01	<0.01	<0.005	<0.01	0.003	0.002	0.002	0.002	0.004	0.003	0.002	0.005
Copper	0.02 - 0.09	0.3	1.5	mg/L	0.002	<0.01	0.003	0.003	0.0039	<0.001	0.011	0.005	0.001	0.005	<0.001	<0.001	<0.001	0.002
Iron	-	-	6.5	mg/L	0.06	<0.03	0.07	0.03	0.084	0.05	0.083	0.28	0.33	0.25	0.28	0.34	0.33	0.44
Lead	0.04 - 0.16	0.1	0.01	mg/L	<0.001	<0.01	<0.001	0.002	<0.05	<0.001	<0.02	0.002	<0.001	0.002	<0.001	<0.001	<0.001	< 0.001
Lithium	-	5	0.008	mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	0.002	-
Magnesium	-	-	-	mg/L	29.8	33.8	43.6	45.7	44.8	46.9	42.1	37.3	36.4	30.5	29.4	36.2	28.3	35.4
Manganese	-	-	1.5	mg/L	2.58	2.44	2.1	1.49	2.09	2.29	3.04	3.03	2.88	2.36	2.93	2.97	2.38	4.82
Mercury	0.00025	0.002	0.001	mg/L	<0.00005	<0.00005	0.00001	<0.00001	-	<0.00001	0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002
Molybdenum	10	0.05	0.25	mg/L	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Nickel	0.25 - 1.5	1	0.08	mg/L	<0.02	<0.02	<0.02	0.02	<0.02	<0.05	<0.008	0.008	0.006	0.006	0.008	0.008	0.006	0.007
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.08	<0.01	0.1	0.11	0.07
Potassium	-	-	-	mg/L	-	-	-	-	104	-	88.9	91	75.6	61.3	88.8	76.8	68.7	68.4
Rubidium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	<0.0005	<0.01	<0.0005	0.0005	<0.05	0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	12	24.9	19.2	14.9	21.8
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.0001	<0.001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Sodium	-	-	200	mg/L	133	-	-	-	177	-	141	125	122	102	105	123	114	108
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	0.9	1.13	0.95	1	1.06
Sulfur	-	-	-	mg/L	-	-	-	-	21.6	-	8.33	-	-	-	-	-	-	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	<0.001	<0.0001	-	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001
Titanium	1	-	-	mg/L	-	-	<0.01	<0.01	<0.002	<0.01	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	0.0003	0.0002	-	0.0001	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005
Vanadium	-	0.1	0.02	mg/L	<0.03	-	<0.03	<0.03	<0.01	<0.03	<0.003	0.001	0.001	0.004	<0.001	0.002	<0.001	0.005
Zinc	0.075 - 38.1	2	3	mg/L	0.008	0.11	0.007	<0.005	0.003	<0.005	0.013	0.016	<0.005	0.014	<0.005	<0.005	0.011	< 0.005
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.02	<0.03	<0.04	< 0.01
Dissolved Metals																		
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

Table D-3: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location					Thornhill Landfill													
Site Name					SW-3													
Sample ID	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03		1-Aug-03	3-Dec-03	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08
QAQC					-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	uS/cm	79	1,980	518	1,710	1,820	2,050	852	1930	2470	1460	2490	76	1,790	1,760
Hardness (Total as CaCO3)	-	-	-	mg/L	316	93	156	527	-	601	21	653	573	500	559	28	492	470
pH	-	-	-	pH	7.29	7.6	7.26	7.37	7.9	7.54	6.81	7.2	7.42	8.1	7.36	10.2	7.66	7.5
Total Suspended Solids	-	-	-	mg/L	-	-	-	-	38	-	-	8	-	10	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	1.6	44.4	6.0	41.2	31.9	34.0	0.04	29.7	54.6	24.7	49.2	0.27	40.6	41.0
Chloride (Cl)	1500	-	-	mg/L	56.5	122	22.5	94.6	95.3	128	0.4	116	141	90.4	164	2.56	0.111	173
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	<0.05	<0.25	<0.05	<0.05	-	<0.05	<0.05	-	<0.25	-	<0.05	<0.25	<0.25	<0.1
Nitrate (as N)	400	100	10	mg/L	2.4	2.3	2.5	3.4	3.39	0.79	0.2	0.539	1.2	1.32	1.24	<0.25	4.15	2
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	2.4	0.465	0.035	0.34	0.12	0.041	<0.002	0.06	0.013	0.08	<0.002	0.08	0.178	0.061
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	22.4	6.7	12.7	7.8	7.6	0.6	1.2	14.2	<2.5	12.5	2.06	2.51	2.5	3.6
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<10	76	<10	<10	<6	<10	<10	<10	<10	<10	11	<10	12	28
Chemical Oxygen Demand (COD)	-	-	-	mg/L	41	102	38	66	<10	73	<25	110	111	98	134	<20	111	140
Total Metals																		
Aluminum	-	5	9.5	mg/L	0.022	<0.005	0.085	0.005	0.01	0.017	0.063	0.0122	0.006	0.0092	< 0.005	0.074	< 0.005	0.015
Antimony	0.09	-	0.006	mg/L	<0.001	<0.001	<0.001	<0.001	0.000027	<0.001	< 0.001	0.000344	< 0.0002	0.000176	< 0.001	<0.001	<0.001	<0.0006
Arsenic	0.05	0.025	0.01	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	0.001	< 0.001	0.0016	0.0012	0.0013	0.001	<0.001	<0.001	<0.001
Barium	10	-	1	mg/L	0.25	0.031	0.13	0.32	0.0195	0.37	0.017	0.453	0.37	0.295	0.39	0.012	0.37	0.403
Beryllium	0.0015	0.1	0.008	mg/L	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	< 0.001	<0.001	<0.001	-
Boron	12	5	5	mg/L	1.04	0.08	0.47	2.00	-	1.74	< 0.05	1.6	1.89	1.39	2.17	<0.05	0.15	2.2
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	<0.0002	0.0011	< 0.0002	<0.0002	<0.00001	<0.0002	< 0.0002	0.00005	< 0.00004	0.00003	< 0.0002	0.0002	<0.0002	0.0003
Calcium	-	1000	-	mg/L	91.8	25.4	47.6	148	-	172	7.41	202	171	139	171	9.8	150	142
Cesium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	<0.001	<0.001	<0.001	0.002	<0.0002	0.001	< 0.001	<0.002	0.0015	0.0064	0.002	<0.001	0.001	0.005
Cobalt	0.04	1	0.001	mg/L	-	0.003	<0.001	0.003	0.000044	0.003	< 0.001	0.00293	0.0026	0.00183	0.002	<0.001	0.002	0.0019
Copper	0.02 - 0.09	0.3	1.5	mg/L	0.007	<0.001	0.004	0.005	0.00075	<0.001	< 0.001	0.00621	0.0021	0.00225	< 0.001	0.001	0.001	0.0176
Iron	-	-	6.5	mg/L	0.41	0.42	0.22	0.08	-	<0.05	< 0.05	0.053	0.08	1.33	< 0.05	0.14	0.09	0.48
Lead	0.04 - 0.16	0.1	0.01	mg/L	<0.001	<0.001	<0.001	<0.001	0.00008	<0.001	< 0.001	<0.1	< 0.0002	0.00001	< 0.001	<0.001	<0.001	0.0002
Lithium	-	5	0.008	mg/L	-	<0.001	<0.001	0.003	0.00032	0.003	<0.001	0.00082	0.0025	0.00168	0.003	<0.001	<0.005	0.0017
Magnesium	-	-	-	mg/L	21	7.27	9.05	38.0	-	41.6	0.59	36.2	35.1	25.2	31.9	0.8	282	25.1
Manganese	-	-	1.5	mg/L	1.51	3.89	0.53	2.73	0.0028	2.75	0.004	2.82	2.49	1.56	2.36	0.007	2.23	2.17
Mercury	0.00025	0.002	0.001	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.00002	<0.00005	< 0.02	-	< 0.02	<0.00002	<0.00002	<0.00006
Molybdenum	10	0.05	0.25	mg/L	<0.001	<0.0005	<0.0005	0.013	0.00064	<0.0005	< 0.0005	0.00075	< 0.0001	0.00016	< 0.0005	<0.0005	<0.0005	0.0002
Nickel	0.25 - 1.5	1	0.08	mg/L	0.005	0.01	0.002	0.008	<0.00005	0.006	< 0.001	0.00931	0.0084	0.00523	0.006	<0.001	0.005	0.008
Phosphorus	-	-	-	mg/L	0.08	0.1	0.06	0.14	-	0.15	0.36	0.1	0.08	0.1	< 0.15	<0.15	<0.15	-
Potassium	-	-	-	mg/L	39.3	2.09	19.3	66.3	-	72.9	0.52	68	70.7	57	69.4	1.2	64.4	-
Rubidium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	<0.002	<0.001	<0.001	<0.001	<0.0002	<0.001	< 0.001	<0.002	0.0012	0.0006	< 0.001	<0.001	<0.001	<0.001
Silicon	-	-	-	mg/L	10.9	9.93	7.76	16.8	-	20.5	4.18	-	19.7	-	8.2	2.1	6.8	-
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.00002	<0.0001	< 0.0001	<0.0002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008
Sodium	-	-	200	mg/L	65.2	8.52	26.5	121	-	124	0.8	121	126	97.4	137	2.43	113	98.9
Strontium	-	-	2.5	mg/L	0.63	0.18	0.28	1.03	0.0416	1.13	0.03	1.23	1.13	0.793	1.17	0.028	1.04	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	5.9	-	5.3	-	-	-	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.000002	<0.0001	< 0.0001	0.000022	< 0.00002	0.000006	< 0.0001	<0.0001	<0.0001	<0.0001
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	<0.001	<0.001	<0.001	<0.001	0.00001	<0.001	< 0.001	0.00022	0.0002	-	< 0.001	<0.001	<0.001	-
Titanium	1	-	-	mg/L	<0.001	<0.001	0.002	0.001	-	0.002	0.003	<0.003	0.0007	0.003	< 0.001	0.001	0.001	<0.02
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.000016	<0.0005	< 0.0005	0.000205	< 0.0001	0.000063	< 0.0005	<0.0005	<0.0005	<0.0001
Vanadium	-	0.1	0.02	mg/L	<0.001	<0.001	<0.001	<0.001	0.0003	<0.001	< 0.001	<0.0006	0.0006	0.00086	0.001	<0.001	<0.001	<0.002
Zinc	0.075 - 38.1	2	3	mg/L	<0.005	0.007	<0.005	<0.005	0.0046	<0.005	< 0.005	0.0008	0.002	0.0002	< 0.005	<0.005	<0.005	0.014
Zirconium	-	-	-	mg/L	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	0.005	< 0.002	0.005	< 0.01	<0.01	<0.01	-
Dissolved Metals																		
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

Table D-3: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	SW-3 - 10-Oct-08 -	SW-3 - 22-Feb-10 -	SW-3 - 15-Jun-10 -	SW-3 - 25-Oct-10 -	SW-3 - 15-Feb-11 -	SW-3 - 22-Feb-12 -	SW-3 - 8-May-12 -	SW-3 - 4-Jan-13 -	SW-3 - 16-Apr-13 -	SW-3 - 6-Jun-13 -	SW-3 - 22-Oct-13 -	SW-3 - 6-May-14 -	SW-3 - 29-Oct-14 -	SW-3 - 31-Mar-15 -
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	uS/cm	1,800	1,645	2,120	1,930	1,850	1,820	1,650	1,520	98	1,640	1,740	1,840	1760	1,620
Hardness (Total as CaCO3)	-	-	-	mg/L	592	486	537	541	575	519	462	432	41	641	631	535	518	516
pH	-	-	-	pH	8.0	7.0	6.9	7.6	6.9	6.8	6.7	7.5	7.4	7.6	7.4	7.4	7.3	7.6
Total Suspended Solids	-	-	-	mg/L	10	-	-	-	-	-	-	20	-	91	460	33	8	35
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	37.1	55.2	64.4	57.2	54.1	48.3	43.7	34.9	0.1	34.8	36.1	<0.03	36.7	26.5
Chloride (Cl)	1500	-	-	mg/L	110	95	127	73	74	92.2	76.8	100	2.3	109	107	119	122	104
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	<0.1	0.025	<0.1	<0.1	<0.1	0.11	0.11
Nitrate (as N)	400	**100**	10	mg/L	-	1.74	ND	0.71	<0.1	<0.1	0.2	4.39	0.42	4.48	0.141	2.57	5.09	4.6
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	0.111	0.013	ND	0.019	<0.01	<0.01	<0.01	0.014	<0.01	0.013	0.061	0.045	0.029	0.09
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	-	12.5	ND	17	28.9	19.5	5	7.52	1.44	10.5	15.8	19.6	80.6	96.7
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<10	ND	9.3	21	6.8	10	10	5.6	<4	<4	>220	<4	12	ND
Chemical Oxygen Demand (COD)	-	-	-	mg/L	89	104	132	181	130	90	90	77	<20	75	230	115	114	120
Total Metals																		
Aluminum	-	**5**	9.5	mg/L	0.006	0.007	0.013	0.007	0.017	0.011	0.0117	0.646	0.0873	9.56	0.989	0.279	0.923	0.72
Antimony	0.09	-	0.006	mg/L	0.0001	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000051	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
Arsenic	0.05	**0.025**	0.01	mg/L	0.0008	0.0007	0.0009	0.0005	<0.0001	0.0009	0.00072	0.00106	0.000094	0.00504	0.00175	0.00129	0.00234	0.0018
Barium	10	-	1	mg/L	0.395	0.336	0.324	ND	0.416	0.392	0.37	0.263	0.0202	0.494	1.51	0.334	0.363	0.334
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.00005	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00016	<0.0001	<0.0001	<0.0001	ND
Bismuth	-	-	-	mg/L	<0.00003	ND	0.381	0.381	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND
Boron	12	**5**	5	mg/L	1.89	1.89	1.85	2.03	2.1	1.5	1.32	1.27	<0.05	1.88	1.83	1.59	1.93	2.68
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	<0.00003	0.00003	0.000016	0.00009	0.0001	0.00003	<0.00001	0.00002	0.00010	0.00011	0.000079	0.000048	0.00014	0.00009
Calcium	-	**1000**	-	mg/L	180	172	157	166	184	168	149	137	15	198	203	173	168	169
Cesium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	**0.05**	0.05	mg/L	0.0006	0.001	0.003	0.001	0.002	0.001	<0.001	0.0011	ND	0.0117	0.0019	0.0011	0.0024	0.002
Cobalt	0.04	**1**	0.001	mg/L	0.00178	0.0015	0.0022	0.0018	0.018	0.0016	0.00095	0.0021	0.000091	0.00765	0.00341	0.0026	0.00287	0.00286
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.0005	0.0009	0.0506	0.0205	0.0026	0.0011	0.00062	0.00386	0.00107	0.023	0.00709	0.00309	0.00775	0.0069
Iron	-	-	6.5	mg/L	0.072	0.54	0.069	0.057	13.3	14.4	19.2	5.4	0.159	22.3	5.3	6.5	11.5	7.2
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.00003	0.0004	0.0021	0.0002	0.0004	<0.0002	<0.0002	0.00024	0.000098	0.00309	0.00034	0.00034	0.00051	0.0003
Lithium	-	**5**	0.008	mg/L	<0.003	ND	0.005	0.006	<0.0005	<0.0005	<0.0005	<0.005	<0.005	0.0085	<0.005	<0.005	<0.005	0.0029
Magnesium	-	-	-	mg/L	34.1	28.4	29.1	26.1	28.4	24.4	21.8	22.1	1.1	35.6	30	24.9	24.0	22.6
Manganese	-	-	1.5	mg/L	2.18	2.59	2.72	2.88	3.24	2.98	2.7	2.95	0.0161	4.99	4.95	4.72	3.21	3.36
Mercury	0.00025	**0.002**	0.001	mg/L	-	0.00003	0.00003	0.00004	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000023	ND
Molybdenum	10	**0.05**	0.25	mg/L	<0.0003	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	0.000401	<0.001	<0.001	<0.001	0.0012	0.0009
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.0055	0.006	0.005	0.012	0.009	0.006	0.0036	0.0046	0.00024	0.0178	0.0073	0.0059	0.009	0.0076
Phosphorus	-	-	-	mg/L	0.032	-	-	-	0.176	0.235	0.229	0.067	<0.01	0.38	0.413	0.079	0.172	0.139
Potassium	-	-	-	mg/L	69.8	65	71.5	62.5	69.9	57.3	45.7	44.9	1.5	71.4	63.9	55.0	53	53.7
Rubidium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	mg/L	<0.0002	ND	ND	ND	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00027	0.00019	0.00016	0.00014	ND
Silicon	-	-	-	mg/L	7.6	11.7	11.7	10.6	12.2	10.6	10.3	8.52	2.76	23	11.6	10.4	9.8	10.8
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.00003	ND	ND	ND	0.00003	<0.000005	<0.000005	<0.000005	<0.000005	0.000026	<0.000005	<0.000005	<0.000005	ND
Sodium	-	-	200	mg/L	118	99.3	108	102	104	88.8	73.5	77.6	2.39	122	114	102	113	115
Strontium	-	-	2.5	mg/L	1.13	1.12	1.12	1.05	1.08	1.04	0.931	0.857	0.0593	1.23	1.14	0.988	0.949	0.941
Sulfur	-	-	-	mg/L	<3	5	5	6	13	<3	6.2	3.4	<3	4.2	9.8	7.9	29.3	37
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	<0.00001	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000057	<0.00005	<0.00005	<0.00005	ND
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	0.00018	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00032	0.00032	<0.005	<0.005	<0.005	ND
Titanium	1	-	-	mg/L	<0.003	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0331	0.0132	0.0378	0.026
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	mg/L	0.00004	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.000046	0.000046	0.0002	0.00013	0.0002	0.00023
Vanadium	-	**0.1**	0.02	mg/L	<0.001	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00062	0.00062	<0.005	<0.005	<0.005	0.002
Zinc	0.075 - 38.1	**2**	3	mg/L	0.0007	0.026	0.024	0.077	<0.005	<0.005	<0.005	0.0053	0.0025	0.0025	0.223	0.105	0.0776	0.041
Zirconium	-	-	-	mg/L	-	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00086	0.0005
Dissolved Metals																		
Aluminum	-	**5**	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	**0.025**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	**0.1**	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	**5**	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	**0.08**	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	**1000**	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	**0.05**	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	**1**	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	**0.3**	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	**0.1**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	**5**	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	**0.002**	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	**0.05**	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	**1**	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	**0.1**	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	**2**	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

Table D-3: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	SW-3 - 11-Aug-15 -	SW-3 - 4-Nov-15 -	SW-3 - 22-Mar-16 -	SW-3 - 25-Jul-16 -	SW-3 - 13-Oct-16 -	SW-3 - 24-Aug-17 -	SW-3 L2070515-2 19-Mar-18 -	SW-3 L2124909-2 4-Jul-18 -	SW-3 L2163156-2 10-Sep-18 -
Field Observations													
pH	-	-	-	-	-	-	-	-	-	-	-	7.35	6.5
Temperature	-	-	-	°C	-	-	-	-	-	-	-	19.4	14.2
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	1458	1877
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	5.7	3.2
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	385.6	-102.4
Conventional Parameters													
Conductivity	-	-	-	uS/cm	1,820	1,980	2,110	1,360	2560	1420	890	1500	2020
Hardness (Total as CaCO3)	-	-	-	mg/L	640	-	801	429	709	386	289	447	540
pH	-	-	-	pH	7.5	7.5	7.7	8.0	7	7.6	8.22	8.16	7.44
Total Suspended Solids	-	-	-	mg/L	49	42	10	18	75	31	21.4	21	122
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	22	717	962
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	23.1	37.8	44.6	28.7	60.8	35.1	22	41.7	67.1
Chloride (Cl)	1500	-	-	mg/L	125	115	182	123	206	97.9	34.6	85.6	117
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	0.11	0.13	0.13	0.13	0.11	<0.10	<0.10	0.1	<0.20
Nitrate (as N)	400	**100**	10	mg/L	4.7	4.4	2.61	1.18	0.62	0.38	2.49	0.546	0.211
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	-	0.029	0.017	0.97	<0.01	0.05	0.0179	0.197	0.025
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	22.5	41.7	71.7
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	0.326
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	55.3	-	66.5	7.1	7.4	10.7	10.5	4.5	<3.0
Biological Oxygen Demand (BOD)	-	-	-	mg/L	19	16	13	8.9	10	11	2.7	5.8	8.3
Chemical Oxygen Demand (COD)	-	-	-	mg/L	108	121	152	137	234	93	48	122	155
Total Metals													
Aluminum	-	**5**	9.5	mg/L	0.626	-	0.264	0.654	0.05	0.511	0.203	0.197	0.122
Antimony	0.09	-	0.006	mg/L	0.0004	-	0.0004	0.0004	0.0006	0.0002	0.0001	0.00021	0.00014
Arsenic	0.05	**0.025**	0.01	mg/L	0.0023	-	0.002	0.0021	0.0071	0.0025	0.00144	0.00205	0.0142
Barium	10	-	1	mg/L	0.409	-	0.452	0.301	1.06	0.369	0.262	0.402	0.902
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	mg/L	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	12	**5**	5	mg/L	3.88	-	3.84	2.21	3.09	1.88	0.945	2.07	2.06
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	0.00005	-	0.00004	0.00007	0.00014	0.00005	0.0000322	0.000018	0.000009
Calcium	-	**1000**	-	mg/L	204	-	260	115	231	112	80.7	121	162
Cesium	-	-	-		-	-	-	-	-	-	0.000102	0.000243	0.000329
Chromium	0.01	**0.05**	0.05	mg/L	0.0021	-	0.0023	0.0015	0.0022	0.00152	0.00071	0.00097	0.00136
Cobalt	0.04	**1**	0.001	mg/L	0.00319	-	0.00307	0.00552	0.0101	0.00353	0.00177	0.00363	0.00373
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.0051	-	0.003	0.0098	0.0041	0.00366	0.0025	0.00216	0.00051
Iron	-	-	6.5	mg/L	8.9	-	4.8	2.0	28.2	3.86	5.21	1.8	53
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	0.0002	-	<0.0001	0.0002	0.0001	0.00021	0.000058	0.000075	0.000061
Lithium	-	**5**	0.008	mg/L	0.0023	-	0.0033	0.0018	0.0018	0.00166	0.0011	0.0014	0.0029
Magnesium	-	-	-	mg/L	31.3	-	36.6	34.2	31.9	25.8	14.1	29.6	33.3
Manganese	-	-	1.5	mg/L	2.91	-	4.26	2.04	14.1	3.54	2.35	1.98	3.07
Mercury	0.00025	**0.002**	0.001	mg/L	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	10	**0.05**	0.25	mg/L	0.0007	-	0.0007	0.0023	0.0018	0.00093	0.000319	0.000726	0.000528
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.0075	-	0.0079	0.0079	0.0113	0.00531	0.0026	0.00616	0.00553
Phosphorus	-	-	-	mg/L	0.27	-	0.1	<0.02	0.12	0.113	0.056	0.068	0.356
Potassium	-	-	-	mg/L	64.0	-	88.4	46.0	64.9	46.3	23.7	54.6	66.9
Rubidium	-	-	-		-	-	-	-	-	-	0.0164	0.0382	0.053
Selenium	0.02	**0.03**	0.01	mg/L	<0.0005	-	<0.0005	0.0008	<0.0005	0.00057	0.000122	0.000245	0.000147
Silicon	-	-	-	mg/L	13.6	-	14.3	9.3	12	9.8	6.1	8.25	12.2
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-	-	200	mg/L	161	-	187	122	147	98.6	46	108	121
Strontium	-	-	2.5	mg/L	1.2	-	1.39	0.809	1.5	0.797	0.469	0.963	1.15
Sulfur	-	-	-	mg/L	30	-	33	4	3	4.5	4.19	2.96	1.16
Tellurium	-	-	-	mg/L	-	-	-	-	-	<0.00050	<0.00020	<0.00020	0.0002
Thallium	0.003	-	-	mg/L	<0.00002	-	<0.00002	0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	mg/L	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	mg/L	0.0004	-	0.0003	0.0002	0.0003	<0.00020	<0.00010	0.00017	0.00022
Titanium	1	-	-	mg/L	0.021	-	0.011	0.02	<0.005	0.012	0.00534	0.00511	0.00604
Tungsten	-	-	0.003		-	-	-	-	-	-	0.00027	<0.00010	0.00013
Uranium	0.085	**0.2**	0.02	mg/L	0.0003	-	0.0002	0.00086	0.00061	0.000244	0.000078	0.000226	0.000048
Vanadium	-	**0.1**	0.02	mg/L	0.002	-	0.002	0.002	0.003	0.0016	0.0008	0.0008	0.00257
Zinc	0.075 - 38.1	**2**	3	mg/L	0.049	-	0.026	0.007	0.012	0.0065	<0.0030	<0.0030	0.0057
Zirconium	-	-	-	mg/L	0.0009	-	0.0008	0.0007	0.0013	0.00096	0.000226	0.000433	0.000532
Dissolved Metals													
Aluminum	-	**5**	9.5	mg/L	-	-	-	-	-	-	0.0023	0.0094	0.0086
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	<0.00010	0.00018	0.00012
Arsenic	0.05	**0.025**	0.01	mg/L	-	-	-	-	-	-	0.0006	0.00175	0.0123
Barium	10	-	1	mg/L	-	-	-	-	-	-	0.261	0.378	0.861
Beryllium	0.0015	**0.1**	0.008	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	12	**5**	5	mg/L	-	-	-	-	-	-	0.961	2.05	2.11
Cadmium	0.0005 - 0.004 (d)	**0.08**	0.005	mg/L	-	-	-	-	-	-	0.000021	0.000013	0.000009
Calcium	-	**1000**	-	mg/L	-	-	-	-	-	-	88.3	129	162
Cesium	-	-	-	mg/L	-	-	-	-	-	-	0.000103	0.000224	0.000325
Chromium	0.01 (e)	**0.05**	0.05	mg/L	-	-	-	-	-	-	0.00033	0.00074	0.00109
Cobalt	0.04	**1**	0.001	mg/L	-	-	-	-	-	-	0.00173	0.00336	0.00358
Copper	0.02 - 0.09 (d, f)	**0.3**	1.5	mg/L	-	-	-	-	-	-	0.00189	0.00173	<0.00020
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	0.02	0.062	50.4
Lead	0.04 - 0.16 (d, f)	**0.1**	0.01	mg/L	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Lithium	-	**5**	0.008	mg/L	-	-	-	-	-	-	<0.0010	0.0012	0.003
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	16.8	30.4	33.2
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	2.64	1.92	3.14
Mercury	0.00025	**0.002**	0.001	mg/L	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	10	**0.05**	0.25	mg/L	-	-	-	-	-	-	0.000321	0.000706	0.00054
Nickel	0.25 - 1.5 (d, f)	**1**	0.08	mg/L	-	-	-	-	-	-	0.00248	0.00609	0.00574
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	<0.050	<0.050	0.056
Potassium	-	-	-	mg/L	-	-	-	-	-	-	27.6	60.7	72.1
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	0.0177	0.0391	0.0529
Selenium	0.02	**0.03**	0.01	mg/L	-	-	-	-	-	-	0.00016	0.000239	0.000217
Silicon	-	-	-	mg/L	-	-	-	-	-	-	5.51	7.66	13.7
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-	-	200	mg/L	-	-	-	-	-	-	48.5	115	127
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	0.512	0.964	1.17
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	4.08	2.73	1.5
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	mg/L	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	<0.00010	0.00027	0.00021
Titanium	1	-	-	mg/L	-	-	-	-	-	-	<0.00030	<0.00030	0.00125
Tungsten	-	-	0.003		-	-	-	-	-	-	<0.00010	<0.00010	0.00014
Uranium	0.085	**0.2**	0.02	mg/L	-	-	-	-	-	-	0.000078	0.000232	0.000042
Vanadium	-	**0.1**	0.02	mg/L	-	-	-	-	-	-	<0.00050	<0.00050	0.00137
Zinc	0.075 - 2.4 (d)	**2**	3	mg/L	-	-	-	-	-	-	0.0012	0.0013	<0.0010
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	<0.000060	0.000219	0.000498

NOTES

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

Table D-4: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Thornhill Landfill
SW-3

Location Site Name Sample ID Laboratory ID Sample Date QAQC	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	SW-3 - 1-Oct-96 -	SW-3 - 1-Jun-97 -	SW-3 - 4-Dec-97 -	SW-3 - 4-May-98 FDA	SW-3 - FD	SW-3 - 24-Sep-98 -	SW-3 - 27-Jan-99 -	SW-3 - 30-Apr-99 -	SW-3 - 1-Nov-99 -	SW-3 - 17-Mar-00 -	SW-3 - 15-Aug-00 -	SW-3 - 20-Dec-00 -	SW-3 - 7-May-01 -	SW-3 - 1-Dec-01 -	SW-3 - 1-Apr-02 -	SW-3 - 1-Jun-02 -	SW-3 - 1-Jan-03 -	SW-3 - 1-Mar-03 FDA	SW-3 - FD	SW-3 - 1-Aug-03 -	SW-3 - 3-Dec-03 -	SW-3 - 18-Oct-04 -	SW-3 - 1-Jun-05 -	SW-3 - 1-Nov-05 -	SW-3 - 1-Jun-06 -	SW-3 - 2-Jan-07 -	SW-3 - 18-Jun-07 -	SW-3 - 27-May-08 -	SW-3 - 10-Oct-08 -	SW-3 - 22-Feb-10 -	SW-3 - 15-Jun-10 -	SW-3 - 25-Oct-10 -
Field Observations																																							
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																																							
Conductivity	-		-		-		uS/cm	1590	1760	2400	2160	2140	2090	-	2160	-	1780	-	-	1790	2000	79	1980	518	1710	1820	2050	852	1930	2470	1460	2490	76	1790	1760	1800	1645	2120	1930
Hardness (Total as CaCO3)	-		-		-		mg/L	439	460	618	603	696	651	640	611	549	480	529	493	534	551	316	93	156	527	-	601	21	653	573	500	559	28	492	470	592	486	537	541
pH	6.5-9.0		-		6.5 - 8.5		-	8.01	7.81	7.71	7.93	7.91	7.89	-	-	-	7.27	7.21	7.42	7.61	7.06	7.29	7.6	7.26	7.37	7.9	7.54	6.81	7.2	7.42	8.1	7.36	10.2	7.66	7.5	8	7	6.9	7.6
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	199	10	408	183	-	515	-	-	-	-	-	-	-	-	-	-	-	-	38	-	-	8	-	10	-	-	-	-	10	-	-	-
Total Dissolved Solids	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.53 - 1.86	pH/T*	3.61 - 23.9	pH/T*	-		mg/L	12.2	19.1	49.9	32.8	31.8	90	48	45.8	-	26.8	47.4	42.6	25.8	45	1.62	44.4	6	41.2	31.9	34	0.04	29.7	54.6	24.7	49.2	0.27	40.6	41	37.1	55.2	64.4	57.2
Chloride (Cl)	150		600		<250	AO	mg/L	131	151	187	168	177	183	140	131	134	104	176	125	111	107	56.5	122	22.5	94.6	95.3	128	0.4	116	141	90.4	164	2.56	0.111	173	110	95	127	73
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	-	-	-	-	-	-	0.37	<0.1	<0.1	<0.25	< 0.05	<0.05	<0.25	<0.05	<0.05	-	<0.05	<0.05	-	<0.25	-	<0.05	<0.25	<0.25	<0.1	-	-	-	-
Nitrate (as N)	3		32.8		10		mg/L	9.88	15.5	7.38	10.6	13.7	7.31	2.54	2.3	0.12	-	<0.05	0.31	1.8	0.13	2.4	2.3	2.5	3.4	3.39	0.79	0.2	0.539	1.2	1.32	1.24	<0.25	4.15	2	-	1.74	ND	0.71
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	0.383	0.262	0.273	0.81	0.795	0.585	0.205	0.245	0.076	-	<0.002	0.038	0.18	0.011	2.4	0.465	0.035	0.34	0.12	0.041	<0.002	0.06	0.013	0.08	<0.002	0.08	0.178	0.061	0.111	0.013	ND	0.019
Nitrate + Nitrite (as N)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	12.2	18	16	63	68	9	20.3	17.4	21.4	2.1	<1	19	9.3	21.1	22.4	6.7	12.7	7.8	7.6	0.6	1.2	14.2	<2.5	12.5	2.06	2.51	2.5	3.6	-	12.5	ND	17
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	27	61	84	116	<5	-	<10	<10	<10	<10	<10	<10	< 10	<10	76	<10	<10	<6	<10	<10	<10	<10	<10	11	<10	12	28	<10	ND	9.3	21
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	95	299	164	136	184	375	104	-	84	88	72	62	86	41	102	38	66	<10	73	<25	110	111	98	134	<20	111	140	89	104	132	181
Total Metals																																							
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.04	<0.05	0.018	0.019	<0.05	0.08	0.05	0.024	0.019	0.27	0.012	0.042	0.026	0.011	0.022	<0.005	0.085	0.005	0.01	0.017	0.063	0.0122	0.006	0.0092	< 0.005	0.074	< 0.005	0.015	0.006	0.007	0.013	0.007
Antimony	0.009		-		-		mg/L	-	*<0.2*	<0.001	0.0003	*<0.05*	<0.001	0.035	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000027	<0.001	< 0.001	0.000344	< 0.0002	0.000176	< 0.001	<0.001	<0.001	<0.0006	0.0001	ND	ND	ND
Arsenic	0.005		-		0.01		mg/L	0.0002	*<0.2*	0.003	0.0006	0.0006	0.002	0.14	0.002	0.002	0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	< 0.001	0.0016	0.0012	0.0013	0.001	<0.001	<0.001	<0.001	0.0008	0.0007	0.0009	0.0005
Barium	1		-		-		mg/L	0.18	0.17	0.35	0.35	0.374	0.42	0.37	0.34	0.32	0.26	0.26	0.028	0.28	0.43	0.25	0.031	0.13	0.32	0.0195	0.37	0.017	0.453	0.37	0.295	0.39	0.012	0.37	0.403	0.395	0.336	0.324	ND
Beryllium	0.00013		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	0.003	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00005	ND	ND	ND
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.001	<0.001	<0.001	-	<0.00003	ND	0.381	0.381
Boron	1.2		-		5		mg/L	1.8	-	-	-	3.03	-	2.16	2.29	1.48	1.51	2.14	1.86	1.47	1.62	1.04	0.08	0.47	2	-	1.74	< 0.05	1.6	1.89	1.39	2.17	<0.05	0.15	2.2	1.89	1.89	1.85	2.03
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	<0.0002	<0.002	<0.0002	<0.0002	<0.005	0.0003	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	< 0.0002	<0.0002	0.0011	< 0.0002	<0.0002	<0.00001	<0.0002	< 0.0002	0.00005	< 0.00004	0.00003	< 0.0002	0.0002	<0.0002	0.0003	<0.00003	0.00003	0.000016	0.00009
Calcium	-		-		-		mg/L	127	129	175	166	202	183	187	183	160	142	163	137	150	162	91.8	25.4	47.6	148	-	172	7.41	202	171	139	171	9.8	150	142	180	172	157	166
Cesium	-		-		-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	0.002	<0.01	0.003	0.003	0.0034	0.002	0.008	0.002	0.002	0.004	0.002	0.002	0.001	0.003	<0.001	<0.001	<0.001	0.002	<0.0002	0.001	< 0.001	<0.002	0.0015	0.0064	0.002	<0.001	0.001	0.005	0.0006	0.001	0.003	0.001
Cobalt	0.004		0.11		-		mg/L	<0.02	<0.01	<0.01	<0.01	<0.005	<0.01	0.003	0.002	0.002	0.002	0.004	0.003	0.002	0.005	-	0.003	<0.001	0.003	0.000044	0.003	< 0.001	0.00293	0.0026	0.00183	0.002	<0.001	0.002	0.0019	0.00178	0.0015	0.0022	0.0018
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.002	<0.01	0.003	0.003	0.0039	<0.001	0.011	0.005	0.001	0.005	<0.001	<0.001	<0.001	0.002	0.007	<0.001	0.004	0.005	0.00075	<0.001	< 0.001	0.00621	0.0021	0.00225	< 0.001	0.001	0.001	0.0176	0.0005	0.0009	0.0506	0.0205
Iron	-		1		<0.3	AO	mg/L	0.06	<0.03	0.07	0.03	0.084	0.05	0.083	0.28	0.33	0.25	0.28	0.34	0.33	0.44	0.41	0.42	0.22	0.08	-	<0.05	< 0.05	0.053	0.08	1.33	< 0.05	0.14	0.09	0.48	0.072	0.54	0.069	0.057
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	<0.001	<0.01	<0.001	0.002	<0.05	<0.001	<0.02	0.002	<0.001	0.002	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00008	<0.001	< 0.001	<0.1	< 0.0002	0.00001	< 0.001	<0.001	<0.001	0.0002	<0.00003	0.0004	0.0021	0.0002
Lithium	-		-		-		mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	<0.001	<0.001	0.003	0.00032	0.003	<0.001	0.00082	0.0025	0.00168	0.003	<0.001	<0.005	0.0017	<0.003	ND	0.005	0.006
Magnesium	-		-		-		mg/L	29.8	33.8	43.6	45.7	44.8	46.9	42.1	37.3	36.4	30.5	29.4	36.2	28.3	35.4	21	7.27	9.05	38	-	41.6	0.59	36.2	35.1	25.2	31.9	0.8	282	25.1	34.1	28.4	29.1	26.1
Manganese	0.61 - 4.13	H	0.54 - 9.37	H	<0.05	AO	mg/L	2.58	2.44	2.1	1.49	2.09	2.29	3.04	3.03	2.88	2.36	2.93	2.97	2.38	4.82	1.51	3.89	0.53	2.73	0.0028	2.75	0.004	2.82	2.49	1.56	2.36	0.007	2.23	2.17	2.18	2.59	2.72	2.88
Mercury	0.0001		-		0.001		mg/L	<0.00005	<0.00005	0.00001	<0.00001	-	<0.00001	0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.00002	<0.00005	< 0.02	-	< 0.02	<0.00002	<0.00002	<0.00006	-	0.00003	0.00003	0.00004
Molybdenum	2		-		0.25		mg/L	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.0005	<0.0005	0.013	0.00064	<0.0005	< 0.0005	0.00075	< 0.0001	0.00016	< 0.0005	<0.0005	<0.0005	0.0002	<0.0003	ND	ND	ND
Nickel	0.025-0.15		-		-		mg/L	<0.02	<0.02	<0.02	0.02	<0.02	<0.05	<0.008	0.008	0.006	0.006	0.008	0.008	0.006	0.007	0.005	0.01	0.002	0.008	<0.00005	0.006	< 0.001	0.00931	0.0084	0.00523	0.006	<0.001	0.005	0.008	0.0055	0.006	0.005	0.012
Phosphorus	0.005-0.015	H	-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	0.08	<0.01	0.1	0.11	0.07	0.08	0.1	0.06	0.14	-	0.15	0.36	0.1	0.08	0.1	*< 0.15*	*<0.15*	*<0.15*	-	0.032	-	-	-
Potassium	-		-		-		mg/L	-	-	-	-	104	-	88.9	91	75.6	61.3	88.8	76.8	68.7	68.4	39.3	2.09	19.3	66.3	-	72.9	0.52	68	70.7	57	69.4	1.2	64.4	-	69.8	65	71.5	62.5
Rubidium	-		-		-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005	<0.01	<0.0005	0.0005	<0.05	0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.001	<0.001	<0.001	<0.0002	<0.001	< 0.001	<0.002	0.0012	0.0006	< 0.001	<0.001	<0.001	<0.001	<0.0002	ND	ND	ND
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	12	24.9	19.2	14.9	21.8	10.9	9.93	7.76	16.8	-	20.5	4.18	-	19.7	-	8.2	2.1	6.8	-	7.6	11.7	11.7	10.6
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.0001	<0.001	<0.0001	<0.0001	*<0.01*	<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	<0.00002	<0.0001	< 0.0001	<0.0002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.00003	ND	ND	ND
Sodium	-		-		<200	AO	mg/L	133	-	-	-	177	-	141	125	122	102	105	123	114	108	65.2	8.52	26.5	121	-	124	0.8	121	126	97.4	137	2.43	113	98.9	118	99.3	108	102
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	0.9	1.13	0.95	1	1.06	0.63	0.18	0.28	1.03	0.0416	1.13	0.03	1.23	1.13	0.793	1.17	0.028	1.04	-	1.13	1.12	1.12	1.05
Sulfur	-		-		-		mg/L	-	-	-	-	21.6	-	8.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.9	-	5.3	-	-	-	-	<3	5	5	6
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	<0.001	<0.0001	-	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000002	<0.0001	< 0.0001	0.000022	< 0.00002	0.000006	< 0.0001	<0.0001	<0.0001	<0.0001	<0.00001	ND	ND	ND
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00001	<0.001	< 0.001	0.00022	0.0002	-	< 0.001	<0.001	<0.001	-	0.00018	ND	ND	ND
Titanium	-		-		-		mg/L	-	-	<0.01	<0.01	<0.002	<0.01	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	0.002	0.001	-	0.002	0.003	<0.003	0.0007	0.003	< 0.001	0.001	0.001	<0.02	<0.003	ND	ND	ND
Tungsten	-		-		-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	0.0003	0.0002	-	0.0001	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000016	<0.0005	< 0.0005	0.000205	< 0.0001	0.000063	< 0.0005	<0.0005	<0.0005	<0.0001	0.00004	ND	ND	ND
Vanadium	-		-		-		mg/L	<0.03	-	<0.03	<0.03	<0.01	<0.03	<0.003	0.001	0.001	0.004	<0.001	0.002	<0.001	0.005	<0.001	<0.001	<0.001	<0.001	0.0003	<0.001	< 0.001	<0.0006	0.0006	0.00086	0.001	<0.001	<0.001	<0.002	<0.001	ND	ND	ND
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	0.008	0.11	0.007	<0.005	0.003	<0.005	0.013	0.016	<0.005	0.014	<0.005	<0.005	0.011	< 0.005	<0.005	0.007	<0.005	<0.005	0.0046	<0.005	< 0.005	0.0008	0.002	0.0002	< 0.005	<0.005	<0.005	0.014	0.0007	0.026	0.024	0.077
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.02	<0.03	<0.04	< 0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	0.005	< 0.002	0.005	< 0.01	<0.01	<0.01	-	-	ND	ND	ND
Dissolved Metals																																							
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1.88 - 2.98	H	3.72 - 6.49	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-		-		-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653		<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-4: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location			BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3	SW-3
Site Name								-	-	-	-	-	-	-	-	-	-	-	-	-	-	L2070515-2	L2124909-2	L2163156-2	
Sample ID	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)																					19-Mar-18	4-Jul-18	10-Sep-18	
Laboratory ID																									
Sample Date								15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	16-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	24-Aug-17			
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Field Observations																									
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.35	6.5	
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.4	14.2	
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1458	1877	
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	3.2	
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	385.6	-102.4	
Conventional Parameters																									
Conductivity	-		-		-		uS/cm	1850	1820	1650	1520	97.7	1640	1740	1840	1760	1620	1820	1980	2110	1360	2560	1420	890	1500	2020	
Hardness (Total as CaCO3)	-		-		-		mg/L	575	519	462	432	41.1	641	631	535	518	516	640	-	801	429	709	386	289	447	540	
pH	6.5-9.0		-		6.5 - 8.5		-	6.9	6.8	6.7	7.5	7.4	7.6	7.4	7.4	7.3	7.6	7.5	7.5	7.7	8	7	7.6	8.22	8.16	7.44	
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l) I (i)		-		mg/L	-	-	-	20	-	91	460	33	8	35	49	42	10	18	75	31	21.4	21	122	
Total Dissolved Solids	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	717	962	
Ammonia, Total (as N)	0.53 - 1.86	pH/T*	3.61 - 23.9	pH/T*	-		mg/L	54.1	48.3	43.7	34.9	0.1	34.8	36.1	<0.03	36.7	26.5	23.1	37.8	44.6	28.7	60.8	35.1	22	41.7	67.1	
Chloride (Cl)	150		600		<250	AO	mg/L	74	92.2	76.8	100	2.3	109.1	107	119	122	104	125	115	182	123	206	97.9	34.6	85.6	117	
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	<0.1	0.025	<0.1	<0.1	<0.1	0.11	0.11	0.11	0.13	0.13	0.13	0.11	<0.10	<0.10	0.1	<0.20	
Nitrate (as N)	3		32.8		10		mg/L	<0.1	<0.1	0.2	4.39	0.42	4.48	0.141	2.57	5.09	4.6	4.7	4.4	2.61	1.18	0.62	0.38	2.49	0.546	0.211	
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	<0.01	<0.01	<0.01	0.014	<0.01	0.013	0.061	0.045	0.029	0.09	-	0.029	0.017	0.97	<0.01	0.05	0.0179	0.197	0.025	
Nitrate + Nitrite (as N)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.5	41.7	71.7	
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0318	0.326	
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	28.9	19.5	5	7.52	1.44	10.5	15.8	19.6	80.6	96.7	55.3	-	66.5	7.1	7.4	10.7	10.5	4.5	<3.0	
Biological Oxygen Demand (BOD)	-		-		-		mg/L	6.8	10	10	5.6	<4	<4	<4	>220	<4	12	ND	19	16	13	8.9	10	11	2.7	5.8	8.3	
Chemical Oxygen Demand (COD)	-		-		-		mg/L	130	90	90	77	<20	75	230	115	114	120	108	121	152	137	234	93	48	122	155	
Total Metals																									
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.017	0.011	0.0117	0.646	0.0873	5.56	0.989	0.279	0.923	0.72	0.626	-	0.264	0.654	0.05	0.511	0.203	0.197	0.122	
Antimony	0.009		-		-		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.000051	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0004	-	0.0004	0.0004	0.0006	0.0002	0.0001	0.00021	0.00014	
Arsenic	0.005		-		0.01		mg/L	<0.0001	0.0009	0.00072	0.00106	0.000094	0.00504	0.00175	0.00129	0.00234	0.0018	0.0023	-	0.002	0.0021	0.0071	0.0025	0.00144	0.00205	0.0142	
Barium	1		-		-		mg/L	0.416	0.392	0.37	0.263	0.0202	0.494	1.51	0.334	0.363	0.334	0.409	-	0.452	0.301	1.06	0.369	0.262	0.402	0.902	
Beryllium	0.00013		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00016	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	
Bismuth	-		-		-		mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.001	-	<0.001	<0.001	<0.001	<0.00010	<0.0000050	<0.0000050	<0.0000050	
Boron	1.2		-		5		mg/L	2.1	1.5	1.32	1.27	<0.05	1.88	1.83	1.59	1.93	2.68	3.88	-	3.84	2.21	3.09	1.88	0.945	2.07	2.06	
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	0.0001	0.00003	<0.00001	0.00002	0.0001	0.000113	0.000079	0.000048	0.00014	0.00009	0.00005	-	0.00004	0.00007	0.00014	0.00005	0.0000322	0.000018	0.000009	
Calcium	-		-		-		mg/L	184	168	149	137	14.6	198	203	173	168	169	204	-	260	115	231	112	80.7	121	162	
Cesium	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000102	0.000243	0.000329	
Chromium	0.001 Cr VI 0.0089 Cr III	V	-		-		mg/L	0.002	0.001	<0.001	0.0011	ND	0.0117	0.0019	0.0011	0.0024	0.002	0.0021	-	0.0023	0.0015	0.0022	0.00152	0.00071	0.00097	0.00136	
Cobalt	0.004		0.11		-		mg/L	0.018	0.0016	0.00095	0.0021	0.000091	0.00765	0.00341	0.0026	0.00287	0.00286	0.00319	-	0.00307	0.00552	0.0101	0.00353	0.00177	0.00363	0.00373	
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.0026	0.0011	0.00062	0.00386	0.00107	0.023	0.00709	0.00309	0.00775	0.0069	0.0051	-	0.003	0.0098	0.0041	0.00366	0.0025	0.00216	0.00051	
Iron	-		1		<0.3	AO	mg/L	13.3	14.4	19.2	5.41	0.159	22.3	5.27	6.53	11.5	7.22	8.04	-	4.82	1.95	26.2	3.96	5.21	1.8	53	
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	0.0004	<0.0002	<0.0002	0.00024	0.000098	0.00309	0.00034	0.00034	0.00051	0.0003	0.0002	-	<0.0001	0.0002	0.0001	0.00021	0.000058	0.000075	0.000061	
Lithium	-		-		-		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	0.0085	<0.005	<0.005	<0.005	0.0029	0.0023	-	0.0033	0.0018	0.0018	0.00166	0.0011	0.0014	0.0029	
Magnesium	-		-		-		mg/L	28.4	24.4	21.8	22.1	1.14	35.6	30	24.9	24	22.6	31.3	-	36.6	34.2	31.9	25.8	14.1	29.6	33.3	
Manganese	0.61 - 4.13	H	0.54 - 9.37	H	<0.05	AO	mg/L	3.24	2.98	2.7	2.95	0.0161	4.99	4.95	4.72	3.21	3.36	2.91	-	4.26	2.04	14.1	3.54	2.35	1.98	3.07	
Mercury	0.0001		-		0.001		mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000023	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050	
Molybdenum	2		-		0.25		mg/L	<0.001	<0.001	<0.001	<0.001	0.000401	<0.001	<0.001	<0.001	0.0012	0.0009	0.0007	-	0.0007	0.0023	0.0018	0.00093	0.000319	0.000726	0.000528	
Nickel	0.025-0.15		-		-		mg/L	0.009	0.006	0.0036	0.0046	0.00024	0.0178	0.0073	0.0059	0.009	0.0076	0.0075	-	0.0079	0.0079	0.0113	0.00531	0.0026	0.00616	0.00553	
Phosphorus	0.005-0.015	H			0.01	AO	mg/L	0.176	0.215	0.229	0.067	<0.01	0.38	0.413	0.078	0.172	0.158	0.27	-	0.1	<0.02	0.12	0.113	0.056	0.068	0.356	
Potassium	-		-		-		mg/L	69.9	57.3	45.7	44.9	1.53	71.4	63.9	55	53	53.7	64	-	88.4	46	64.9	46.3	23.7	54.6	66.9	
Rubidium	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0164	0.0382	0.053	
Selenium	0.002		-		0.01	MAC	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00027	0.00019	0.00016	0.00014	ND	<0.0005	-	<0.0005	0.0008	<0.0005	0.00057	0.000122	0.000245	0.000147	
Silicon	-		-		-		mg/L	12.2	10.6	10.3	8.52	2.76	23	11.6	10.4	9.8	10.8	13.6	-	14.3	9.3	12	9.8	6.1	8.25	12.2	
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	0.00003	<0.000005	<0.000005	<0.000005	<0.000005	0.000026	<0.000005	<0.000005	<0.000005	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010	
Sodium	-		-		<200	AO	mg/L	104	88.8	73.5	77.6	2.39	122	114	102	113	115	161	-	187	122	147	98.6	46	108	121	
Strontium	-		-		-		mg/L	1.08	1.04	0.931	0.857	0.0593	1.23	1.14	0.988	0.949	0.941	1.2	-	1.39	0.809	1.5	0.797	0.469	0.963	1.15	
Sulfur	-		-		-		mg/L	13	<3	6.2	3.4	<3	4.2	9.8	7.9	29.3	37	30	-	33	4	3	4.5	4.19	2.96	1.16	
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00020	<0.00020	0.0002	
Thallium	0.0008		-		-		mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.000057	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	0.00002	<0.00002	<0.000010	<0.000010	<0.000010	<0.000010	
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	<0.00010	
Tin	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	0.00032	0.00032	<0.005	<0.005	<0.005	ND	0.0004	-	0.0003	0.0002	0.0003	<0.00020	<0.00010	0.00017	0.00022	
Titanium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0331	0.0132	0.0378	0.026	0.021	-	0.011	0.02	<0.005	0.012	0.00534	0.00511	0.00604	
Tungsten	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00027	<0.00010	0.00013	
Uranium	0.0085		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.000046	0.000046	0.0002	0.00013	0.0002	0.00023	0.0003	-	0.0002	0.00086	0.00061	0.000244	0.000078	0.000226	0.000048	
Vanadium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	0.00062	0.00062	<0.005	<0.005	<0.005	0.002	0.002	-	0.002	0.002	0.003	0.0016	0.0008	0.0008	0.00257	
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	<0.005	<0.005	<0.005	0.0053	0.0025	0.0025	0.223	0.105	0.0776	0.041	0.049	-	0.026	0.007	0.012	0.0065	<0.0030	<0.0030	0.0057	
Zirconium	-		-		-		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00086	0.0005	0.0009	-	0.0008	0.0007	0.0013	0.00096	0.000226	0.000433	0.000532	
Dissolved Metals																									
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0023	0.0094	0.0086	
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	0.00018	0.00012	
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0006	0.00175	0.0123	
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.261	0.378	0.861	
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.961	2.05	2.11	
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000021	0.000013	0.000009	
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.3	129	162	
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000103	0.000224	0.000325	
Chromium	0.001 Cr VI 0.0089 Cr III	V	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00033	0.00074	0.00109	
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00173	0.00336	0.00358	
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00189	0.00173	<0.00020	
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.062	0.404	
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050	
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	0.0012	0.003	
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.8	30.4	33.2	
Manganese	1.88 - 2.98	H	3.72 - 6.49	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.64	1.92	3.14	
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000321	0.000706	0.00054	
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00248	0.00609	0.00574	
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	0.056	
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.6	60.7	72.1	
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0177	0.0391	0.0529	
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00016	0.000239	0.000217	
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.51	7.66	13.7	
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.5	115	127	
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.512	0.964	1.17	
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.08	2.73	1.5	
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020	
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010	
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010	
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	0.00027	0.00021	
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	0.00125	
Tungsten	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	0.00014	
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000078	0.000232	0.000042	
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	0.00137	
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0012	0.0013	<0.0010	
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000060	0.000219	0.000498	

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-5: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill																
Site Name					SW-1																
Sample ID					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-1	SW-1	SW-1	SW-1	SW-1
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98		27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																					
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																					
Conductivity	-	-	-	uS/cm	60	42	64	31	28	67	-	41	-	55	-	-	59	53	1100	35	31
Hardness (Total as CaCO3)	-	-	-	mg/L	25.9	15.9	29.2	14.6	15.1	34.2	29.1	22	27	29	26	27	25	22	25	14	14
pH	-	-	-	pH	7.5	6.8	7.0	7.1	7.5	7.0	-	-	-	7.2	7.5	7.5	6.4	6.7	7.5	5.1	6.8
Total Suspended Solids	-	-	-	mg/L	7	2	13	3	-	<1	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	0.02	0.009	0.04	<0.005	<0.005	0.005	<0.005	0.02	-	0.04	0.05	0.2	0.03	0.03	0.087	<0.005	0.03
Chloride (Cl)	1500	-	-	mg/L	<0.5	<0.5	0.9	0.8	0.17	1	<1	0.3	0.3	0.4	0.3	0.6	0.3	0.4	0.3	0.3	0.3
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	<0.05	<0.05
Nitrate (as N)	400	100	10	mg/L	0.029	0.011	0.379	0.018	0.017	0.025	0.08	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	0.06	0.23	<0.05	0.14
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	0.001	<0.001	0.005	0.001	<0.005	0.001	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	< 0.002	0.23	<0.002	<0.002
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	1.4	<1	2	1	0.79	3	<1	1	1.2	1.4	1.3	1.5	1.3	1.3	1.3	1.9	0.7
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<5	<5	<5	-	<10	<10	<10	<10	<10	<10	< 10	<10	<10	<10	<10	<6	<10
Chemical Oxygen Demand (COD)	-	-	-	mg/L	<20	24	<20	<10	<25	-	<25	<25	<25	-	< 25	<25	<25	<25	<25	<10	<25
Total Metals																					
Aluminum	-	5	9.5	mg/L	0.026	<0.05	0.024	0.059	0.07	0.016	<0.02	0.028	0.029	2.3	0.017	0.023	0.026	0.019	0.04	0.041	0.068
Antimony	0.09	-	0.006	mg/L	-	*<0.2*	<0.0001	<0.0001	*<0.05*	<0.0001	*<0.015*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Arsenic	0.05	0.025	0.01	mg/L	<0.0001	*<0.2*	<0.0001	<0.0001	0.0005	<0.0001	*<0.04*	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Barium	10	-	1	mg/L	0.02	0.01	0.02	0.01	0.009	0.03	0.018	0.013	0.017	0.15	0.015	0.017	0.017	0.013	0.015	0.01	0.01
Beryllium	0.0015	0.1	0.008	mg/L	<0.005	<0.005	<0.005	<0.005	<0..001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	<0.1	-	-	-	<0.01	-	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	0.08	<0.05
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	<0.0002	<0.002	0.0007	<0.0002	*<0.005*	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	< 0.0002	<0.0002	0.0014	<0.0002
Calcium	-	1000	-	mg/L	9.32	5.73	10.4	5.25	5.3	12.3	10.4	7.78	9.45	10.4	9.41	9.38	8.75	7.7	8.72	4.85	4.76
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	<0.001	*<0.01*	<0.001	<0.001	<0.0005	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Cobalt	0.04	1	0.001	mg/L	<0.02	<0.01	<0.01	<0.01	<0.005	0.01	0.004	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Copper	0.02 - 0.09	0.3	1.5	mg/L	<0.001	<0.01	<0.001	0.001	0.0012	0.001	0.002	0.001	0.001	0.019	0.001	0.001	<0.001	0.001	0.001	0.001	-
Iron	-	-	6.5	mg/L	<0.03	<0.03	<0.03	<0.03	0.018	<0.03	0.021	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	< 0.05	0.06	0.07	< 0.05
Lead	0.04 - 0.16	0.1	0.01	mg/L	<0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.02	<0.001	<0.001	0.015	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Lithium	-	5	0.008	mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Magnesium	-	-	-	mg/L	0.64	0.39	0.79	0.4	0.4	0.9	0.77	0.59	0.75	0.081	0.59	0.75	0.73	0.64	0.83	0.4	0.45
Manganese	-	-	1.5	mg/L	<0.005	<0.005	0.006	<0.005	0.002	<0.005	0.007	0.001	0.004	0.005	0.014	0.001	<0.001	0.004	0.003	0.003	0.018
Mercury	0.00025	0.002	0.001	mg/L	<0.00005	<0.00005	<0.00001	<0.00001	-	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	10	0.05	0.25	mg/L	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001
Nickel	0.25 - 1.5	1	0.08	mg/L	<0.02	<0.02	< 0.02	<0.02	<0.02	<0.05	<0.008	<0.001	<0.001	<0.001	<0.001	0.06	0.002	< 0.001	<0.001	<0.001	<0.001
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	0.06	0.04	0.02	0.05	0.1	0.03
Potassium	-	-	-	mg/L	-	-	-	-	0.5	-	0.8	0.54	0.67	0.071	0.56	0.68	1.46	0.59	0.76	0.51	0.54
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	<0.0005	*<0.01*	<0.0005	<0.0005	*<0.05*	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	3.97	5.51	5.41	13.2	5.36	5.11	2.39	0.35
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.0001	<0.001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	<0.0001	<0.0001
Sodium	-	-	200	mg/L	<2.0	-	-	-	0.8	-	1.23	0.91	0.96	1.17	1.02	0.57	1.03	0.86	1.1	0.73	0.62
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	0.042	0.042	0.036	0.17	0.031	0.033	0.2	0.02
Sulfur	-	-	-	mg/L	-	-	-	0.33	-	0.55	-	-	-	-	-	-	-	-	-	-	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	<0.0001	-	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000002	<0.0001
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00001	<0.001
Titanium	1	-	-	mg/L	<0.01	<0.002	<0.01	<0.003	<0.001	<0.001	0.001	0.001	0.001	0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	0.00002	-	0.00001	-	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000016	<0.0005
Vanadium	-	0.1	0.02	mg/L	<0.03	<0.01	<0.03	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.0003	<0.001
Zinc	0.075 - 38.1	2	3	mg/L	<0.005	0.002	<0.005	0.006	<0.005	<0.012	0.012	0.006	<0.005	<0.005	< 0.005	0.008	<0.005	<0.005	<0.005	0.0046	<0.005
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	0.008	< 0.01	<0.01	-	<0.01
Dissolved Metals																					
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Location	Units	Thornhill Landfill																				
Site Name		SW-1																				
Sample ID		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-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
Laboratory ID		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date		1-Mar-03		3-Aug-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08	26-Aug-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	16-Apr-13
QAQC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																						
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																						
Conductivity	uS/cm	58	65	83	31	58	42	55	41	46	26	20	73	75	54	40	60	44	59	43	60	63
Hardness (Total as CaCO3)	mg/L	24	-	30	16	28.9	17.5	28	<0.05	19	10	13.4	34.8	37.5	21.1	17.1	27.3	22.4	26.1	21.1	27.2	28.0
pH	pH	7.0	7.1	7.5	6.9	6.3	7.3	6.6	6.3	7.6	7.1	7.1	7.8	7.0	7.0	6.6	7.4	7.1	7.3	7.1	7.0	7.1
Total Suspended Solids	mg/L	-	<4	-	-	<4	-	<4	0.03	<0.01	<0.01	<0.01	<4	-	-	-	-	-	-	-	3.9	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	mg/L	<0.01	<0.005	0.03	0.02	0.005	0.03	0.005	-	-	-	<0.01	<0.005	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Chloride (Cl)	mg/L	0.3	<0.5	0.3	<0.2	0.6	<0.2	0.5	0.24	0.71	0.23	<1	0.8	<1	<1	<1	<0.5	<0.5	<0.5	<1	<1	<1
Fluoride (F)	mg/L	<0.05	-	<0.05	<0.3	-	<0.05	-	<0.05	<0.05	<0.05	<0.05	-	<0.1	<0.1	<0.1	0.03	<0.1	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L	0.08	0.06	<0.05	<0.05	0.035	0.08	0.027	<0.05	0.13	<0.05	0.061	-	ND	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1
Nitrite (as N)	mg/L	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<2	<0.1	0.002	ND	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	mg/L	1.5	1.3	1.4	<0.4	1.6	0.78	1.2	0.8	1.23	0.51	<1.0	-	-	1.7	ND	0.6	1.3	<1.0	0.9	0.75	1.01
Biological Oxygen Demand (BOD)	mg/L	<10	<10	<10	-	-	-	-	<10	<10	<10	<6	<10	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chemical Oxygen Demand (COD)	mg/L	<25	11	<20	27	-	-	-	<20	<20	22	<30	11	<30	<30	<30	<30	31	<30	<30	<20	<20
Total Metals																						
Aluminum	mg/L	0.022	0.024	0.018	0.051	0.0322	0.035	0.0349	0.01	0.024	0.049	0.067	0.0271	0.016	0.025	0.029	0.06	0.129	0.041	0.131	0.0373	0.0342
Antimony	mg/L	<0.001	0.000027	<0.001	< 0.001	0.000011	< 0.0002	0.000005	< 0.001	<0.001	<0.001	<0.0006	<0.00002	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic	mg/L	<0.001	0.0001	<0.001	< 0.001	0.0001	< 0.0002	0.0001	< 0.001	<0.001	<0.001	<0.001	0.00003	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Barium	mg/L	0.015	0.0195	0.024	0.01	0.017	0.011	0.0152	0.011	0.015	0.007	0.01	0.0233	0.079	0.059	0.07	0.02	0.017	0.02	0.0109	0.018	0.0177
Beryllium	mg/L	<0.001	<0.00002	<0.001	< 0.001	0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00001	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	mg/L	-	-	<0.001	< 0.001	0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	-	<0.000005	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	<0.005	-	<0.05	< 0.05	0.008	< 0.01	<0.008	< 0.05	<0.05	<0.05	0.004	<0.05	ND	ND	ND	ND	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	mg/L	<0.0002	<0.00001	<0.0002	< 0.0002	0.00001	< 0.00004	<0.00001	< 0.0002	<0.0002	<0.0002	0.0003	<0.00005	0.00026	0.00003	0.00003	0.00005	<0.00005	0.00017	<0.00001	<0.00001	0.000013
Calcium	mg/L	8.46	-	10.5	5.53	10.3	6.08	10.2	5.59	6.54	3.62	11.8	11.3	14.3	9.86	6.32	8.93	7.85	9.29	7.48	9.61	9.95
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	<0.001	<0.0002	<0.001	< 0.001	0.0002	< 0.0002	<0.0002	< 0.001	<0.001	<0.001	0.001	<0.0001	ND	ND	ND	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	<0.001	0.000044	<0.001	< 0.001	0.000026	< 0.0002	0.000018	< 0.001	<0.001	<0.001	<0.0001	0.000025	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<.0005
Copper	mg/L	0.008	0.00075	<0.001	< 0.001	0.00077	0.0006	0.00073	< 0.001	0.002	<0.001	0.01	0.00052	0.0065	0.001	0.0148	0.0141	0.0029	0.0021	0.00133	0.00127	0.00063
Iron	mg/L	< 0.05	-	<0.05	< 0.05	0.015	< 0.01	0.014	< 0.05	<0.05	<0.05	0.06	0.034	0.104	0.01	0.015	0.07	0.135	0.038	0.115	0.0564	0.0394
Lead	mg/L	<0.001	0.00008	<0.001	< 0.001	0.00001	< 0.0002	<0.00001	< 0.001	<0.001	<0.001	<0.0002	<0.000005	0.0003	ND	ND	0.0049	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Lithium	mg/L	<0.001	0.00032	<0.001	< 0.001	0.00005	< 0.0002	<0.00005	< 0.001	<0.001	<0.005	<0.0004	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	mg/L	0.81	-	0.86	0.45	0.77	0.56	0.66	0.39	0.54	0.25	0.38	0.88	0.98	0.74	0.51	0.65	0.67	0.697	0.587	0.778	0.77
Manganese	mg/L	0.003	0.0028	0.009	0.005	0.0019	0.0042	0.00152	0.001	0.014	< 0.001	0.0074	0.00614	0.023	0.003	0.023	0.006	0.006	0.003	0.0044	0.0067	0.00391
Mercury	mg/L	<0.00002	-	<0.00002	< 0.02	0.00005	< 0.02	<0.00005	< 0.02	<0.00002	<0.0002	<0.00006	-	ND	ND	ND	0.00003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	mg/L	0.0014	0.00064	<0.0005	< 0.0005	0.00034	< 0.0001	0.00029	< 0.0005	<0.0005	<0.0005	0.0003	0.00024	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	0.000462
Nickel	mg/L	<0.001	<0.00005	<0.001	< 0.001	0.00023	0.0003	<0.00005	< 0.001	0.001	< 0.001	<0.001	0.00008	0.002	ND	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phosphorus	mg/L	0.06	-	0.09	< 0.15	0.1	< 0.03	<0.1	< 0.15	<0.15	<0.15	-	0.003	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01
Potassium	mg/L	0.8	-	0.98	0.5	2	0.6	<1	0.5	0.8	0.4	-	0.77	0.89	0.62	0.49	0.64	0.64	0.755	0.466	0.686	0.76
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.002	<0.0002	<0.001	< 0.001	0.0002	< 0.0002	<0.0002	< 0.001	<0.001	<0.001	<0.001	<0.00004	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Silicon	mg/L	4.57	-	5.16	4.1	-	4.77	-	1.6	1.8	1.1	-	2.23	3.02	2.7	1.89	2.32	2.72	2.42	2.08	2.31	2.33
Silver	mg/L	<0.0001	<0.00002	<0.0001	< 0.00025	0.00002	< 0.00005	<0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000006
Sodium	mg/L	1.29	-	1.07	0.67	1.54	1.05	1.07	0.65	1.4	0.53	0.93	1.14	1.67	1.11	1.08	0.93	0.91	1.06	1.02	1.04	1.04
Strontium	mg/L	0.032	0.0412	0.045	0.021	0.0364	0.025	0.0328	0.021	0.026	0.015	-	0.0459	0.056	0.043	0.029	0.037	0.033	0.036	0.0351	0.0413	0.0405
Sulfur	mg/L	-	-	-	0.5	-	0.4	-	-	-	-	-	<3	ND	ND	4	ND	<3	<3	3.2	<3	<3
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	< 0.0001	0.000002	< 0.00002	<0.000002	0.05	< 0.0002	-	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.000002	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	< 0.001	0.00003	< 0.0002	-	-	< 0.0001	-	< 0.001	< 0.001	< 0.001	-	<0.00001	ND	ND	ND	ND	<0.05	<0.05	<0.05	<0.005	<0.005
Titanium	mg/L	< 0.001	0.003	0.0003	<0.003	0.00003	< 0.0002	-	< 0.001	< 0.001	< 0.001	<0.02	<0.0005	ND	ND	ND	ND	0.008	<0.0005	0.0056	<0.005	<0.005
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	< 0.0005	0.000021	< 0.0001	0.000018	-	-	-	< 0.0005	< 0.0005	< 0.0005	-	0.000013	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.000012
Vanadium	mg/L	< 0.001	0.00029	0.0003	0.00036	-	-	-	< 0.001	< 0.001	< 0.001	<0.002	0.0003	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	mg/L	< 0.005	0.0001	< 0.001	<0.0001	-	-	-	< 0.005	< 0.005	0.011	0.018	0.0002	0.037	0.02	0.031	0.011	<0.005	<0.005	<0.005	<0.005	0.0013
Zirconium	mg/L	< 0.01	0.005	< 0.002	<0.005	-	-	-	< 0.01	< 0.01	< 0.01	-	-	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals																						
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Location	Units	Thornhill Landfill														
Site Name		SW-1														
Sample ID		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-1	SW-1	SW-1
Laboratory ID		-	-	-	-	-	-	-	-	-	-	-	-	L2070515-1	L2124909-1	L2163156-1
Sample Date		6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
QAQC		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	7.5
Temperature	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	8.7	11.5
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	37.4	72.6
Water level	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	442.4	-
Conventional Parameters																
Conductivity	uS/cm	29	84	43	60	56	69	65	70	80	83.8	56.5	65.8	66.4	52.8	87.6
Hardness (Total as CaCO3)	mg/L	18.9	42.6	18.7	27.7	26	34.8	-	39.4	40	35.7	24.6	30.5	30.2	25.8	39.3
pH	pH	7.0	7.2	7.2	6.9	7.5	7.3	7.4	7.0	7.3	7.3	7.2	7.4	7.77	7.63	7.57
Total Suspended Solids	mg/L	1	<1	<1	<1	ND	<1.0	2.8	1.5	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	3
Alkalinity, Total (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	27.4	55.7	36.9
Ammonia, Total (as N)	mg/L	<0.03	0.03	<0.03	<0.03	ND	<0.03	<0.03	<0.03	<0.03	0.057	<0.03	<0.03	0.0056	<0.0050	0.0137
Chloride (Cl)	mg/L	<1	<1	<1	<1	ND	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	<0.5	<0.5	<0.5	<0.5	ND	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.020	<0.020	<0.020
Nitrate (as N)	mg/L	<0.1	0.11	<0.1	0.021	0.03	0.01	0.02	0.02	0.061	0.053	0.026	0.022	0.172	0.0238	0.999
Nitrite (as N)	mg/L	<0.01	<0.01	<0.01	<0.01	ND	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0010	<0.0010	0.0018
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.05	0.211
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0083
Sulfate (SO4)	mg/L	0.68	0.64	0.9	<0.5	1.1	<1.0	-	1.5	1.1	1.4	1.2	<1.0	1.3	0.77	3.33
Biological Oxygen Demand (BOD)	mg/L	<4	<4	<4	<4	ND	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<2.0	<2.0	<2.0
Chemical Oxygen Demand (COD)	mg/L	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Metals																
Aluminum	mg/L	0.0869	0.0304	0.0511	0.0782	0.083	0.052	-	0.045	0.237	0.029	0.032	0.0528	0.0297	0.0364	0.094
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	0.0001	0.0002	<0.0001	<0.00020	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00010	<0.00010	0.00017
Barium	mg/L	0.0127	0.0254	0.0114	0.018	0.018	0.024	-	0.022	0.028	0.024	0.018	0.0214	0.0191	0.0207	0.0337
Beryllium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	mg/L	<0.05	<0.05	<0.05	<0.05	0.004	0.021	-	0.007	0.019	0.138	0.03	0.178	<0.010	<0.020	<0.010
Cadmium	mg/L	<0.00001	<0.00001	<0.00001	0.000015	ND	<0.00001	-	0.00001	0.00009	<0.00001	<0.00001	<0.000010	<0.0000050	<0.0000050	0.00000650
Calcium	mg/L	6.79	15.4	6.71	9.89	9.3	12.5	-	14	14.3	12.8	8.7	10.9	10.1	8.64	14.2
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	mg/L	<0.001	<0.001	<0.001	<0.002	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00047	<0.00010	0.00013
Cobalt	mg/L	<.0005	<.0005	<.0005	<.0006	ND	0.00006	-	<0.00005	0.00021	<0.00005	<0.00005	<0.00010	<0.00010	<0.00010	0.00015
Copper	mg/L	0.00075	0.00069	0.00074	0.00109	0.0011	0.0011	-	0.0013	0.0033	0.001	0.0011	0.00061	<0.00050	0.00051	0.00164
Iron	mg/L	0.0759	0.0854	0.024	0.046	0.07	0.07	-	0.05	0.34	0.04	0.02	0.057	0.025	0.024	0.196
Lead	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.000050	<0.000050	<0.000050
Lithium	mg/L	<0.005	<0.005	<0.005	<0.005	0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	0.475	1.05	0.465	0.725	0.65	0.88	-	1.05	1.04	0.88	0.69	0.79	0.735	0.692	1.04
Manganese	mg/L	0.0053	0.0164	0.0017	0.0079	0.0044	0.0169	-	0.0064	0.0295	0.0165	0.0013	0.00945	0.00154	0.00345	0.0536
Mercury	mg/L	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	<0.001	<0.001	<0.001	<0.001	0.0015	0.0003	-	0.0006	0.0002	0.0005	0.0001	0.0002	0.000156	0.000151	0.000227
Nickel	mg/L	<0.001	<0.001	<0.001	<0.001	0.0003	<0.0002	-	<0.0002	0.0003	<0.0002	<0.0002	<0.00040	<0.00050	<0.00050	<0.00050
Phosphorus	mg/L	<0.01	<0.01	<0.01	<0.01	ND	0.07	-	0.03	<0.02	0.02	<0.05	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	0.553	0.977	0.514	0.701	0.7	0.81	-	1.25	0.95	0.82	0.59	0.79	0.609	0.709	1.13
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00071	0.00085	0.00174
Selenium	mg/L	<0.0001	<0.0001	<0.0001	<0.0002	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	<0.000050	0.000095
Silicon	mg/L	1.72	2.71	1.84	2.51	2.5	3.1	-	3.1	3	2.4	2.5	2.6	2.43	2.4	3.03
Silver	mg/L	<0.000005	<0.000005	<0.000005	<0.000006	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	mg/L	0.733	1.39	0.814	1.13	0.96	1.25	-	2.33	1.43	1.32	0.89	1.11	0.988	1.04	1.34
Strontium	mg/L	0.026	0.0539	0.0283	0.0414	0.035	0.049	-	0.049	0.056	0.055	0.038	0.0446	0.0417	0.0391	0.0636
Sulfur	mg/L	<3	<3	<3	<4	ND	<1	-	1	<1	<1	<1	<3.0	0.54	<0.50	1.13
Tellurium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	mg/L	<0.005	<0.005	<0.005	<0.005	ND	0.0002	-	<0.0002	0.0003	<0.0002	<0.0002	<0.00020	<0.00010	<0.00010	<0.00010
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	ND	<0.005	-	<0.005	0.013	<0.005	<0.005	<0.0050	0.00092	0.00089	<0.0030
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00019	<0.00010	<0.00010
Uranium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	0.00003	<0.00002	-	<0.00002	0.00005	0.00002	<0.00002	<0.000020	<0.000010	0.000011	0.000023
Vanadium	mg/L	<0.005	<0.005	<0.005	<0.005	ND	<0.001	-	<0.001	0.001	<0.001	<0.001	<0.0010	<0.00050	<0.00050	0.00066
Zinc	mg/L	<0.005	<0.005	<0.005	0.0063	ND	<0.004	-	<0.004	0.007	<0.004	<0.004	0.0066	<0.0030	<0.0030	<0.0030
Zirconium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000060	<0.000060	<0.000060
Dissolved Metals																
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.0023	0.0239	0.043
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Arsenic	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.0006	<0.00010	<0.00010
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.261	0.0199	0.0372
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.961	<0.010	<0.010
Cadmium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.000021	<0.0000050	<0.0000050
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	88.3	9.19	14.1
Cesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.000103	<0.000010	<0.000010
Chromium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00033	<0.00010	<0.00010
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00173	<0.00010	0.00014
Copper	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00189	0.00039	0.00133
Iron	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.02	<0.010	0.121
Lead	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	16.8	0.682	0.979
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	2.64	0.00217	0.0628
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.000321	0.000152	0.000219
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00248	<0.00050	<0.00050
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	27.6	0.699	1.09
Rubidium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.0177	0.00098	0.00155
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.00016	<0.000050	0.000083
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	5.51	2.21	2.91
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	48.5	1.03	1.32
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.512	0.0383	0.0562
Sulfur	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	4.08	<0.50	0.94
Tellerium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	0.00088
Tungsten	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.000078	0.000011	0.000019
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050
Zinc	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.0012	<0.0010	<0.0010
Zirconium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.000060	<0.000060	<0.000060

NOTES

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

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)

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

Table D-6: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location									Thornhill Landfill																							
Site Name									SW-1																							
Sample ID	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG - Drinking Water	Notes	Units	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-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03	3-Aug-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08	26-Aug-09	22-Feb-10
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																																		
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																																		
Conductivity	-		-		-		uS/cm	60.3	42	64	31	28	67	-	40.8	-	55	-	-	59	53	1100	35	31	58	65	83	31	58	42	55	41	46	26	19.6	73	75.3	54.3
Hardness (Total as CaCO3)							mg/L	25.9	15.9	29.2	14.6	15.1	34.2	29.1	22	27	29	26	27	25	22	25	14	24	-	30	16	28.9	17.5	28	<0.05	19	10	13.4	34.8	37.5	21.1
pH	6.5-9.0		-		6.5 - 8.5		-	7.46	6.82	6.95	7.12	7.47	7.04	-	-	-	7.16	7.45	7.53	6.38	6.66	7.54	6.1	6.75	7	7.1	7.49	6.91	6.3	7.25	6.6	6.3	7.6	7.1	7.1	7.8	7	7
Total Suspended Solids			25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	7	2	13	3	-	<1	-	-	-	-	-	-	-	-	-	-	-	<4	-	<4	-	<4	0.03	<0.01	<0.01	<0.01	<4	-	-
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.59 - 1.86	pH/T*	8.25 - 24.7	pH/T*	-		mg/L	0.02	0.009	0.04	<0.005	<0.005	0.005	<0.005	0.02	-	0.04	0.05	0.2	0.03	0.03	0.087	<0.005	0.03	<0.01	<0.005	0.03	0.02	0.005	0.03	0.005	-	-	<0.01	<0.005	<0.03	<0.03
Chloride (Cl)	150		600		<250	AO	mg/L	<0.5	<0.5	0.9	0.8	0.17	1	<1	0.3	0.3	0.4	0.3	0.6	0.3	0.4	0.3	0.3	0.3	0.3	<0.5	0.3	<0.2	0.6	<0.2	0.5	0.24	0.71	0.23	<1	0.8	<1	<1
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.3	-	<0.05	-	<0.05	<0.05	<0.05	<0.05	-	<0.1	<0.1
Nitrate (as N)	3		32.8		10		mg/L	0.029	0.011	0.379	0.018	0.017	0.025	0.08	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	0.06	0.23	<0.05	0.14	0.08	0.06	<0.05	<0.05	0.035	0.08	0.027	<0.05	0.13	<0.05	0.061	-	ND	0.11
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	0.001	<0.001	0.005	0.001	<0.005	0.001	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	< 0.002	0.23	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<2	<0.1	0.002	ND	<0.01
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	1.4	<1	2	1	0.79	3	<1	1	1.2	1.4	1.3	1.5	1.3	1.3	1.3	1.9	0.7	1.5	1.3	1.4	<0.4	1.6	0.78	1.2	0.8	1.23	0.51	<1.0	-	-	1.7
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<5	<5	<5	-	<10	<10	<10	<10	<10	<10	< 10	<10	<10	<10	<10	<6	<10	<10	<10	-	-	-	-	<10	<10	<10	<6	<10	<4	<4
Chemical Oxygen Demand (COD)	-		-		-		mg/L	<20	24	<20	<10	<25	-	<25	<25	<25	-	< 25	<25	<25	<25	<25	<25	<10	<25	<25	11	<20	27	-	-	-	<20	<20	22	<30	11	<30	<30
Total Metals																																		
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.026	<0.05	0.024	0.059	0.07	0.016	<0.02	0.028	0.029	2.3	0.017	0.023	0.026	0.019	0.04	0.041	0.068	0.022	0.024	0.018	0.051	0.0322	0.035	0.0349	0.01	0.024	0.049	0.067	0.0271	0.016	0.025
Antimony	0.009		-		-		mg/L	-	<0.2	<0.0001	<0.0001	<0.05	<0.0001	<0.015	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.000027	<0.001	< 0.001	0.000011	< 0.0002	0.000005	< 0.001	<0.001	<0.001	<0.0006	<0.00002	ND	ND
Arsenic	0.005		-		0.01		mg/L	<0.0001	<0.2	<0.0001	<0.0001	0.0005	<0.0001	<0.04	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.0001	<0.001	< 0.001	0.0001	< 0.0002	0.0001	< 0.001	<0.001	<0.001	<0.001	0.00003	ND	ND
Barium	1		-		-		mg/L	0.02	0.01	0.02	0.01	0.009	0.03	0.018	0.013	0.017	0.15	0.015	0.017	0.017	0.013	0.015	0.01	0.01	0.015	0.0195	0.024	0.01	0.017	0.011	0.0152	0.011	0.015	0.007	0.01	0.0233	0.079	0.059
Beryllium	0.00013		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00001	ND	ND
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	< 0.001	0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	-	<0.000005	ND	ND
Boron	1.2 (i)		-		5		mg/L	<0.1	-	-	-	<0.01	-	<0.008	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.05	<0.05	0.08	<0.05	<0.005	-	<0.05	< 0.05	0.008	< 0.01	<0.008	< 0.05	<0.05	<0.05	<0.05	0.004	<0.05	ND	ND
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	<0.0002	<0.002	0.0007	<0.0002	<0.005	<0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	< 0.0002	<0.0002	0.0014	<0.0002	<0.0002	<0.00001	<0.0002	< 0.0002	0.00001	< 0.00004	<0.00001	< 0.0002	<0.0002	<0.0002	0.0003	<0.00005	0.00026	0.00003
Calcium	-		-		-		mg/L	9.32	5.73	10.4	5.25	5.3	12.3	10.4	7.78	9.45	10.4	9.41	9.38	8.75	7.7	8.72	4.85	4.76	8.46	10.5	5.53	10.3	6.08	10.2	5.59	6.54	3.62	11.8	11.3	14.3	9.86
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001 Cr VI 0.0089 Cr III	V	-		-		mg/L	<0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.0002	<0.001	< 0.001	0.0002	< 0.0002	<0.0002	< 0.001	<0.001	<0.001	0.001	<0.0001	ND	ND
Cobalt	0.004		0.11		-		mg/L	<0.02	<0.01	<0.01	<0.01	<0.005	0.01	0.004	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000044	<0.001	< 0.001	0.000026	< 0.0002	0.000018	< 0.001	<0.001	<0.001	<0.0001	0.000025	ND	ND
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	<0.001	<0.01	<0.001	0.001	0.0012	0.001	0.002	0.001	0.001	0.019	0.001	0.001	<0.001	0.001	0.001	0.001	-	0.008	0.00075	<0.001	< 0.001	0.00077	0.0006	0.00073	< 0.001	0.002	<0.001	0.01	0.00052	0.0065	0.001
Iron	-		1		<0.3	AO	mg/L	<0.03	<0.03	<0.03	<0.03	0.018	<0.03	0.021	<0.05	<0.05	0.015	< 0.05	<0.05	<0.05	< 0.05	0.06	0.07	< 0.05	< 0.05	-	<0.05	< 0.05	0.015	< 0.01	0.014	< 0.05	<0.05	<0.05	0.06	0.034	0.104	0.01
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	<0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.02	<0.001	<0.001	0.015	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00008	<0.001	< 0.001	0.00001	< 0.0002	<0.00001	< 0.001	<0.001	<0.001	<0.0002	<0.000005	0.0003	ND
Lithium	-		-		-		mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	0.00032	<0.001	< 0.001	0.00005	< 0.0002	<0.00005	< 0.001	<0.001	<0.001	<0.0004	0.0005	<0.005	<0.005
Magnesium	-		-		-		mg/L	0.64	0.39	0.79	0.4	0.4	0.4	0.9	0.77	0.59	0.75	0.081	0.59	0.75	0.73	0.64	0.83	0.4	0.45	0.81	-	0.86	0.45	0.77	0.56	0.66	0.39	0.54	0.25	0.38	0.88	0.98	0.74
Manganese	0.61 - 0.79	H	0.54 - 1.01	H	<0.05	AO	mg/L	<0.005	<0.005	0.006	<0.005	0.002	<0.005	0.007	0.001	0.004	0.005	0.014	0.001	<0.001	0.004	0.003	0.003	0.018	0.003	0.0028	0.009	0.005	0.0019	0.0042	0.00152	0.001	0.014	< 0.001	0.0074	0.00614	0.023	0.003
Mercury	0.0001 (i)		-		0.001		mg/L	<0.00005	<0.00005	<0.00001	<0.00001	-	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.02	<0.00005	< 0.02	<0.00005	< 0.02	<0.00002	<0.00002	<0.00002	<0.00006	-	ND	ND
Molybdenum	2 (i)		-		0.25		mg/L	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	0.0014	0.00064	<0.0005	< 0.0005	0.00034	< 0.0001	0.00029	< 0.0005	<0.0005	<0.0005	0.0003	0.00024	ND	ND
Nickel	0.025-0.15		-		-		mg/L	<0.02	<0.02	< 0.02	<0.02	<0.02	<0.05	<0.008	<0.001	<0.001	<0.001	0.06	0.002	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.001	< 0.001	0.00023	0.0003	<0.00005	< 0.001	<0.001	<0.001	<0.001	0.00008	0.002	ND
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	0.08	0.04	0.02	0.05	0.1	0.03	0.04	-	0.09	< 0.15	0.1	< 0.03	<0.1	< 0.15	<0.15	<0.15	-	0.003	-	-
Potassium	-		-		-		mg/L	-	-	-	-	0.5	-	0.8	0.54	0.67	0.071	0.56	0.68	1.46	0.59	0.76	0.51	0.54	0.8	-	0.98	0.5	2	0.6	<1	0.5	0.8	0.4	-	0.77	0.89	0.62
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005	<0.01	<0.0005	<0.0005	<0.05	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	< 0.001	0.0002	< 0.0002	<0.0002	< 0.001	<0.001	<0.001	<0.001	<0.00004	ND	ND
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	3.97	5.51	5.41	13.2	5.36	5.11	2.39	0.35	4.57	-	5.16	4.1	-	4.77	-	1.6	1.8	1.1	-	2.23	3.02	2.7
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.0001	<0.001	<0.0001	<0.0001	<0.01	<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	<0.00002	<0.0001	< 0.00025	0.00002	< 0.00005	<0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.000005	<0.000005	<0.000005
Sodium	-		-		<200	AO	mg/L	<2.0	-	-	-	0.8	-	1.23	0.91	0.96	1.17	1.02	0.57	1.03	0.86	1.1	0.73	0.62	1.29	-	1.07	0.67	1.54	1.05	1.07	0.65	1.4	0.53	0.93	1.14	1.67	1.11
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	0.042	0.042	0.036	0.17	0.031	0.033	0.2	0.02	0.032	0.0412	0.045	0.021	0.0364	0.025	0.0328	0.021	0.026	0.015	-	0.0459	0.056	0.043
Sulfur	-		-		-		mg/L	-	-	-	0.33	-	0.55	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	0.4	-	-	-	-	-	<3	ND	ND
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	<0.0001	-	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.000002	<0.0001	< 0.0001	0.000002	< 0.00002	<0.000002	0.05	< 0.0002	-	< 0.0001	< 0.0001	< 0.0001	<0.0001	<0.000002	ND	ND
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		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	0.00003	< 0.002	-	-	-	< 0.0001	-	< 0.001	< 0.001	< 0.001	-	<0.00001	ND	ND
Titanium	-		-		-		mg/L	<0.01	<0.002	<0.01	<0.003	<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	0.003	0.0003	<0.003	0.00003	< 0.0002	-	< 0.001	< 0.001	< 0.001	<0.02	<0.0005	ND	ND
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	0.00002	-	0.00001	-	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000016	<0.0005	< 0.0005	0.000021	< 0.0001	0.000018	-	-	-	< 0.0005	< 0.0005	< 0.0005	-	0.000013	ND	ND
Vanadium	-		-		-		mg/L	<0.03	<0.01	<0.03	<0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.0003	<0.001	< 0.001	0.00029	0.0003	0.00036	-	-	-	< 0.001	< 0.001	< 0.001	<0.002	0.0003	ND	ND
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	<0.005	0.002	<0.005	0.006	<0.005	<0.012	0.012	0.006	<0.005	<0.005	< 0.005	0.008	<0.005	<0.005	<0.005	0.0046	<0.005	< 0.005	0.0001	< 0.001	<0.0001	-	-	-	< 0.005	< 0.005	0.011	0.018	0.0002	0.037	0.02
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	0.008	< 0.01	<0.01	-	<0.01	< 0.01	0.005	< 0.002	<0.005	-	-	-	< 0.01	< 0.01	< 0.01	-	-	ND	ND
Dissolved Metals	-		-		-																													
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	1.2 (i)		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001 Cr VI 0.0089 Cr III		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	0.72 - 0.78	H	0.82 - 0.97	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653		<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water
Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG).
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-6: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG - Drinking Water	Notes	Units																						
Site Name								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-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1	SW-1
Sample ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory ID																											L2070515-1	L2124909-1	L2163156-1
Sample Date								15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	16-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																													
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.2	7.5
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.7	11.5
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37.4	72.6
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.8	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	442.4	-
Conventional Parameters																													
Conductivity	-		-		-		uS/cm	40	60.4	44.3	58.5	42.6	59.5	62.8	29.1	84.3	42.5	60	55.9	68.6	65.3	70	79.9	83.8	56.5	65.8	66.4	52.8	87.6
Hardness (Total as CaCO3)	-		-		-		mg/L	17.1	27.3	22.4	26.1	21.1	27.2	28	18.9	42.6	18.7	27.7	26	34.8	-	39.4	40	35.7	24.6	30.5	30.2	25.8	39.3
pH	6.5-9.0		-		6.5 - 8.5		-	6.6	7.4	7.1	7.3	7.1	7	7.1	7	7.2	7.2	6.9	7.5	7.3	7.4	7	7.3	7.3	7.2	7.4	7.77	7.63	7.57
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	-	-	-	-	-	3.9	-	1	<1	<1	<1	ND	<1.0	2.8	1.5	<1.0	<1.0	<1.0	<1.0	<3.0	<3.0	3
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.4	55.7	36.9
Ammonia, Total (as N)	1.59 - 1.86	pH/T*	8.25 - 24.7	pH/T*	-		mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	<0.03	<0.03	ND	<0.03	<0.03	<0.03	<0.03	0.057	<0.03	<0.03	0.0056	<0.0050	0.0137
Chloride (Cl)	150		600		<250	AO	mg/L	<1	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	ND	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<0.50	<0.50	<0.50
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	<0.1	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	ND	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.020	<0.020	<0.020
Nitrate (as N)	3		32.8		10		mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1	<0.1	0.11	<0.1	0.021	0.03	0.01	0.02	0.02	0.061	0.053	0.026	0.022	0.172	0.0238	0.999
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0010	<0.0010	0.0018
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.05	0.211
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0023	0.0083
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	ND	0.6	1.3	<1.0	0.9	0.75	1.01	0.68	0.64	0.9	<0.5	1.1	<1.0	-	1.5	1.1	1.4	1.2	<1.0	1.3	0.77	3.33
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ND	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<2.0	<2.0	<2.0
Chemical Oxygen Demand (COD)	-		-		-		mg/L	<30	<30	31	<30	<30	<20	<20	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Metals																													
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.029	0.06	**0.129**	0.041	**0.131**	0.0373	0.0342	0.0869	0.0304	0.0511	0.0782	0.083	0.052	-	0.045	**0.237**	0.029	0.032	0.0528	0.0297	0.0364	0.094
Antimony	0.009		-		-		mg/L	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	0.0001	0.0002	<0.0001	<0.00020	<0.00010	<0.00010	<0.00010
Arsenic	0.005		-		0.01		mg/L	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00010	<0.00010	0.00017
Barium	1		-		-		mg/L	0.07	0.02	0.017	0.02	0.0109	0.018	0.0177	0.0127	0.0254	0.0114	0.018	0.018	0.024	-	0.022	0.028	0.024	0.018	0.0214	0.0191	0.0207	0.0337
Beryllium	0.00013		-		-		mg/L	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	1.2 (j)		-		5		mg/L	ND	ND	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.004	0.021	-	0.007	0.019	0.138	0.03	0.178	<0.010	<0.020	<0.010
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	0.00003	0.00005	<0.00005	0.00017	<0.00001	<0.00001	0.000013	<0.00001	<0.00001	<0.00001	0.000015	ND	<0.00001	-	0.00001	0.00009	<0.00001	<0.00001	<0.000010	<0.0000050	<0.0000050	0.0000065
Calcium	-		-		-		mg/L	6.32	8.93	7.85	9.29	7.48	9.61	9.95	6.79	15.4	6.71	9.89	9.3	12.5	-	14	14.3	12.8	8.7	10.9	10.1	8.64	14.2
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	0.001 $^{\text{Cr VI}}$ 0.0089 $^{\text{Cr III}}$	V	-		-		mg/L	ND	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00047	<0.00010	0.00013
Cobalt	0.004		0.11		-		mg/L	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<.0005	<.0005	<.0005	<.0005	<.0006	ND	0.00006	-	<0.00005	0.00021	<0.00005	<0.00005	<0.00010	<0.00010	<0.00010	0.00015
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.0148	0.0141	0.0029	0.0021	0.00133	0.00127	0.00063	0.00075	0.00069	0.00074	0.00109	0.0011	0.0011	-	0.0013	0.0033	0.001	0.0011	0.00061	<0.00050	0.00051	0.00164
Iron	-		1		<0.3	AO	mg/L	0.015	0.07	0.135	0.038	0.115	0.0564	0.0394	0.0759	0.0854	0.024	0.046	0.07	0.07	-	0.05	0.34	0.04	0.02	0.057	0.025	0.024	0.196
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	ND	0.0049	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.000050	<0.000050	<0.000050
Lithium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0010	<0.0010	<0.0010
Magnesium	-		-		-		mg/L	0.51	0.65	0.67	0.697	0.587	0.778	0.77	0.475	1.05	0.465	0.725	0.65	0.88	-	1.05	1.04	0.88	0.69	0.79	0.735	0.692	1.04
Manganese	0.61 - 0.79	H	0.54 - 1.01	H	<0.05	AO	mg/L	0.023	0.006	0.006	0.003	0.0044	0.0067	0.00391	0.0053	0.0164	0.0017	0.0079	0.0044	0.0169	-	0.0064	0.0295	0.0165	0.0013	0.00945	0.00154	0.00345	0.0536
Mercury	0.0001 (j)		-		0.001		mg/L	ND	0.00003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	2 (j)		-		0.25		mg/L	ND	ND	<0.001	<0.001	<0.001	<0.001	0.000462	<0.001	<0.001	<0.001	<0.001	0.0015	0.0003	-	0.0006	0.0002	0.0005	0.0001	0.0002	0.000156	0.000151	0.000227
Nickel	0.025-0.15		-		-		mg/L	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0003	<0.0002	-	<0.0002	0.0003	<0.0002	<0.0002	<0.00040	<0.00050	<0.00050	<0.00050
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND	0.07	-	0.03	*<0.02*	0.02	*<0.05*	*<0.050*	<0.050	*<0.050*	*<0.050*
Potassium	-		-		-		mg/L	0.49	0.64	0.64	0.755	0.466	0.686	0.76	0.553	0.977	0.514	0.701	0.7	0.81	-	1.25	0.95	0.82	0.59	0.79	0.609	0.709	1.13
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00071	0.00085	0.00174
Selenium	0.002		-		0.01	MAC	mg/L	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	<0.000050	0.000095
Silicon	-		-		-		mg/L	1.89	2.32	2.72	2.42	2.08	2.31	2.33	1.72	2.71	1.84	2.51	2.5	3.1	-	3.1	3	2.4	2.5	2.6	2.43	2.4	3.03
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.000006	<0.000005	<0.000005	<0.000005	<0.000006	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	1.08	0.93	0.91	1.06	1.02	1.04	1.04	0.733	1.39	0.814	1.13	0.96	1.25	-	2.33	1.43	1.32	0.89	1.11	0.988	1.04	1.34
Strontium	-		-		-		mg/L	0.029	0.037	0.033	0.036	0.0351	0.0413	0.0405	0.026	0.0539	0.0283	0.0414	0.035	0.049	-	0.049	0.056	0.055	0.038	0.0446	0.0417	0.0391	0.0636
Sulfur	-		-		-		mg/L	4	ND	<3	<3	3.2	<3	<3	<3	<3	<3	<4	ND	<1	-	1	<1	<1	<1	<3.0	0.54	<0.50	1.13
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	ND	ND	<0.05	<0.05	<0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	0.0002	-	<0.0002	0.0003	<0.0002	<0.0002	<0.00020	<0.00010	<0.00010	<0.00010
Titanium	-		-		-		mg/L	ND	ND	0.008	<0.0005	0.0056	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.005	-	<0.005	0.013	<0.005	<0.005	<0.0050	0.00092	0.00089	<0.0030
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00019	<0.00010	<0.00010
Uranium	0.0085		-		-		mg/L	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.000012	<0.0001	<0.0001	<0.0001	<0.0001	0.00003	<0.00002	-	<0.00002	0.00005	0.00002	<0.00002	<0.000020	<0.000010	0.000011	0.000023
Vanadium	-		-		-		mg/L	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.001	-	<0.001	0.001	<0.001	<0.001	<0.0010	<0.00050	<0.00050	0.00066
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	0.031	0.011	<0.005	<0.005	<0.005	<0.005	0.0013	<0.005	<0.005	<0.005	0.0063	ND	<0.004	-	<0.004	0.007	<0.004	<0.004	0.0066	<0.0030	<0.0030	<0.0030
Zirconium	-		-		-		mg/L	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000060	<0.000060	<0.000060
Dissolved Metals	-		-		-																								
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0023	0.0239	0.043
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0006	<0.00010	<0.00010
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.261	0.0199	0.0372
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	1.2 (j)		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.961	<0.010	<0.010
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000021	<0.0000050	<0.0000050
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.3	9.19	14.1
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000103	<0.000010	<0.000010
Chromium	0.001 $^{\text{Cr VI}}$ 0.0089 $^{\text{Cr III}}$		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00033	<0.00010	<0.00010
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00173	<0.00010	0.00014
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00189	0.00039	0.00133
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.02	<0.010	0.121
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.8	0.682	0.979
Manganese	0.72 - 0.78	H	0.82 - 0.97	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.64**	0.00217	0.0628
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000321	0.000152	0.000219
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00248	<0.00050	<0.00050
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27.6	0.699	1.09
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0177	0.00098	0.00155
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00016	<0.000050	0.000083
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.51	2.21	2.91
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.5	1.03	1.32
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.512	0.0383	0.0562
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.08	<0.50	0.94
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030	0.00088
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000078	0.000011	0.000019
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0012	<0.0010	<0.0010
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000060	<0.000060	<0.000060

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-7: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Sample Date	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	1-Jun-97	4-Dec-97	4-May-98	4-May-98	24-Sep-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00	20-Dec-00	7-May-01	1-Dec-01	1-Apr-02
Location					Thornhill Landfill															
Site Name					SW-21															
Sample ID					SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC					-	-	FDA	FD	FDA	FD	-	-	-	-	-	FDA	FD	-	-	-
Field Observations																				
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																				
Conductivity	-	-	-	uS/cm	1,480	1,280	1,300	1,060	1,450	1,460	-	1,235	-	864	-	700	-	1,200	1570	725
Hardness (Total as CaCO3)	-	-	-	mg/L	399	281	287	395	439	471	441	366	351	277	384	402	440	415	487	219
pH	-	-	-	pH	7.74	7.82	8.08	8.02	8.07	8.1	-	-	-	7.55	7.96	7.61	7.58	7.82	7.67	7.69
Total Suspended Solids	-	-	-	mg/L	7	6	5	-	5	5	-	-	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	3.8	11.3	7.6	5.1	11.1	12.5	8.2	15.4	20.6	8.6	6.5	27.5	19.5	1.9	25.0	1.5
Chloride (Cl)	1500	-	-	mg/L	130	99	96.9	90	146	148	100	71.4	97.1	65.2	144	102	102	81.8	96.3	31.3
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.15	<0.05	<0.05	<0.05	0.24	< 0.05	<0.05
Nitrate (as N)	400	100	10	mg/L	17.6	8.3	10.6	10.8	8.8	9.5	14.4	6.5	2.3	-	9.0	6.1	6.3	13.8	4.1	5.2
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	0.188	0.056	0.14	0.023	0.18	0.154	0.098	0.09	0.059	-	0.3	0.034	0.028	0.193	0.03	1.38
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	18	56	58	64	19	14	90.6	28.1	21.6	28	3.2	24.6	24.7	20	28.8	2
Biological Oxygen Demand (BOD)	-	-	-	mg/L	10	19	8	13	45	58	-	18	<10	<10	<10	<10	<10	<10	< 10	<10
Chemical Oxygen Demand (COD)	-	-	-	mg/L	62	82	105	77	144	251	75	64	123	58	74	64	61	53	63	31
Total Metals																				
Aluminum	-	5	9.5	mg/L	<0.05	0.051	0.057	0.07	<0.005	<0.005	0.03	0.029	0.047	0.074	0.014	0.037	0.017	0.03	0.015	0.018
Antimony	0.09	-	0.006	mg/L	<0.2	0.0004	0.0005	<0.05	<0.001	<0.001	0.026	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Arsenic	0.05	0.025	0.01	mg/L	<0.2	0.001	0.0008	<0.0005	0.002	0.002	<0.04	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Barium	10	-	1	mg/L	0.08	0.12	0.11	0.155	0.21	0.23	0.144	0.16	0.16	0.27	0.17	0.17	0.18	0.16	0.21	0.12
Beryllium	0.0015	0.1	0.008	mg/L	<0.005	<0.005	<0.005	0.002	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	1.56	-	-	1.35	1.27	0.85	0.77	1.66	1.19	1.28	1.08	1.08	0.63
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	<0.002	<0.0002	<0.0002	<0.005	<0.0002	<0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0002	0.001	<0.0002	<0.0002	< 0.0002	<0.0002
Calcium	-	1000	-	mg/L	112	79	82	116	122	131	124	112	98	86	115	116	128	122	146	66
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	mg/L	<0.01	<0.001	<0.001	0.0019	0.002	0.002	0.005	0.001	0.003	0.002	0.0001	0.001	0.002	<0.001	0.002	<0.001
Cobalt	0.04	1	0.001	mg/L	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	0.003	0.001	0.003	<0.001	0.003	0.002	0.002	0.001	0.002	<0.001
Copper	0.02 - 0.09	0.3	1.5	mg/L	<0.01	0.002	0.004	0.0024	<0.001	<0.001	0.007	0.004	0.002	0.002	0.002	<0.001	<0.001	0.005	0.002	0.002
Iron	-	-	6.5	mg/L	<0.03	0.09	0.05	0.069	0.05	0.04	0.045	0.17	0.39	0.12	0.21	0.30	0.31	0.26	0.39	0.24
Lead	0.04 - 0.16	0.1	0.01	mg/L	<0.01	<0.001	<0.001	<0.05	<0.001	<0.001	<0.02	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	29.1	20.1	20.2	24.5	32.7	35	31.8	21.1	25.8	15.4	23.7	27.4	29.2	27	29.7	13.1
Manganese	-	-	1.5	mg/L	0.285	1.31	1.23	1.96	2.02	2.3	0.934	2.26	3.42	1.18	2.13	2.06	2.31	1.8	3.32	0.96
Mercury	0.00025	0.002	0.001	mg/L	<0.00005	0.00001	<0.00001	-	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00002	<0.00002
Molybdenum	10	0.05	0.25	mg/L	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Nickel	0.25 - 1.5	1	0.08	mg/L	<0.02	0.02	<0.02	<0.02	<0.05	<0.05	<0.008	0.006	0.005	0.003	0.009	0.007	0.007	0.005	0.005	0.003
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	0.06	0.06	0.11	0.1	0.11	0.06	0.03
Potassium	-	-	-	mg/L	-	-	-	51.2	-	-	58.6	39.4	51.9	31	52.3	54.6	57.3	46.1	52.5	22.1
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	<0.01	<0.0005	0.0015	<0.05	0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	6.59	16.9	12.1	13.1	11.8	15.3	8.28
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001
Sodium	-	-	200	mg/L	-	-	-	92.6	-	-	111	64.1	91.1	49.9	84.8	91.2	98.2	78.3	87.9	35.6
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	0.51	0.89	0.71	0.77	0.75	0.86	0.033
Sulfur	-	-	-	mg/L	-	-	-	19.8	-	-	33.2	-	-	-	-	-	-	-	-	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	<0.0001	<0.0001	-	0.001	0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Titanium	1	-	-	mg/L	-	<0.01	<0.01	0.003	<0.01	<0.01	<0.003	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	0.00009	0.0001	-	0.0002	0.0002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005
Vanadium	-	0.1	0.02	mg/L	-	<0.03	<0.03	<0.01	<0.03	<0.03	<0.003	<0.001	0.001	0.003	0.001	<0.001	0.001	<0.001	0.003	<0.001
Zinc	0.075 - 38.1	2	3	mg/L	0.007	<0.005	<0.005	0.004	<0.005	<0.005	<0.002	0.007	0.012	0.042	0.006	0.005	0.013	0.01	< 0.005	<0.005
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01
Dissolved Metals																				
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	1-Jun-02	1-Jan-03	1-Mar-03	12-Aug-03	1-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08
Location														
Site Name														
Sample ID	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Laboratory ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations														
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters														
Conductivity	1,310	495	1,130	1,340	575	1240	1340	1760	920	1,490	790	1,220	1190	1,200
Hardness (Total as CaCO3)	412	148	281	452	155	377	536	444	320	396	184	361	337	363
pH	8.04	7.55	7.73	6.94	7.52	7.84	7.7	7.79	8.2	7.93	7.74	7.96	7.9	8.20
Total Suspended Solids	-	-	-	-	-	-	<4	-	25	-	-	-	-	4
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.5	4.0	5.3	0.0	4.4	0.7	14.2	0.1	15.1	13.3	13.8	14.4	6.5	7.4
Chloride (Cl)	104	21.5	80.3	104	33.7	83.4	67.3	100	44.4	113	45	84	134	87
Fluoride (F)	<0.25	<0.05	<0.05	<0.05	0.06	<0.05	-	<0.25	-	<0.25	<0.25	<0.25	<0.1	-
Nitrate (as N)	11.5	4.6	16.1	9.9	4.7	11.8	3.9	7.9	1.2	8.8	4.4	8.8	9.0	-
Nitrite (as N)	0.242	0.034	0.084	0.092	0.028	0.146	0.054	0.02	0.03	0.024	0.038	0.002	0.128	0.034
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	11.9	25.4	12.7	2.1	10.5	9.0	33.7	6.6	20.5	4.4	17.2	5.3	5.4	<0.5
Biological Oxygen Demand (BOD)	<10	11	<10	<10	<10	<10	<10	<10	<10	27	<10	10	9.4	<10
Chemical Oxygen Demand (COD)	53	38	46	59	<25	35	69	62	94	94	41	96	82	81
Total Metals														
Aluminum	0.011	0.042	0.01	0.013	0.072	0.008	0.0128	0.009	0.00186	< 0.005	0.043	0.011	0.012	0.0189
Antimony	<0.001	-	< 0.001	<0.001	< 0.001	< 0.001	0.0002	< 0.0002	0.000177	< 0.001	<0.001	<0.001	<0.0006	0.00018
Arsenic	<0.001	-	< 0.001	<0.001	< 0.001	< 0.001	0.0006	0.0007	0.0006	< 0.001	0.001	<0.001	<0.001	0.00048
Barium	0.15	0.072	0.12	0.17	0.084	0.1	0.217	0.104	0.134	0.14	0.11	0.16	0.123	0.0784
Beryllium	<0.001	-	< 0.001	<0.001	< 0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004	0.00002
Bismuth	-	-	-	<0.001	-	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	-	<0.00000
Boron	1.35	0.49	1.04	1.82	0.35	1.37	1.12	2.4	0.738	1.68	0.72	1.5	1.55	1.17
Cadmium	<0.0002	-	< 0.0002	<0.0002	< 0.0002	< 0.0002	<0.0001	0.000070	0.000010	< 0.0002	<0.0002	<0.0002	0.000060	0.000025
Calcium	118	46	81	121	48	112	168	139	104	117	59	112	100	95
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001	-	< 0.001	0.001	< 0.001	0.001	<0.002	0.001	0.003	0.001	0.003	0.002	0.004	0.0008
Cobalt	0.002	-	< 0.001	0.002	< 0.001	0.001	0.00118	0.0013	0.00145	0.002	<0.001	0.002	0.0017	0.00149
Copper	0.003	0.003	0.002	0.001	0.003	0.002	0.00197	0.0024	0.00099	0.001	0.003	0.002	0.0163	0.00168
Iron	0.32	0.12	< 0.05	<0.05	0.33	< 0.05	0.022	0.05	0.06	< 0.05	0.30	0.11	0.34	0.071
Lead	<0.001	-	< 0.001	<0.001	< 0.001	< 0.001	<0.0001	< 0.0002	0.00001	< 0.001	<0.001	<0.001	<0.0002	0.000006
Lithium	0.002	-	0.001	0.002	-	0.001	0.00058	0.0012	0.00133	0.002	0.001	<0.005	0.0009	0.0008
Magnesium	28.3	7.98	19	36.3	8.44	23.8	28.4	23.4	15.3	25.2	9.24	19.7	18.2	17.9
Manganese	0.93	0.47	0.97	0.18	0.58	0.25	1.99	0.054	1.59	1.12	1.16	1.49	1.2	0.318
Mercury	<0.00002	-	< 0.00002	<0.00002	< 0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.00002	<0.0002	<0.00006	-
Molybdenum	<0.001	-	0.0012	<0.0005	< 0.0005	< 0.0005	<0.0005	0.0003	0.00032	< 0.0005	<0.0005	<0.0005	0.0003	0.00041
Nickel	0.006	0.002	0.005	0.006	0.002	0.005	0.00579	0.0069	0.00404	0.006	0.004	0.005	0.008	-
Phosphorus	0.18	0.05	0.07	0.17	0.4	< 0.15	<0.1	0.07	0.1	< 0.15	<0.15	<0.15	-	0.032
Potassium	47.9	18.7	32.4	61	16.8	43.2	48	47.6	32	52.7	22.4	43.9	-	42.6
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	<0.002	-	< 0.001	<0.001	< 0.001	< 0.001	<0.002	0.0009	0.0004	< 0.001	<0.001	<0.001	<0.001	0.00011
Silicon	11.8	7.18	8.72	16.3	6.32	13	-	13.8	-	6.3	3.4	5.2	-	4.69
Silver	<0.0001	-	< 0.0001	<0.0001	< 0.0001	< 0.00025	<0.0002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.00005
Sodium	85.2	26.6	60.1	106	25.1	81.5	77.6	139	48	99.8	41.4	82	73.3	79.5
Strontium	0.75	0.25	0.53	0.94	0.32	0.69	0.915	0.68	0.503	0.87	0.34	0.75	-	0.591
Sulfur	-	-	-	-	-	-	12.7	-	7.2	-	-	-	-	3
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	<0.0001	<0.0001	< 0.0001	<0.0001	< 0.0001	< 0.0001	<0.00002	< 0.00002	0.000006	< 0.0001	< 0.0001	<0.0001	<0.0001	0.000003
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	<0.001	<0.001	< 0.001	<0.001	< 0.001	< 0.001	0.00012	0.0004	-	< 0.001	< 0.001	<0.001	-	0.00011
Titanium	<0.001	0.001	< 0.001	0.001	0.003	< 0.001	<0.003	0.0006	0.003	< 0.001	0.002	<0.001	<0.02	0.0014
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	<0.0005	<0.0005	< 0.0005	<0.0005	< 0.0005	< 0.0005	0.000063	0.0001	0.000073	< 0.0005	< 0.0005	<0.0005	<0.0001	0.000151
Vanadium	0.002	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.0006	0.0004	0.00048	< 0.001	<0.001	<0.001	<0.002	0.0002
Zinc	0.012	<0.005	< 0.005	0.006	< 0.005	< 0.005	0.0011	0.004	0.0009	< 0.005	0.018	<0.005	0.015	0.0013
Zirconium	<0.01	<0.01	< 0.01	<0.01	< 0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.01	-	-
Dissolved Metals														
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	24-Sep-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14
Location													
Site Name													
Sample ID	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Laboratory ID	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations													
pH	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters													
Conductivity	949	1,077	1,199	1,540	895	1,090	1,020	1,360	1,260	1,210	1,590	1,290	1,380
Hardness (Total as CaCO3)	281	332	358	424	310	283	272	357	394	476	478	361	333
pH	7.90	7.60	7.90	8.10	7.60	7.90	7.80	7.60	7.80	8.00	7.20	7.80	7.90
Total Suspended Solids	-	-	-	-	-	-	-	<1	-	7.8	<1	2.6	2.2
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.8	11.2	3.3	29.2	4.7	18.2	14.9	11.4	12.9	1.7	12.3	<0.03	30.5
Chloride (Cl)	82	80	110	89	40.6	60.1	58.9	108	74	104	143	108	107
Fluoride (F)	0.11	0.16	0.16	0.04	<0.1	<0.1	<0.1	<0.1	0.069	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	6.8	21.0	9.2	5.5	14.5	10.0	7.7	22.4	15.4	4.5	14.0	14.5	4.8
Nitrite (as N)	0.109	0.11	0.11	0.047	0.047	0.038	0.057	0.041	0.062	0.013	0.121	0.058	0.08
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	10.8	14.3	4.5	12.0	18.3	10.7	6.8	8.5	8.8	6.7	19.0	21.3	29.8
Biological Oxygen Demand (BOD)	5.4	ND	17	<4	<4	15	16	5.8	<6	10	13	4.1	10
Chemical Oxygen Demand (COD)	66	62	198	102	77	54	39	61	59	47	68	89	130
Total Metals													
Aluminum	0.014	0.013	0.012	0.019	0.192	0.443	0.163	0.0201	0.033	0.0564	0.0239	0.0367	0.206
Antimony	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0008	<0.0008	<0.0008
Arsenic	0.0004	0.0004	0.0005	0.0006	0.0002	0.00004	0.00044	0.00032	0.00041	0.00061	0.00064	0.00048	0.00086
Barium	0.146	0.178	0.314	0.225	0.079	0.17	0.152	0.14	0.172	0.11	0.23	0.16	0.287
Beryllium	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	1.37	1.41	1.37	2.15	1.09	1.46	1.23	1.21	1.84	1.59	2.41	1.79	2.44
Cadmium	0.000010	0.000080	0.000260	0.000230	0.000050	0.000060	0.000032	0.000036	0.000029	0.000076	0.000041	0.000060	0.000089
Calcium	91	121	94	125	98	88	85	109	120	148	145	110	105
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.001	0.001	0.001	0.003	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	0.0015
Cobalt	0.0013	0.001	0.0015	0.0014	0.0008	0.0011	0.00081	0.00094	0.00112	0.0012	0.00158	0.00147	0.00172
Copper	0.0032	0.0029	0.0443	0.0804	0.003	0.0038	0.00189	0.00235	0.002	0.00303	0.00231	0.00254	0.00447
Iron	0.059	0.056	0.023	0.045	0.258	0.886	0.633	0.0648	0.205	0.153	0.178	0.077	0.642
Lead	0.0003	ND	ND	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	0.00026
Lithium	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005
Magnesium	17.3	21.4	21.2	22.5	16.1	15.3	14.5	20.4	22.6	25.7	27.9	20.9	17.3
Manganese	0.389	0.216	0.191	1.27	0.091	0.67	0.877	0.185	0.548	0.417	0.934	0.531	1.04
Mercury	0.00004	0.00004	0.00003	0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	0.00035	<0.001	<0.001	<0.001	<0.001
Nickel	0.006	0.006	0.006	0.01	0.004	0.005	0.0039	0.0044	0.0055	0.0053	0.0078	0.0066	0.0104
Phosphorus	-	-	-	-	0.021	0.031	0.025	0.022	<0.01	0.107	0.03	0.015	0.033
Potassium	40.6	44.4	50.6	51.1	36.7	34.8	30.9	40.7	46.2	57.4	61.4	46.4	45.6
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.0001	ND	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.00004	<0.00004	0.00016	0.00023	<0.00004	0.00016
Silicon	5.29	5.96	4.07	6.69	5.88	5.79	5.47	5.08	6.3	7.32	7.63	5.62	6.91
Silver	ND	ND	ND	ND	0.000008	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Sodium	75.6	82.6	91.9	97.8	55.9	61.1	55	74.1	87.1	104	126	96.6	92.8
Strontium	0.569	0.723	0.705	0.854	0.572	0.583	0.566	0.729	0.767	0.901	0.938	0.747	0.723
Sulfur	ND	6	ND	6	7	4.8	4.1	<15	<75	3.5	7.7	<3	12.1
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Titanium	ND	ND	ND	ND	0.007	0.017	0.0055	<0.005	<0.005	<0.005	<0.005	<0.005	0.0056
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0001	0.0001	0.0002	0.0001	0.0001	<0.0001	<0.0001	0.00014	0.000105	0.00021	0.00017	0.00014	0.00012
Vanadium	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.031	0.03	0.032	0.044	<0.005	0.005	<0.005	<0.005	<0.005	0.0055	<0.005	0.0061	0.0091
Zirconium	ND	ND	ND	ND	<0.0005	0.0023	0.00054	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals													
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
Location											
Site Name											
Sample ID	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Laboratory ID	-	-	-	-	-	-	-	-	L2070515-4	L2124909-4	L2163156-4
QAQC	-	-	-	-	-	-	-	-	-	-	-
Field Observations											
pH	-	-	-	-	-	-	-	-	-	7.4	7.9
Temperature	-	-	-	-	-	-	-	-	-	13.5	13.6
Conductivity	-	-	-	-	-	-	-	-	-	774.0	642.0
Water level	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	2.3	2
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	444.7	104.7
Conventional Parameters											
Conductivity	1,050	1,280	1,680	1,810	1,450	1500	373	768	349	954	779
Hardness (Total as CaCO3)	277	418	-	637	641	444	114	212	141	255	165
pH	8.00	8.00	8.00	8.10	8.00	7.9	7.8	7.9	8.26	8.37	8.47
Total Suspended Solids	2.9	<1.0	1.9	3.8	6.8	10	22	15	<3.0	3.6	35
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	144	399	300
Ammonia, Total (as N)	17.9	0.2	36.9	40.2	10.6	28.2	5.85	9.09	3.91	8.97	4.15
Chloride (Cl)	75	121	119	153	138	118	24.2	53.9	9.6	68.9	65
Fluoride (F)	ND	0.1	0.1	0.11	0.11	<0.10	<0.10	0.1	0.061	<0.10	0.1
Nitrate (as N)	8.2	6.9	7.2	7.7	9.8	5.28	0.24	3.2	1.56	4.99	1.66
Nitrite (as N)	0.15	-	0.059	0.061	0.15	0.014	0.013	0.12	0.0166	0.22	0.181
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	4.48	12.4	5.9
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	0.146
Sulfate (SO4)	30.6	31.6	-	38.6	36.4	45.4	6.2	11.6	7.19	7.9	8.1
Biological Oxygen Demand (BOD)	ND	<4.0	25	33	37	15	<5.0	14	<2.0	5.4	6.4
Chemical Oxygen Demand (COD)	70	98	106	142	130	104	48	48	22	86	113
Total Metals											
Aluminum	0.504	0.051	-	0.109	0.313	0.298	3.52	0.519	0.446	0.129	0.589
Antimony	0.0003	0.0004	-	0.0004	0.0006	0.0006	0.0002	0.00021	<0.00010	0.00024	0.00032
Arsenic	0.0007	0.0008	-	0.0013	0.0013	0.0014	0.0018	0.00124	0.00034	0.00117	0.00365
Barium	0.24	0.19	-	0.31	0.46	0.545	0.121	0.142	0.0773	0.139	0.131
Beryllium	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	1.81	3.1	-	3.56	2.8	1.69	0.446	1.29	0.332	1.53	1.31
Cadmium	0.000040	0.000050	-	0.000030	0.000060	0.00014	0.00006	0.000055	0.0000164	0.0000235	0.0000302
Calcium	87	128	-	197	194	135	34.5	57.5	39.2	61.5	35.5
Cesium	-	-	-	-	-	-	-	-	0.000047	0.00009	0.000089
Chromium	0.0014	0.0014	-	0.0021	0.0016	0.0015	0.0039	0.00099	0.00057	0.00058	0.00096
Cobalt	0.00146	0.00225	-	0.00314	0.00397	0.00369	0.00226	0.00163	0.00051	0.00187	0.00192
Copper	0.0049	0.0035	-	0.0027	0.0058	0.0069	0.01	0.00399	0.00201	0.00354	0.00409
Iron	0.81	0.21	-	0.94	0.82	1.21	4.63	0.821	0.515	0.355	1.91
Lead	0.0002	<0.0001	-	0.0001	0.0001	0.0002	0.0011	0.00021	0.0001	0.000076	0.000405
Lithium	0.0018	0.0012	-	0.0022	0.0012	0.001	0.0025	0.00088	<0.0010	<0.0010	<0.0010
Magnesium	14.7	23.8	-	35.3	37.7	26.1	6.78	16.6	6.07	20.4	18.7
Manganese	0.899	0.589	-	2.57	4.23	5.54	0.794	0.562	0.513	0.209	0.303
Mercury	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	0.0007	0.0011	-	0.001	0.0029	0.0017	0.0004	0.00129	0.000245	0.000948	0.00113
Nickel	0.0076	0.0082	-	0.0085	0.0084	0.0073	0.0055	0.00369	0.00111	0.00509	0.004
Phosphorus	ND	0.19	-	0.04	0.04	0.03	0.08	0.104	<0.050	0.066	0.167
Potassium	38.2	55.7	-	87.9	57.7	33.3	8.85	27.2	8.29	38.8	34.1
Rubidium	-	-	-	-	-	-	-	-	0.00478	0.0244	0.0199
Selenium	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	0.00054	0.000123	0.000217	0.000386
Silicon	6.9	9	-	11.8	10.5	7.2	7.9	6	3.3	3.84	5.21
Silver	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	73.8	137	-	185	139	90.9	19.5	61.2	14.3	81.7	73.6
Strontium	0.571	0.881	-	1.19	1.24	0.983	0.203	0.479	0.214	0.582	0.406
Sulfur	7	16	-	21	32	15	<1	4.3	2.69	3.98	3.64
Tellurium	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	-	0.0002	<0.00010	<0.00010	<0.00010	<0.00010
Tin	ND	0.0004	-	0.0003	0.0002	<0.0002	<0.0002	<0.00020	<0.00010	0.0001	<0.00010
Titanium	0.015	<0.005	-	<0.005	0.008	0.009	0.089	0.0112	0.0111	<0.0036	0.0115
Tungsten	-	-	-	-	-	-	-	-	0.00022	<0.00010	<0.00010
Uranium	0.0001	0.00024	-	0.00021	0.0007	0.00063	0.00014	0.00022	0.000082	0.000395	0.000359
Vanadium	0.001	<0.001	-	<0.001	0.001	0.001	0.008	0.0013	0.00099	<0.00050	0.00205
Zinc	0.008	0.005	-	0.01	0.014	0.008	0.014	0.007	<0.0030	<0.0030	0.0046
Zirconium	0.0004	0.0002	-	0.0005	0.0005	0.0004	0.001	0.00028	0.000206	0.000145	0.000195
Dissolved Metals											
Aluminum	-	-	-	-	-	-	-	-	0.0186	0.0338	0.0346
Antimony	-	-	-	-	-	-	-	-	<0.00010	0.0002	0.00027
Arsenic	-	-	-	-	-	-	-	-	0.00023	0.00112	0.00258
Barium	-	-	-	-	-	-	-	-	0.0768	0.133	0.115
Beryllium	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	-	-	-	-	-	-	-	-	0.353	1.56	1.32
Cadmium	-	-	-	-	-	-	-	-	0.0000118	0.0000236	0.0000128
Calcium	-	-	-	-	-	-	-	-	44.9	64.3	36.1
Cesium	-	-	-	-	-	-	-	-	0.000019	0.000076	0.000043
Chromium	-	-	-	-	-	-	-	-	0.00018	0.0005	0.00042
Cobalt	-	-	-	-	-	-	-	-	0.00029	0.00184	0.00156
Copper	-	-	-	-	-	-	-	-	0.0014	0.00343	0.00235
Iron	-	-	-	-	-	-	-	-	0.027	0.091	0.418
Lead	-	-	-	-	-	-	-	-	<0.000050	<0.000050	0.000086
Lithium	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	-	-	-	-	-	-	-	-	7.08	22.8	18.1
Manganese	-	-	-	-	-	-	-	-	0.295	0.194	0.224
Mercury	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	-	-	-	-	-	-	-	-	0.000257	0.000894	0.00125
Nickel	-	-	-	-	-	-	-	-	0.00082	0.00512	0.00364
Phosphorus	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Potassium	-	-	-	-	-	-	-	-	9.6	43.8	35.8
Rubidium	-	-	-	-	-	-	-	-	0.00493	0.0249	0.0195
Selenium	-	-	-	-	-	-	-	-	0.000137	0.000251	0.000347
Silicon	-	-	-	-	-	-	-	-	2.75	3.6	4.52
Silver	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-	-	-	-	-	-	-	-	15	90.2	74.8
Strontium	-	-	-	-	-	-	-	-	0.223	0.588	0.386
Sulfur	-	-	-	-	-	-	-	-	2.59	3.45	3.42
Tellerium	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-	-	-	-	-	-	-	-	<0.00010	0.0001	<0.00010
Titanium	-	-	-	-	-	-	-	-	0.00089	0.00098	0.00169
Tungsten	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	-	-	-	-	-	-	-	-	0.000085	0.000421	0.000342
Vanadium	-	-	-	-	-	-	-	-	<0.00050	<0.00050	0.0006
Zinc	-	-	-	-	-	-	-	-	<0.0010	0.0013	<0.0010
Zirconium	-	-	-	-	-	-	-	-	0.000069	0.000107	0.000197

NOTES

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

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

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

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

Table D-8: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill																																	
Site Name								SW-21																																	
Sample ID								SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								1-Jun-97	4-Dec-97	4-May-98		24-Sep-98		27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00		7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03	12-Aug-03	1-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08	24-Sep-09	22-Feb-10	15-Jun-10	25-Oct-10
QAQC								-	-	FDA	FD	FDA	FD	-	-	-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																																									
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																																									
Conductivity	-		-		-		uS/cm	1480	1280	1300	1060	1450	1460	-	1235	-	864	-	700	-	1200	1570	725	1310	495	1130	1340	575	1240	1340	1760	920	1490	790	1220	1190	1200	949	1077	1199	1540
Hardness (Total as CaCO3)	-		-		-		mg/L	399	281	287	395	439	471	441	366	351	277	384	402	440	415	487	219	412	148	281	452	155	377	536	444	320	396	184	361	337	363	281	332	358	424
pH	6.5-9.0		-		6.5 - 8.5		-	7.74	7.82	8.08	8.02	8.07	8.1	-	-	-	7.55	7.96	7.61	7.58	7.82	7.67	7.69	8.04	7.55	7.73	6.94	7.52	7.84	7.7	7.79	8.2	7.93	7.74	7.96	7.9	8.2	7.9	7.6	7.9	8.1
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	7	6	5	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	-	25	-	-	-	-	4	-	-	-	-
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.37 - 1.86	pH/T*	1.9 - 21.8	pH/T*	-		mg/L	3.81	11.3	7.61	5.14	11.1	12.5	8.23	15.4	20.6	8.6	6.5	27.5	19.5	1.9	25	1.51	0.54	4	5.3	0.01	4.4	0.74	14.2	0.06	15.1	13.3	13.8	14.4	6.5	7.4	0.76	11.2	3.3	29.2
Bromide (Br)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	150		600		<250	AO	mg/L	130	99	96.9	90	146	148	100	71.4	97.1	65.2	144	102	102	81.8	96.3	31.3	104	21.5	80.3	104	33.7	83.4	67.3	100	44.4	113	45	84	134	87	82	80	110	89
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	-	-	-	-	-	-	0.15	<0.05	<0.05	<0.05	0.24	< 0.05	<0.05	<0.25	<0.05	<0.05	<0.05	0.06	<0.05	-	<0.25	-	<0.25	<0.25	<0.25	<0.1	-	0.11	0.16	0.16	0.04
Nitrate (as N)	3		32.8		10		mg/L	17.6	8.27	10.6	10.8	8.8	9.48	14.4	6.5	2.3	-	9	6.1	6.3	13.8	4.1	5.2	11.5	4.6	16.1	9.9	4.65	11.8	3.86	7.9	1.24	8.8	4.4	8.81	9	-	6.8	21	9.22	5.45
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	0.188	0.056	0.14	0.023	0.18	0.154	0.098	0.09	0.059	-	0.3	0.034	0.028	0.193	0.03	1.38	0.242	0.034	0.084	0.092	0.028	0.146	0.054	0.02	0.03	0.024	0.038	0.002	0.128	0.034	0.109	0.11	0.11	0.047
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	18	56	58	64	19	14	90.6	28.1	21.6	28	3.2	24.6	24.7	20	28.8	2	11.9	25.4	12.7	2.1	10.5	9	33.7	6.6	20.5	4.4	17.2	5.27	5.4	<0.5	10.8	14.3	4.5	12
Biological Oxygen Demand (BOD)	-		-		-		mg/L	10	19	8	13	45	58	-	18	<10	<10	<10	<10	<10	<10	< 10	<10	<10	11	<10	<10	<10	<10	<10	<10	<10	27	<10	10	9.4	<10	5.4	ND	17	<4
Chemical Oxygen Demand (COD)	-		-		-		mg/L	62	82	105	77	144	251	75	64	123	58	74	64	61	53	63	31	53	38	46	59	<25	35	69	62	94	94	41	96	82	81	66	62	198	102
Total Metals																																									
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	<0.05	0.051	0.057	0.07	<0.005	<0.005	0.03	0.029	0.047	0.074	0.014	0.037	0.017	0.03	0.015	0.018	0.011	0.042	0.01	0.013	0.072	0.008	0.0128	0.009	0.00186	< 0.005	0.043	0.011	0.012	0.0189	0.014	0.013	0.012	0.019
Antimony	0.009		-		-		mg/L	<0.2	0.0004	0.0005	<0.05	<0.001	<0.001	0.026	<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	0.0002	< 0.0002	0.000177	< 0.001	<0.001	<0.001	<0.0006	0.00018	ND	ND	ND	ND
Arsenic	0.005		-		0.01		mg/L	<0.2	0.001	0.0008	<0.0005	0.002	0.002	<0.04	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	-	< 0.001	<0.001	< 0.001	< 0.001	0.0006	0.0007	0.0006	< 0.001	0.001	<0.001	<0.001	0.00048	0.0004	0.0004	0.0005	0.0006
Barium	1		-		-		mg/L	0.08	0.12	0.11	0.155	0.21	0.23	0.144	0.16	0.16	0.27	0.17	0.17	0.18	0.16	0.21	0.12	0.15	0.072	0.12	0.17	0.084	0.1	0.217	0.104	0.134	0.14	0.11	0.16	0.123	0.0784	0.146	0.178	0.314	0.225
Beryllium	0.00013		-		-		mg/L	<0.005	<0.005	<0.005	0.002	<0.005	<0.005	<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	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004	0.00002	ND	ND	ND	ND
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	-	<0.00000	ND	ND	ND	ND
Boron	1.2		-		5		mg/L	-	-	-	1.56	-	-	1.35	1.27	0.85	0.77	1.66	1.19	1.28	1.08	1.08	0.63	1.35	0.49	1.04	1.82	0.35	1.37	1.12	2.4	0.738	1.68	0.72	1.5	1.55	1.17	1.37	1.41	1.37	2.15
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	<0.002	<0.0002	<0.0002	<0.005	<0.0002	<0.0002	0.0001	<0.0002	<0.0002	0.0002	0.0002	0.001	<0.0002	<0.0002	< 0.0002	<0.0002	<0.0002	-	< 0.0002	<0.0002	< 0.0002	< 0.0002	<0.0001	0.00007	0.00001	< 0.0002	<0.0002	<0.0002	0.00006	0.000025	0.00001	0.00008	0.00026	0.00023
Calcium	-		-		-		mg/L	112	79.4	81.6	116	122	131	124	112	98	85.5	115	116	128	122	146	65.9	118	46.1	81.1	121	48.3	112	168	139	104	117	58.5	112	100	94.5	90.7	121	94.4	125
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	$0.001^{Cr VI}$ $0.0089^{Cr II}$	V	-		-		mg/L	<0.01	<0.001	<0.001	0.0019	0.002	0.002	0.005	0.001	0.003	0.002	0.0001	0.001	0.002	<0.001	0.002	<0.001	0.001	-	< 0.001	0.001	< 0.001	0.001	<0.002	0.001	0.003	0.001	0.003	0.002	0.004	0.0008	0.001	0.001	0.001	0.003
Cobalt	0.004		0.11		-		mg/L	<0.01	<0.01	<0.01	<0.005	<0.01	<0.01	0.003	0.001	0.003	<0.001	0.003	0.002	0.002	0.001	0.002	<0.001	0.002	-	< 0.001	0.002	< 0.001	0.001	0.00118	0.0013	0.00145	0.002	<0.001	0.002	0.0017	0.00149	0.0013	0.001	0.0015	0.0014
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	<0.01	0.002	0.004	0.0024	<0.001	<0.001	0.007	0.004	0.002	0.002	0.002	<0.001	<0.001	0.005	0.002	0.002	0.003	0.003	0.002	0.001	0.003	0.002	0.00197	0.0024	0.00099	0.001	0.003	0.002	0.0163	0.00168	0.0032	0.0029	0.0443	0.0804
Iron	-		1		<0.3	AO	mg/L	<0.03	0.09	0.05	0.069	0.05	0.04	0.045	0.17	0.39	0.12	0.21	0.3	0.31	0.26	0.39	0.24	0.32	0.12	< 0.05	<0.05	0.33	< 0.05	0.022	0.05	0.06	< 0.05	0.3	0.11	0.34	0.071	0.059	0.056	0.023	0.045
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	<0.01	<0.001	<0.001	<0.05	<0.001	<0.001	<0.02	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	<0.0001	< 0.0002	0.00001	< 0.001	<0.001	<0.001	<0.0002	0.000006	0.0003	ND	ND	0.0002
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	0.001	0.002	-	0.001	0.00058	0.0012	0.00133	0.002	0.001	<0.005	0.0009	0.0008	ND	ND	ND	ND
Magnesium	-		-		-		mg/L	29.1	20.1	20.2	24.5	32.7	35	31.8	21.1	25.8	15.4	23.7	27.4	29.2	27	29.7	13.1	28.3	7.98	19	36.3	8.44	23.8	28.4	23.4	15.3	25.2	9.24	19.7	18.2	17.9	17.3	21.4	21.2	22.5
Manganese	1.11 - 3.43	H	1.8 - 7.6	H	<0.05	AO	mg/L	0.285	1.31	1.23	1.96	2.02	2.3	0.934	2.26	3.42	1.18	2.13	2.06	2.31	1.8	3.32	0.96	0.93	0.47	0.97	0.18	0.58	0.25	1.99	0.054	1.59	1.12	1.16	1.49	1.2	0.318	0.389	0.216	0.191	1.27
Mercury	0.0001		-		0.001		mg/L	<0.00005	0.00001	<0.00001	-	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	< 0.00002	<0.00002	<0.00002	-	< 0.00002	<0.00002	< 0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.00002	<0.0002	<0.00006	-	0.00004	0.00004	0.00003	0.00002
Molybdenum	2		-		0.25		mg/L	<0.03	<0.03	<0.03	<0.01	<0.03	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	-	0.0012	<0.0005	< 0.0005	< 0.0005	<0.0005	0.0003	0.00032	< 0.0005	<0.0005	<0.0005	0.0003	0.00041	ND	ND	ND	ND
Nickel	0.025-0.15		-		-		mg/L	<0.02	0.02	<0.02	<0.02	<0.05	<0.05	<0.008	0.006	0.005	0.003	0.009	0.007	0.007	0.005	0.005	0.003	0.006	0.002	0.005	0.006	0.002	0.005	0.00579	0.0069	0.00404	0.006	0.004	0.005	0.008	-	0.006	0.006	0.006	0.01
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	0.06	0.06	0.11	0.1	0.11	0.06	0.03	0.18	0.05	0.07	0.17	0.4	*< 0.15*	*<0.1*	0.07	0.1	*< 0.15*	*<0.15*	*<0.15*	-	0.032	-	-	-	-
Potassium	-		-		-		mg/L	-	-	-	51.2	-	-	58.6	39.4	51.9	31	52.3	54.6	57.3	46.1	52.5	22.1	47.9	18.7	32.4	61	16.8	43.2	48	47.6	32	52.7	22.4	43.9	-	42.6	40.6	44.4	50.6	51.1
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	<0.01	<0.0005	0.0015	<0.05	0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002	<0.002	<0.002	-	< 0.001	<0.001	< 0.001	< 0.001	<0.002	0.0009	0.0004	< 0.001	<0.001	<0.001	<0.001	0.00011	0.0001	ND	0.0001	0.0001
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	6.59	16.9	12.1	13.1	11.8	15.3	8.28	11.8	7.18	8.72	16.3	6.32	13	-	13.8	-	6.3	3.4	5.2	-	4.69	5.29	5.96	4.07	6.69
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.001	<0.0001	<0.0001	<0.01	<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	< 0.00025	<0.0002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008	<0.00005	ND	ND	ND	ND
Sodium	-		-		<200	AO	mg/L	-	-	-	92.6	-	-	111	64.1	91.1	49.9	84.8	91.2	98.2	78.3	87.9	35.6	85.2	26.6	60.1	106	25.1	81.5	77.6	139	48	99.8	41.4	82	73.3	79.5	75.6	82.6	91.9	97.8
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	0.51	0.89	0.71	0.77	0.75	0.86	0.033	0.75	0.25	0.53	0.94	0.32	0.69	0.915	0.68	0.503	0.87	0.34	0.75	-	0.591	0.569	0.723	0.705	0.854
Sulfur	-		-		-		mg/L	-	-	-	19.8	-	-	33.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.7	-	7.2	-	-	-	-	3	ND	6	ND	6
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	<0.0001	<0.0001	-	0.001	0.001	<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	<0.00002	< 0.00002	0.000006	< 0.0001	< 0.0001	<0.0001	<0.0001	0.000003	ND	ND	ND	ND
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		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	0.00012	0.0004	-	< 0.001	< 0.001	<0.001	-	0.00011	ND	ND	ND	ND
Titanium	-		-		-		mg/L	-	<0.01	<0.01	0.003	<0.01	<0.01	<0.003	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001	<0.001	<0.001	0.001	< 0.001	0.001	0.003	< 0.001	<0.003	0.0006	0.003	< 0.001	0.002	<0.001	<0.02	0.0014	ND	ND	ND	ND
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	0.00009	0.0001	-	0.0002	0.0002	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005	<0.0005	<0.0005	< 0.0005	<0.0005	< 0.0005	< 0.0005	0.000063	0.0001	0.000073	< 0.0005	< 0.0005	<0.0005	<0.0001	0.000151	0.0001	0.0001	0.0002	0.0001
Vanadium	-		-		-		mg/L	-	<0.03	<0.03	<0.01	<0.03	<0.03	<0.003	<0.001	0.001	0.003	0.001	<0.001	0.001	<0.001	0.003	<0.001	0.002	<0.001	< 0.001	<0.001	< 0.001	< 0.001	<0.0006	0.0004	0.00048	< 0.001	<0.001	<0.001	<0.002	0.0002	ND	ND	ND	ND
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	0.007	<0.005	<0.005	0.004	<0.005	<0.005	<0.002	0.007	0.012	0.042	0.006	0.005	0.013	0.01	< 0.005	<0.005	0.012	<0.005	< 0.005	0.006	< 0.005	< 0.005	0.0011	0.004	0.0009	< 0.005	0.018	<0.005	0.015	0.0013	0.031	0.03	0.032	0.044
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	<0.01	<0.01	< 0.01	<0.01	< 0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.01	-	-	ND	ND	ND	ND
Dissolved Metals																																									
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	$0.001^{Cr VI}$ $0.0089^{Cr III}$		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	1.23 - 1.73	H	2.09 - 2.36	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653		<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-8: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location																						
Site Name	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21	SW-21
Sample ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L2070515-4	L2124909-4
Sample Date								15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																								
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	7.9
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.5	13.6
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	774.0	642.0
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	2
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	444.7	104.7
Conventional Parameters																								
Conductivity	-		-		-		uS/cm	895	1090	1020	1360	1260	1210	1590	1290	1380	1050	1280	1680	1810	1450	1500	373	768	349	954	779
Hardness (Total as CaCO3)	-		-		-		mg/L	310	283	272	357	394	476	478	361	333	277	418	-	637	641	444	114	212	141	255	165
pH	6.5-9.0		-		6.5 - 8.5		-	7.6	7.9	7.8	7.6	7.8	8	7.2	7.8	7.9	8	8	8	8.1	8	7.9	7.8	7.9	8.26	8.37	8.47
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l) i) ii)		-		mg/L	-	-	-	<1	-	7.8	<1	2.6	2.2	2.9	<1.0	1.9	3.8	6.8	10	22	15	<3.0	3.6	35
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144	399	300
Ammonia, Total (as N)	0.37 - 1.86	pH/T*	1.9 - 21.8	pH/T*	-		mg/L	4.7	18.2	14.9	11.4	12.9	1.71	12.3	<0.03	30.5	17.9	0.17	36.9	40.2	10.6	28.2	5.85	9.09	3.91	8.97	4.15
Bromide (Br)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	150		600		<250	AO	mg/L	40.6	60.1	58.9	108	74	103.8	143	108	107	75.4	121	119	153	138	118	24.2	53.9	9.6	68.9	65
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	<0.1	<0.1	<0.1	<0.1	0.069	<0.1	<0.1	<0.1	<0.1	ND	0.1	0.1	0.11	0.11	<0.10	<0.10	0.1	0.061	<0.10	0.1
Nitrate (as N)	3		32.8		10		mg/L	14.5	9.96	7.74	22.4	15.4	4.48	14	14.5	4.79	8.16	6.9	7.2	7.71	9.8	5.28	0.24	3.2	1.56	4.99	1.66
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	0.047	0.038	0.057	0.041	0.062	0.013	0.121	0.058	0.08	0.15	-	0.059	0.061	0.15	0.014	0.013	0.12	0.0166	0.22	0.181
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.48	12.4	5.9
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0034	0.146
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	0.0013	
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	18.3	10.7	6.78	8.49	8.83	6.73	19	21.3	29.8	30.6	31.6	-	38.6	36.4	45.4	6.2	11.6	7.19	7.9	8.1
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<4	15	16	5.8	<6	10	13	4.1	10	ND	<4.0	25	33	37	15	<5.0	14	<2.0	5.4	6.4
Chemical Oxygen Demand (COD)	-		-		-		mg/L	77	54	39	61	59	47	68	89	130	70	98	106	142	130	104	48	48	22	86	113
Total Metals																								
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.192	0.443	0.163	0.0201	0.033	0.0564	0.0239	0.0367	0.206	0.504	0.051	-	0.109	0.313	0.298	3.52	0.519	0.446	0.129	0.589
Antimony	0.009		-		-		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0006	<0.0007	<0.0008	<0.0008	<0.0008	0.0003	0.0004	-	0.0004	0.0006	0.0006	0.0002	0.00021	<0.00010	0.00024	0.00032
Arsenic	0.005		-		0.01		mg/L	0.0002	0.00004	0.00044	0.00032	0.00041	0.00061	0.00064	0.00048	0.00086	0.0007	0.0008	-	0.0013	0.0013	0.0014	0.0018	0.00124	0.00034	0.00117	0.00365
Barium	1		-		-		mg/L	0.079	0.17	0.152	0.14	0.172	0.11	0.233	0.161	0.287	0.236	0.191	-	0.306	0.455	0.545	0.121	0.142	0.0773	0.139	0.131
Beryllium	0.00013		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	1.2		-		5		mg/L	1.09	1.46	1.23	1.21	1.84	1.59	2.41	1.79	2.44	1.81	3.1	-	3.56	2.8	1.69	0.446	1.29	0.332	1.53	1.31
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	0.00005	0.00006	0.000032	0.000036	0.000029	0.000076	0.000041	0.00006	0.000089	0.00004	0.00005	-	0.00003	0.00006	0.00014	0.00006	0.000055	0.0000164	0.0000235	0.0000302
Calcium	-		-		-		mg/L	97.6	88.3	84.9	109	120	148	145	110	105	86.6	128	-	197	194	135	34.5	57.5	39.2	61.5	35.5
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000047	0.00009	0.000089
Chromium	0.001 Cr VI 0.0089 Cr III	V	-		-		mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	0.0015	0.0014	0.0014	-	0.0021	0.0016	0.0015	0.0039	0.00099	0.00057	0.00058	0.00096
Cobalt	0.004		0.11		-		mg/L	0.0008	0.0011	0.00081	0.00094	0.00112	0.0012	0.00158	0.00147	0.00172	0.00146	0.00225	-	0.00314	0.00397	0.00369	0.00226	0.00163	0.00051	0.00187	0.00192
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.003	0.0038	0.00189	0.00235	0.002	0.00303	0.00231	0.00254	0.00447	0.0049	0.0035	-	0.0027	0.0058	0.0069	0.01	0.00399	0.00201	0.00354	0.00409
Iron	-		1		<0.3	AO	mg/L	0.258	0.886	0.633	0.0648	0.205	0.153	0.178	0.077	0.642	0.81	0.21	-	0.94	0.82	1.21	4.63	0.821	0.515	0.355	1.91
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.002	0.00026	0.0002	<0.0001	-	0.0001	0.0001	0.0002	0.0011	0.00021	0.0001	0.000076	0.000405
Lithium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0018	0.0012	-	0.0022	0.0012	0.001	0.0025	0.00088	<0.0010	<0.0010	<0.0010
Magnesium	-		-		-		mg/L	16.1	15.3	14.5	20.4	22.6	25.7	27.9	20.9	17.3	14.7	23.8	-	35.3	37.7	26.1	6.78	16.6	6.07	20.4	18.7
Manganese	1.11 - 3.43	H	1.8 - 7.6	H	<0.05	AO	mg/L	0.091	0.67	0.877	0.185	0.548	0.417	0.934	0.531	1.04	0.899	0.589	-	2.57	4.23	5.54	0.794	0.562	0.513	0.209	0.303
Mercury	0.0001		-		0.001		mg/L	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	2		-		0.25		mg/L	<0.001	<0.001	<0.001	<0.001	0.00035	<0.001	<0.001	<0.001	<0.001	0.0007	0.0011	-	0.001	0.0029	0.0017	0.0004	0.00129	0.000245	0.000948	0.00113
Nickel	0.025-0.15		-		-		mg/L	0.004	0.005	0.0039	0.0044	0.0055	0.0053	0.0078	0.0066	0.0104	0.0076	0.0082	-	0.0085	0.0084	0.0073	0.0055	0.00369	0.00111	0.00509	0.004
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	0.021	0.031	0.056	0.022	<0.01	0.107	0.03	0.015	0.033	ND	0.19	-	0.24	0.04	0.03	0.04	0.104	<0.050	0.068	0.197
Potassium	-		-		-		mg/L	36.7	34.8	30.9	40.7	46.2	57.4	61.4	46.4	45.6	38.2	55.7	-	87.9	57.7	33.3	8.85	27.2	8.29	38.8	34.1
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00478	0.0244	0.0199
Selenium	0.002		-		0.01	MAC	mg/L	<0.0001	<0.0001	<0.0001	<0.00004	<0.00004	0.00016	0.00023	<0.00004	0.00016	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	0.00054	0.000123	0.000217	0.000386
Silicon	-		-		-		mg/L	5.88	5.79	5.47	5.08	6.3	7.32	7.63	5.62	6.91	6.9	9	-	11.8	10.5	7.2	7.9	6	3.3	3.84	5.21
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	0.000008	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	55.9	61.1	55	74.1	87.1	104	126	96.6	92.8	73.8	137	-	185	139	90.9	19.5	61.2	14.3	81.7	73.6
Strontium	-		-		-		mg/L	0.572	0.583	0.566	0.729	0.767	0.901	0.938	0.747	0.723	0.571	0.881	-	1.19	1.24	0.983	0.203	0.479	0.214	0.582	0.406
Sulfur	-		-		-		mg/L	7	4.8	4.1	<15	<75	3.5	7.7	<3	12.1	7	16	-	21	32	15	<1	4.3	2.69	3.98	3.64
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0002	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	0.0004	-	0.0003	0.0002	<0.0002	<0.0002	<0.00020	<0.00010	0.0001	<0.00010
Titanium	-		-		-		mg/L	0.007	0.017	0.0055	<0.005	<0.005	<0.005	<0.005	<0.005	0.0056	0.015	<0.005	-	<0.005	0.008	0.009	0.089	0.0112	0.0111	<0.0036	0.0115
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00022	<0.00010	<0.00010
Uranium	0.0085		-		-		mg/L	0.0001	<0.0001	<0.0001	0.00014	0.000105	0.00021	0.00017	0.00014	0.00012	0.0001	0.00024	-	0.00021	0.0007	0.00063	0.00014	0.00022	0.000082	0.000395	0.000359
Vanadium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.001	<0.001	-	<0.001	0.001	0.001	0.008	0.0013	0.00099	<0.00050	0.00205
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	<0.005	0.005	<0.005	<0.005	<0.005	0.0055	<0.005	0.0061	0.0091	0.008	0.005	-	0.01	0.014	0.008	0.014	0.007	<0.0030	<0.0030	0.0046
Zirconium	-		-		-		mg/L	<0.0005	0.0023	0.00054	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004	0.0002	-	0.0005	0.0005	0.0004	0.001	0.00028	0.000206	0.000145	0.000195
Dissolved Metals																								
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0186	0.0338	0.0346
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	0.0002	0.00027
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00023	0.00112	0.00258
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0768	0.133	0.115
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.353	1.56	1.32
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000118	0.0000236	0.0000128
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	44.9	64.3	36.1
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000019	0.000076	0.000043
Chromium	0.001 Cr VI 0.0089 Cr III		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00018	0.0005	0.00042
Cobalt	0.004		0.11		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00029	0.00184	0.00156
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0014	0.00343	0.00235
Iron	-		0.35		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.027	0.091	0.418
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	0.000086
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.08	22.8	18.1
Manganese	1.23 - 1.73	H	2.09 - 2.36	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.295	0.194	0.224
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000257	0.000894	0.00125
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00082	0.00512	0.00364
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*<0.050*	*<0.050*	*<0.050*
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.6	43.8	35.8
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00493	0.0249	0.0195
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000137	0.000251	0.000347
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.75	3.6	4.52
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	90.2	74.8
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.223	0.588	0.386
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.59	3.45	3.42
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	0.0001	<0.00010
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00089	0.00098	0.00169
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000085	0.000421	0.000342
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050	0.0006
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	0.0013	<0.0010
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000069	0.000107	0.000197

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-9: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Report
Regional District of Kitimat-Stikine

Location					Thornhill Landfill																			
Site Name					SW-17																			
Sample ID	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Nov-96	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	L2124909-5 4-Jul-18	10-Sep-18
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																								
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.66	DRY
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.5	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	289.6	-
Conventional Parameters																								
Conductivity	-	-	-	uS/cm	67	108	80	119	77	155	-	42	151	74	106	87	106	102	119	140	115	77.1	93.4	104	-
Hardness (Total as CaCO3)	-	-	-	mg/L	-	44.5	34.5	39.6	36.5	52.5	-	24.4	66.1	33.1	40.6	34.9	52	-	56.8	65.1	49.7	31.3	41.1	42.9	-
pH	-	-	-	pH	-	7.7	7.3	7.4	7.4	7.2	-	7.4	7.5	7.4	7.3	7.5	7.7	7.6	7.6	7.7	7.6	7.3	7.6	7.93	-
Total Suspended Solids	-	-	-	mg/L	-	-	-	-	-	-	-	5.1	5.1	2.1	<1	1.4	3.6	1.7	1.8	1.6	1.4	6.6	2.9	<3.0	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.2	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	-	0.046	<0.03	0.47	0.04	0.56	-	<0.03	0.05	<0.03	<0.03	ND	<0.03	0.3	0.49	<0.03	<0.03	0.29	<0.03	0.0053	-
Chloride (Cl)	1500	-	-	mg/L	-	1.8	2.1	4.4	<1	7.7	-	<1	5.3	1.1	4.5	2.6	2.3	2.4	4.1	3.3	1.5	2.1	1.2	2.32	-
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	0.03	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	ND	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.022	-
Nitrate (as N)	400	100	10	mg/L	-	0.21	0.4	0.21	0.1	1.16	-	0.041	0.56	0.139	0.404	0.59	0.08	0.38	0.57	0.32	0.11	0.088	0.13	0.384	-
Nitrite (as N)	0.2 - 0.8	10	1	mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	ND	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0010	-
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.192	-
Sulfate (SO4)	128 - 429	1000	500	mg/L	-	ND	1.8	<1	1.48	1.51	-	0.74	1.88	0.96	<0.5	2.2	1.8	-	2.4	2.6	2.3	1.4	1.6	1.24	-
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	ND	<4.0	<4.0	<4.0	<4.0	<4.0	-	<4.0	<2.0	-
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	<30	39	22	22	<20	-	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	-	<20	<20	-
Total Metals																								
Aluminum	-	5	9.5	mg/L	-	0.036	0.693	0.106	0.749	0.0838	-	0.197	0.0314	0.0969	0.152	0.219	0.143	-	0.127	0.078	0.045	0.632	0.108	0.124	-
Antimony	0.09	-	0.006	mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	0.0002	<0.0001	<0.00020	<0.00010	-
Arsenic	0.05	0.025	0.01	mg/L	-	ND	<0.0001	<0.0001	0.00026	<0.0001	-	<0.0001	0.0001	<0.0001	0.00015	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00019	-
Barium	10	-	1	mg/L	-	0.02	0.019	0.023	0.0162	0.0258	-	0.0117	0.0246	0.0129	0.0215	0.02	0.021	-	0.023	0.026	0.02	0.021	0.0182	0.0269	-
Beryllium	0.0015	0.1	0.008	mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	-
Bismuth	-	-	-	mg/L	-	ND	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	-
Boron	12	5	5	mg/L	-	0.052	<0.05	<0.05	<0.05	0.094	-	<0.05	0.067	<0.05	0.066	0.196	0.068	-	0.073	0.051	0.038	0.044	0.0572	0.053	-
Cadmium	0.0005 - 0.004	0.08	0.005	mg/L	-	0.00002	0.00001	0.00002	0.000258	<0.00001	-	0.000014	<0.00001	<0.00001	<0.00001	ND	<0.00001	-	<0.00001	0.00002	<0.00001	<0.00001	<0.000010	0.0000069	-
Calcium	-	1000	-	mg/L	-	14.7	11.7	13.4	13.2	17.6	-	8.9	23.8	12.3	14	12.2	19.2	-	20.1	23.6	18.2	10.6	14.9	14.5	-
Cesium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000014	-
Chromium	0.01	0.05	0.05	mg/L	-	<0.001	0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	0.0007	<0.00050	0.00025	-
Cobalt	0.04	1	0.001	mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	0.00017	0.00013	-	0.00013	0.00011	0.00007	0.0003	<0.00010	0.00013	-
Copper	0.02 - 0.09	0.3	1.5	mg/L	-	0.0029	0.0027	0.0018	0.0029	0.00103	-	0.00116	0.0007	0.00097	0.00159	0.0017	0.0012	-	0.001	0.0011	0.0011	0.002	0.00099	0.00104	-
Iron	-	-	6.5	mg/L	-	0.045	0.745	0.178	0.927	0.163	-	0.242	0.111	0.127	0.164	0.25	0.22	-	0.21	0.24	0.13	0.64	0.161	0.245	-
Lead	0.04 - 0.16	0.1	0.01	mg/L	-	0.0006	0.0002	<0.0002	0.00022	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0002	<0.00020	<0.000050	-
Lithium	-	5	0.008	mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	0.0002	0.0002	-	0.0001	<0.0001	<0.0001	0.0003	<0.00010	<0.0010	-
Magnesium	-	-	-	mg/L	-	1.11	1.26	1.47	0.836	2.06	-	0.523	1.63	0.584	1.34	1.06	1	-	1.62	1.48	1.01	1.16	0.901	1.34	-
Manganese	-	-	1.5	mg/L	-	0.004	0.027	0.014	0.0338	0.0187	-	0.0113	0.009	0.0052	0.0108	0.0137	0.0152	-	0.0148	0.0141	0.0142	0.046	0.0111	0.0234	-
Mercury	0.00025	0.002	0.001	mg/L	-	ND	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	-
Molybdenum	10	0.05	0.25	mg/L	-	ND	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	0.0005	0.0005	-	0.0005	0.0007	0.0006	0.0003	0.00048	0.000421	-
Nickel	0.25 - 1.5	1	0.08	mg/L	-	0.001	<0.001	<0.001	<0.001	0.0012	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.0002	-	0.0003	<0.0002	<0.0002	0.0008	<0.00040	<0.00050	-
Phosphorus	-	-	-	mg/L	-	-	0.025	<0.01	0.026	<0.01	-	<0.1	<0.1	<0.1	<0.1	ND	0.09	-	0.03	<0.02	0.02	<0.05	<0.050	<0.050	-
Potassium	-	-	-	mg/L	-	1.78	1.68	2.8	0.742	3.41	-	0.64	2.63	0.676	2.23	1.77	1.24	-	2.72	1.97	1.01	1.29	1.03	1.89	-
Rubidium	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016	-
Selenium	0.02	0.03	0.01	mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	-
Silicon	-	-	-	mg/L	-	2.95	3.71	2.81	3.13	2.78	-	2.21	3.28	2.98	3.03	3.1	3.8	-	3.9	3.7	3	3.7	3.5	2.85	-
Silver	0.0005 - 0.015	-	0.02	mg/L	-	ND	<0.000005	<0.000005	<0.000005	<0.000005	-	<0.00002	<0.00002	<0.00002	<0.00002	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	-
Sodium	-	-	200	mg/L	-	3.02	3.01	4.58	1.09	6.29	-	0.935	4.87	1.09	4.17	3.16	2.6	-	5.32	3.84	1.73	2.4	1.8	3.56	-
Strontium	-	-	2.5	mg/L	-	0.061	0.042	0.065	0.0321	0.0853	-	0.0316	0.0891	0.0389	0.0623	0.054	0.07	-	0.069	0.085	0.062	0.043	0.0557	0.0642	-
Sulfur	-	-	-	mg/L	-	ND	<3	<3	<3	<3	-	<3	<3	<3	<3	ND	<1	-	2	<1	<1	<1	<3.0	<0.50	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	-
Thallium	0.003	-	-	mg/L	-	ND	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	-
Tin	-	-	2.5	mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00010	-
Titanium	1	-	-	mg/L	-	ND	<0.005	<0.005	0.0319	<0.005	-	0.0092	<0.005	<0.005	<0.005	0.013	0.007	-	<0.005	<0.005	<0.005	0.02	<0.0050	0.00423	-
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Uranium	0.085	0.2	0.02	mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00004	0.00006	-	0.00006	0.00008	0.00006	0.00004	0.000049	0.000041	-
Vanadium	-	0.1	0.02	mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	0.001	-	0.001	<0.001	<0.001	0.002	<0.0010	0.00076	-
Zinc	0.075 - 38.1	2	3	mg/L	-	0.009	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.0040	<0.0030	-
Zirconium	-	-	-	mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0006	<0.00010	0.000095	-
Dissolved Metals																								
Aluminum	-	5	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0335	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Arsenic	0.05	0.025	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00013	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0255	-
Beryllium	0.0015	0.1	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	-
Boron	12	5	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.056	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000323	-
Calcium	-	1000	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.9	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Chromium	0.01 (e)	0.05	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Cobalt	0.04	1	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00106	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.113	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	-
Lithium	-	5	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.41	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0171	-
Mercury	0.00025	0.002	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-
Molybdenum	10	0.05	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000381	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.09	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00163	-
Selenium	0.02	0.03	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000064	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.75	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.85	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0629	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0008	-
Tungsten	-	-	0.003		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Uranium	0.085	0.2	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000036	-
Vanadium	-	0.1	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	-
Zinc	0.075 - 2.4 (d)	2	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0024	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000060	-

NOTES

BC CSR AW-F — er Quality Guidelines for Protection of Freshwater Aquatic Life
BC CSR LW — ion Water Quality Guidelines for Protection of Livestock
BC CSR DW — ulation Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)

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

Table X: Surface Water Analytical Results
Meziadin Landfill Surface Water Monitoring Program
Regional District of Kitimat-Stikine

Location							Thornhill Landfill																		
Site Name	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes		SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17	SW-17
Sample ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L2124909-5	-
Sample Date								1-Nov-96	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	4-Jul-18	10-Sep-18
QA/QC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																											
pH	-		-		-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.66	DRY
Temperature	-		-		-		°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	-
Conductivity	-		-		-		uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.5	-
Water level	-		-		-		m	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.8	-
Oxidation Reduction Potential	-		-		-		mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	289.6	-
Conventional Parameters																											
Conductivity	-		-		-		uS/cm	67	108	79.6	119	77.4	155	-	41.7	151	74.3	106	86.9	106	102	119	140	115	77.1	93.4	104	-
Hardness (Total as CaCO3)	-		-		-		mg/L	-	44.5	34.5	39.6	36.5	52.5	-	24.4	66.1	33.1	40.6	34.9	52	-	56.8	65.1	49.7	31.3	41.1	42.9	-
pH	6.5-9.0		-		6.5 - 8.5		-	-	7.7	7.3	7.4	7.4	7.2	-	7.4	7.5	7.4	7.3	7.5	7.7	7.6	7.6	7.7	7.6	7.3	7.6	7.93	-
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/L) (i)**		-		mg/L	-	-	-	-	-	-	-	5.1	5.1	2.1	<1	1.4	3.6	1.7	1.8	1.6	1.4	6.6	2.9	<3.0	-
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.2	-
Ammonia, Total (as N)	0.9 - 1.86	pH/T*	**6.88 - 17.6**	pH/T*	-		mg/L	-	0.046	<0.03	0.47	0.04	0.56	-	<0.03	0.05	<0.03	<0.03	ND	<0.03	0.3	0.49	<0.03	<0.03	0.29	<0.03	0.0053	-
Chloride (Cl)	150		600		<250	AO	mg/L	-	1.8	2.1	4.4	<1	7.7	-	<1	5.3	1.1	4.5	2.6	2.3	2.4	4.1	3.3	1.5	2.1	1.2	2.32	-
Fluoride (F)	-		**1.09 - 1.46**	H	1.5		mg/L	-	0.03	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	ND	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.022	-
Nitrate (as N)	3		**32.8**		10		mg/L	-	0.21	0.4	0.21	0.1	1.16	-	0.041	0.56	0.139	0.404	0.59	0.08	0.38	0.57	0.32	0.11	0.088	0.13	0.384	-
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	ND	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0010	-
Total Kjeldahl Nitrogen	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.192	-
Phosphorus (P)-Total	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0081	-
Orthophosphate - Dissolved (as P)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0011	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	-	ND	1.8	<1	1.48	1.51	-	0.74	1.88	0.96	<0.5	2.2	1.8	-	2.4	2.6	2.3	1.4	1.6	1.24	-
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	<4	<4	<4	<4	<4	-	<4	<4	<4	<4	ND	<4.0	<4.0	<4.0	<4.0	<4.0	-	<4.0	<2.0	-
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	<30	39	22	22	<20	-	<20	<20	<20	<20	ND	<20	<20	<20	<20	<20	-	<20	<20	-
Total Metals																											
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	-	0.036	**0.693**	**0.106**	**0.749**	0.0838	-	**0.197**	0.0314	**0.0969**	**0.152**	**0.219**	**0.143**	-	**0.127**	**0.078**	0.045	**0.632**	**0.108**	**0.124**	-
Antimony	0.009		-		-		mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	0.0002	<0.0001	<0.00020	<0.00010	-
Arsenic	0.005		-		0.01		mg/L	-	ND	<0.0001	<0.0001	0.00026	<0.0001	-	<0.0001	0.0001	<0.0001	0.00015	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00019	-
Barium	1		-		-		mg/L	-	0.02	0.019	0.023	0.0162	0.0258	-	0.0117	0.0246	0.0129	0.0215	0.02	0.021	-	0.023	0.026	0.02	0.021	0.0182	0.0269	-
Beryllium	0.00013		-		-		mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	-
Bismuth	-		-		-		mg/L	-	ND	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00050	-
Boron	1.2		-		5		mg/L	-	0.052	<0.05	<0.05	<0.05	0.094	-	<0.05	0.067	<0.05	0.066	0.196	0.068	-	0.073	0.051	0.038	0.044	0.0572	0.053	-
Cadmium	0.00018 - 0.00026	H	**0.00047 - 0.00079**	H	0.005		mg/L	-	0.00002	0.00001	0.00002	0.000258	<0.00001	-	0.000014	<0.00001	<0.00001	<0.00001	ND	<0.00001	-	<0.00001	0.00002	<0.00001	<0.00001	<0.000010	0.0000069	-
Calcium	-		-		-		mg/L	-	14.7	11.7	13.4	13.2	17.6	-	8.9	23.8	12.3	14.1	12.2	19.2	-	20.1	23.6	18.2	10.6	14.9	14.5	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000014	-
Chromium	0.001 Cr VI or 0.0089 Cr III	V	-		-		mg/L	-	<0.001	0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	0.0007	<0.00050	0.00025	-
Cobalt	0.004		**0.11**		-		mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	0.00017	0.00013	-	0.00013	0.00011	0.00007	0.0003	<0.00010	0.00013	-
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	-	0.0029	0.0027	0.0018	0.0029	0.00103	-	0.00116	0.0007	0.00097	0.00159	0.0017	0.0012	-	0.001	0.0011	0.0011	0.002	0.00099	0.00104	-
Iron	-		**1**		<0.3	AO	mg/L	-	0.045	0.745	0.178	0.927	0.163	-	0.242	0.111	0.127	0.164	0.25	0.22	-	0.21	0.24	0.13	0.64	0.161	0.245	-
Lead	0.0057 - 0.0079	H	**0.0611 - 0.1174**	H	0.01		mg/L	-	0.0006	0.0002	<0.0002	0.00022	0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0002	<0.00020	<0.000050	-
Lithium	-		-		-		mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	0.0002	0.0002	-	0.0001	<0.0001	<0.0001	0.0003	<0.00010	<0.0010	-
Magnesium	-		-		-		mg/L	-	1.11	1.26	1.47	0.836	2.06	-	0.523	1.63	0.584	1.34	1.06	1	-	1.62	1.48	1.01	1.16	0.901	1.34	-
Manganese	0.71 - 0.9	H	**0.81 - 1.27**	H	<0.05	AO	mg/L	-	0.004	0.027	0.014	0.0338	0.0187	-	0.0113	0.009	0.0052	0.0108	0.0137	0.0152	-	0.0148	0.0141	0.0142	0.046	0.0111	0.0234	-
Mercury	0.0001		-		0.001		mg/L	-	ND	<0.00001	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	-
Molybdenum	2		-		0.25		mg/L	-	ND	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	0.0005	0.0005	-	0.0005	0.0007	0.0006	0.0003	0.00048	0.000421	-
Nickel	0.025-0.15		-		-		mg/L	-	0.001	<0.001	<0.001	<0.001	0.0012	-	<0.001	<0.001	<0.001	<0.001	0.002	<0.0002	-	0.0003	<0.0002	<0.0002	0.0008	<0.00040	<0.00050	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	0.025	<0.01	0.026	<0.01	-	<0.1	<0.1	<0.1	<0.1	ND	0.09	-	0.03	<0.02	0.02	<0.05	<0.050	<0.050	-
Potassium	-		-		-		mg/L	-	1.78	1.68	2.8	0.742	3.41	-	0.64	2.63	0.676	2.23	1.77	1.24	-	2.72	1.97	1.01	1.29	1.03	1.89	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0016	-
Selenium	0.002		-		0.01	MAC	mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.000050	-
Silicon	-		-		-		mg/L	-	2.95	3.71	2.81	3.13	2.78	-	2.21	3.28	2.98	3.03	3.1	3.8	-	3.9	3.7	3	3.7	3.5	2.85	-
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	-	ND	<0.000005	<0.000005	<0.000005	<0.000005	-	<0.00002	<0.00002	<0.00002	<0.00002	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	-
Sodium	-		-		<200	AO	mg/L	-	3.02	3.01	4.58	1.09	6.29	-	0.935	4.87	1.09	4.17	3.16	2.6	-	5.32	3.84	1.73	2.4	1.8	3.56	-
Strontium	-		-		-		mg/L	-	0.061	0.042	0.065	0.0321	0.0853	-	0.0316	0.0891	0.0389	0.0623	0.054	0.07	-	0.069	0.085	0.062	0.043	0.0557	0.0642	-
Sulfur	-		-		-		mg/L	-	ND	<3	<3	<3	<3	-	<3	<3	<3	<3	ND	<1	-	2	<1	<1	<1	<3.0	<0.50	-
Tellurium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	-
Thallium	0.0008		-		-		mg/L	-	ND	<0.00005	<0.00005	<0.00005	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	-
Tin	-		-		-		mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00010	-
Titanium	-		-		-		mg/L	-	ND	<0.005	<0.005	<0.005	0.0319	-	<0.005	<0.005	<0.005	<0.005	0.0092	<0.005	-	<0.005	<0.005	<0.005	0.02	<0.0050	0.00423	-
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Uranium	0.0085		-		-		mg/L	-	ND	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00004	0.00006	-	0.00006	0.00008	0.00006	0.00004	0.000049	0.000041	-
Vanadium	-		-		-		mg/L	-	ND	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	0.001	-	0.001	<0.001	<0.001	0.002	<0.0010	0.00076	-
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**	H	<5.0	AO	mg/L	-	0.009	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	ND	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.0040	<0.0030	-
Zirconium	-		-		-		mg/L	-	ND	<0.0005	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0006	<0.00010	0.000095	-
Dissolved Metals																											
Aluminum	0.05	pH	**0.1**	pH/T	9.5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0335	-
Antimony	0.009		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Arsenic	0.005		-		0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00013	-
Barium	1		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0255	-
Beryllium	0.00013		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	-
Boron	1.2		-		5		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.056	-
Cadmium	0.00013 - 0.00026	H	**0.00031 - 0.00079**	H	0.005		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0000323	-
Calcium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.9	-
Cesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Chromium	0.001 Cr VI or 0.0089 Cr III		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Cobalt	0.004		**0.11**		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00106	-
Iron	-		**0.35**		<0.3	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.113	-
Lead	0.0048 - 0.0079	H	**0.0373 - 0.1174**	H	0.01		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	-
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	-
Magnesium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.41	-
Manganese	0.71 - 0.9	H	**0.81 - 1.27**	H	<0.05	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0171	-
Mercury	0.0001		-		0.001		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	-
Molybdenum	2		-		0.25		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000381	-
Nickel	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	-
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	-
Potassium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.09	-
Rubidium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00163	-
Selenium	0.002		-		0.01	MAC	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000064	-
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.75	-
Silver	0.00005, 0.0015	H	**0.0001, 0.003**	H	-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Sodium	-		-		<200	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.85	-
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0629	-
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	-
Tellerium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	-
Thallium	0.0008		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	-
Thorium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Titanium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0008	-
Tungsten	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	-
Uranium	0.0085		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.000036	-
Vanadium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	-
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**	H	<5.0	AO	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0024	-
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000060	-

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG), updated
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with temperature
V = Standard is valence dependent.VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QA/QC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-11: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	SW-6 - 1-Jun-96 -	SW-6 - 1-Oct-96 -	SW-6 - 1-Jun-97 -	SW-6 - 4-Dec-97 -	SW-6 - 4-May-98 FDA	SW-6 - 4-May-98 FD	SW-6 - 24-Sep-98 -	SW-6 - 27-Jan-99 -	SW-6 - 1-Apr-99 -	SW-6 - 1-Nov-99 -	SW-6 - 17-Mar-00 -	SW-6 - 15-Aug-00 -	SW-6 - 20-Dec-00 -	SW-6 - 7-May-01 -
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	°C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	m	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	uS/cm	-	131	92	103	75	28	136	-	80	-	77	-	-	60
Hardness (Total as CaCO3)	-	-	-	mg/L	-	57.6	40.2	43.7	35.3	15.1	63.4	48.5	36	39	34	48	43	42
pH	-	-	-	pH	-	7.5	7.4	7.2	7.4	7.6	7.9	-	-	-	7.3	7.7	7.5	8.1
Total Suspended Solids	-	-	-	mg/L	<5	4	5	<1	23	-	19	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	<0.1	0.04	<0.005	0.04	0.007	<0.005	0.008	0.237	<0.02	0.11	0.03	0.29	0.03	-
Chloride (Cl)	1500	-	-	mg/L	0.4	1.9	0.6	2.5	1	0.33	2.5	2.8	0.7	1.7	3.2	1.7	2.4	0.3
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05
Nitrate (as N)	400	**100**	10	mg/L	-	0.139	0.022	0.478	0.047	0.046	0.135	0.44	0.1	0.24	-	0.18	0.06	0.24
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	-	0.006	0.001	0.006	0.003	<0.005	0.002	<0.005	<0.002	0.004	-	<0.002	0.004	0.004
Total Kjeldahl Nitrogen	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	1.6	2.2	2	3	2	0.79	3	2.2	1.7	1.8	2.1	1.8	2.3	1.3
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	-	<5	<5	<5	5	<5	-	<10	<10	<10	<10	<10	<10
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	-	<20	<20	<20	14	<20	<10	<25	-	<25	<25	<25	<25
Total Metals																		
Aluminum	-	**5**	9.5	mg/L	<0.1	0.05	<0.05	0.05	0.062	0.08	0.01	0.02	0.037	0.041	0.14	0.016	0.027	0.062
Antimony	0.09	-	0.006	mg/L	<0.001	-	<0.02	<0.0001	0.0001	<0.05	<0.0001	<0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	0.05	**0.025**	0.01	mg/L	<0.001	0.0002	<0.2	0.0001	0.0001	<0.0005	0.0002	<0.04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	10	-	1	mg/L	<0.1	0.02	0.01	0.02	0.01	0.009	0.02	0.017	0.011	0.013	0.044	0.013	0.016	0.012
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.001	<0.005	<0.005	<0.005	<0.005	>0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	**5**	5	mg/L	-	<0.1	-	-	-	<0.01	-	0.034	<0.05	<0.05	0.06	<0.05	<0.05	0.11
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	0.005	<0.0002	<0.002	<0.0002	<0.0002	<0.005	0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Calcium	-	**1000**	-	mg/L	19	21.5	15.3	15.6	13.3	12.9	23.1	16.8	13.4	13.9	11.7	18.1	15.2	15.1
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	**0.05**	0.05	mg/L	<0.02	<0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	0.04	**1**	0.001	mg/L	<0.02	<0.02	<0.01	<0.01	<0.01	<0.005	<0.01	<0.003	,0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	<0.01	0.001	<0.01	<0.001	0.002	0.0006	0.001	0.002	0.002	<0.001	0.001	<0.001	<0.001	0.001
Iron	-	-	6.5	mg/L	<0.1	0.08	0.04	0.12	0.05	0.046	0.12	0.06	<0.05	0.11	0.2	0.2	0.12	0.09
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	0.001	0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Lithium	-	**5**	0.008	mg/L	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	0.6	0.97	0.51	1.18	0.5	0.5	1.4	1.59	0.7	1.09	1.19	0.68	1.18	0.93
Manganese	-	-	1.5	mg/L	<0.01	<0.005	0.008	0.19	0.007	0.004	<0.005	0.017	0.007	0.006	0.035	0.015	0.008	0.006
Mercury	0.00025	**0.002**	0.001	mg/L	-	<0.00005	<0.00005	<0.00001	<0.00001	-	<0.00001	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	10	**0.05**	0.25	mg/L	<0.01	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	0.25 - 1.5	**1**	0.08	mg/L	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	0.01	<0.01	0.06	0.05
Potassium	-	-	-	mg/L	<5.0	-	-	-	-	0.5	-	1.9	0.69	1.39	1.54	0.75	1.44	0.96
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	mg/L	-	<0.0005	<0.01	<0.0005	<0.0005	<0.05	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	3.98	6.6	5.97	5.21
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.01	<0.0001	<0.001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium	-	-	200	mg/L	<1.0	3	-	-	-	0.8	-	4.27	1.09	2.27	3.07	1.23	2.06	1.67
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	0.042	0.051	0.045	0.039
Sulfur	-	-	-	mg/L	-	-	-	-	-	0.49	-	1.19	-	-	-	-	-	-
Tellurium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001
Titanium	1	-	-	mg/L	<0.01	-	-	<0.01	<0.01	<0.002	<0.01	<0.003	0.001	0.001	0.002	<0.001	<0.001	<0.001
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	mg/L	-	-	-	0.00005	0.00005	-	0.00007	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Vanadium	-	**0.1**	0.02	mg/L	<0.01	<0.03	-	<0.03	<0.03	<0.01	<0.03	<0.003	<0.001	<0.001	0.001	0.001	<0.001	<0.001
Zinc	0.075 - 38.1	**2**	3	mg/L	<0.01	<0.005	<0.005	<0.005	<0.005	<0.002	<0.005	0.004	<0.005	<0.005	<0.005	0.006	<0.005	0.006
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0.1	<0.01	<0.01	0.02
Dissolved Metals																		
Aluminum	-	**5**	9.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	**0.025**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	**0.1**	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	**5**	5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	**0.08**	0.005	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	**1000**	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	**0.05**	0.05	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	**1**	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	**0.3**	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	**0.1**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	**5**	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	**0.002**	0.001	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	**0.05**	0.25	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	**1**	0.08	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	**0.1**	0.02	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	**2**	3	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

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

Location																		Thornhill Landf
Site Name	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)															SW-6
Sample ID				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	SW-6
Laboratory ID				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date				1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03		3-Aug-03	18-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07
QAQC				-	-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	97	76	76	42	121	127	155	106	97	109	85	92	500	1,280	68
Hardness (Total as CaCO3)	-	-	-	41	24	31	19	45	-	64	31	37	51.8	37.9	46	40	248	29
pH	-	-	-	7.1	7.3	7.4	6.9	7.5	7.4	7.9	7.0	7.6	7.1	7.6	6.8	6.4	7.4	7.6
Total Suspended Solids	-	-	-	-	-	-	-	-	<4	-	-	-	<4	-	<4	-	17.6	<0.01
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	0.11	<0.005	<0.005	<0.005	<0.01	<0.005	<0.01	0.11	0.01	0.108	0.04	0.207	0.13	17.6	<0.01
Chloride (Cl)	1500	-	-	1.3	3.4	1.7	0.8	5.9	5.4	5.3	8.9	2.2	1.6	0.45	1.4	16.3	68.3	0.33
Fluoride (F)	2.0-3.0 (e)	-	-	< 0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	<0.05	-	<0.1	<0.05	<0.50
Nitrate (as N)	400	100	10	0.16	0.7	<0.05	0.15	0.65	0.62	<0.05	0.49	<0.05	0.14	<0.05	0.13	<0.002	2.75	<0.05
Nitrite (as N)	0.2 - 0.8	10	1	< 0.002	0.012	<0.002	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.01	0.03	<0.002
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	1000	500	2	34.8	2.3	1.0	2.8	2.6	3.0	3.0	2.0	2.0	1.5	1.7	13.3	16.1	0.8
Biological Oxygen Demand (BOD)	-	-	-	< 10	<10	<10	11	<10	<6	<10	<10	<10	<10	<10	-	23	<10	<10
Chemical Oxygen Demand (COD)	-	-	-	< 25	<25	<25	38	<25	<10	<25	<25	<25	<10	50	12	<20	<20	<20
Total Metals																		
Aluminum	-	5	9.5	0.022	0.11	0.025	0.13	0.07	0.0305	0.02	0.44	0.022	0.0311	0.026	0.0739	< 0.005	0.017	0.034
Antimony	0.09	-	0.006	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000023	<0.001	< 0.001	< 0.001	0.000016	< 0.0002	0.000023	< 0.001	<0.001	<0.001
Arsenic	0.05	0.025	0.01	< 0.001	<0.001	<0.001	<0.001	<0.001	0.0002	<0.001	< 0.001	< 0.001	0.0002	< 0.0002	0.0001	< 0.001	<0.001	<0.001
Barium	10	-	1	0.013	0.01	0.009	0.008	0.015	0.0183	0.023	0.021	0.012	0.0153	0.01	0.0123	0.012	0.2	0.007
Beryllium	0.0015	0.1	0.008	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001
Bismuth	-	-	-	-	-	-	-	-	-	<0.001	-	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001
Boron	12	5	5	0.05	<0.05	0.08	<0.05	0.07	-	<0.05	< 0.05	< 0.05	0.019	0.03	0.018	< 0.05	0.96	< 0.05
Cadmium	0.0005 - 0.004	0.08	0.005	< 0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00001	0.0009	< 0.0002	< 0.0002	<0.00001	< 0.00004	0.00001	< 0.0002	<0.0002	<0.0002
Calcium	-	1000	-	14.8	7.62	11.2	6.49	14.7	-	22.7	9.74	13.5	19.1	13.9	16.7	15.1	77.2	10.9
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	0.05	0.05	< 0.001	<0.001	<0.001	1.0	<0.001	<0.0002	<0.001	< 0.001	< 0.001	<0.0002	< 0.0002	0.0002	< 0.001	<0.001	<0.001
Cobalt	0.04	1	0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000113	<0.001	< 0.001	< 0.001	0.00004	< 0.0002	0.000052	< 0.001	0.001	<0.001
Copper	0.02 - 0.09	0.3	1.5	< 0.001	<0.001	0.001	<0.001	0.002	0.00067	<0.001	0.002	< 0.001	0.0008	0.0006	0.00098	< 0.001	0.003	<0.001
Iron	-	-	6.5	0.13	0.14	0.1	0.08	0.15	-	0.36	0.95	< 0.05	0.053	0.08	0.08	< 0.05	0.08	<0.05
Lead	0.04 - 0.16	0.1	0.01	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00009	<0.001	< 0.001	< 0.001	<0.00001	< 0.0002	0.00001	< 0.001	<0.001	<0.001
Lithium	-	5	0.008	-	-	<0.05	<0.05	<0.05	0.00038	<0.001	-	< 0.001	<0.00005	< 0.0002	0.00005	< 0.001	<0.001	<0.005
Magnesium	-	-	-	1.01	1.18	0.61	0.56	1.88	-	1.81	1.61	0.7	0.99	0.79	0.96	0.5	13.4	0.32
Manganese	-	-	1.5	0.016	0.017	0.003	0.009	0.011	0.0227	0.023	0.078	0.009	0.0066	0.0041	0.00547	0.002	0.72	0.004
Mercury	0.00025	0.002	0.001	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.00002	<0.00002
Molybdenum	10	0.05	0.25	< 0.001	<0.001	<0.001	<0.001	0.0016	0.00055	0.0008	< 0.0005	< 0.0005	0.00041	0.0004	0.00031	< 0.0005	<0.0005	<0.0005
Nickel	0.25 - 1.5	1	0.08	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.001	0.001	< 0.001	0.00024	0.0007	0.00011	< 0.001	0.004	< 0.001
Phosphorus	-	-	-	0.05	0.04	0.11	0.04	0.07	-	0.09	0.45	< 0.15	<0.1	0.03	0.1	< 0.15	<0.15	<0.15
Potassium	-	-	-	1.08	1.61	0.48	0.77	2.12	-	1.89	1.43	0.5	1	0.96	1	0.5	30.4	0.4
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0002	<0.001	< 0.001	< 0.001	<0.0002	0.0005	0.0002	< 0.001	<0.001	<0.001
Silicon	-	-	-	6.11	4.83	2.84	3.27	5.67	-	6.76	5.8	4.5	-	6.25	-	2.1	3.7	1.5
Silver	0.0005 - 0.015	-	0.02	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00002	<0.0001	< 0.0001	< 0.00025	<0.00002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025
Sodium	-	-	200	1.75	3.32	1.77	1.28	6.3	-	5.46	5.71	1.8	1.96	1.81	2.12	0.77	58.2	0.61
Strontium	-	-	2.5	0.041	0.44	0.026	0.018	0.053	0.00625	0.073	0.044	0.031	0.0457	0.039	0.0367	0.031	0.51	0.02
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	0.6	-	-	-
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	< 0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000004	<0.0001	< 0.0001	< 0.0001	0.000002	< 0.00002	0.002	< 0.0001	<0.0001	<0.0001
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00003	<0.001	< 0.001	< 0.001	0.00001	< 0.0002	-	< 0.001	<0.001	<0.001
Titanium	1	-	-	< 0.001	0.003	<0.001	0.001	0.002	-	0.001	0.015	< 0.001	<0.003	0.0006	0.003	< 0.001	<0.001	<0.001
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	< 0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000079	<0.0005	< 0.0005	< 0.0005	0.000062	< 0.0001	0.000043	< 0.0005	<0.0005	<0.0005
Vanadium	-	0.1	0.02	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00028	<0.001	0.001	< 0.001	0.00039	0.0004	0.00043	< 0.001	<0.001	<0.001
Zinc	0.075 - 38.1	2	3	< 0.005	<0.005	0.006	< 0.005	<0.005	0.006	<0.005	0.008	< 0.005	<0.0001	< 0.001	0.0001	< 0.005	<0.005	<0.005
Zirconium	-	-	-	< 0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.01
Dissolved Metals																		
Aluminum	-	5	9.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	0.025	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	0.1	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	0.08	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	1000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	1	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	0.3	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	0.1	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	5	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	0.002	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	0.05	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	1	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	0.03	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	0.2	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	0.1	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

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

Table D-11: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location				II														
Site Name	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	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	SW-6
Sample ID				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Laboratory ID				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date				27-May-08	10-Oct-08	24-Sep-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14
QAQC				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations																		
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-	-	-	66	130	111	99	95	108	80	90	76	126	104	64	156	90	101
Hardness (Total as CaCO3)	-	-	-	26.5	61.6	51.3	41.6	41	49.2	34.7	33.4	36.2	48.6	47.2	35.1	73.6	39.7	44.3
pH	-	-	-	7.7	8.0	7.6	7.0	7.2	7.8	7.4	7.4	7.5	7.1	8.4	7.7	7.4	7.5	7.4
Total Suspended Solids	-	-	-	-	<4	-	-	-	-	-	-	-	<1	-	4.5	<1	3.9	2.3
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	1.3 - 18.5	-	-	<0.03	0.2	<0.03	<0.03	<0.03	0.18	<0.03	0.18	0.04	0.24	<0.03	<0.03	0.04	<0.03	<0.03
Chloride (Cl)	1500	-	-	1	2.4	1.8	2.8	1.1	1.2	2.2	3.3	<1	5.8	2.1	<1	3.5	1	7.4
Fluoride (F)	2.0-3.0 (e)	-	-	<0.1	<0.005	ND	ND	ND	0.03	<0.1	<0.1	<0.1	<0.1	0.026	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	400	**100**	10	<0.1	-	ND	0.6	ND	0.17	0.4	0.44	<0.1	0.8	0.2	<0.1	0.28	0.1	0.212
Nitrite (as N)	0.2 - 0.8	**10**	1	<0.01	0.002	ND	ND	ND	ND	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	**1000**	500	1.1	<0.5	2	2.5	18.1	0.6	1.8	<1	0.97	1.36	1.84	1.02	6.08	0.7	<0.5
Biological Oxygen Demand (BOD)	-	-	-	<6	<10	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chemical Oxygen Demand (COD)	-	-	-	<30	15	<30	<30	<30	<30	33	<30	<30	<20	<20	<20	<20	<20	<20
Total Metals																		
Aluminum	-	**5**	9.5	0.05	0.037	0.022	0.029	0.022	0.042	0.828	0.489	0.514	0.218	0.0516	0.178	0.0402	0.141	0.312
Antimony	0.09	-	0.006	<0.0006	<0.00002	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000123	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic	0.05	**0.025**	0.01	<0.001	0.00013	0.0001	ND	ND	ND	0.0001	0.0001	0.00024	<0.0001	0.000098	<0.0001	0.00013	0.00011	0.00022
Barium	10	-	1	0.01	0.018	0.069	0.051	0.061	0.017	0.02	0.018	0.0146	0.0205	0.0156	0.0111	0.0215	0.0123	0.0173
Beryllium	0.0015	**0.1**	0.008	<0.0004	<0.00001	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	-	-	-	-	<0.000005	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	12	**5**	5	0.004	<0.05	ND	ND	ND	ND	0.055	0.054	<0.05	0.056	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	0.0005 - 0.004	**0.08**	0.005	0.0003	<0.000005	0.00001	0.00004	0.00002	0.00009	0.00002	0.00002	0.000016	0.00006	0.000011	<0.00001	<0.00001	<0.00001	<0.00001
Calcium	-	**1000**	-	11.8	20.1	19.4	15.7	16.2	16.5	11.8	11.4	13.2	16.9	17.3	13.3	27.4	15	16.1
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01	**0.05**	0.05	0.001	<0.0001	ND	ND	ND	ND	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	0.04	**1**	0.001	<0.0001	0.000045	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000048	<0.0005	<0.0005	<0.0005	<0.0005
Copper	0.02 - 0.09	**0.3**	1.5	0.01	0.00058	0.0015	0.0015	0.0049	0.0048	0.0031	0.0031	0.00213	0.0021	0.00082	0.00091	0.00066	0.00079	0.00169
Iron	-	-	6.5	0.06	0.151	0.153	0.077	0.042	0.055	0.947	0.607	0.65	0.314	0.0895	0.209	0.157	0.158	0.34
Lead	0.04 - 0.16	**0.1**	0.01	<0.0002	0.000013	ND	0.0004	ND	0.0022	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Lithium	-	**5**	0.008	<0.0004	<0.0005	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.0017	<0.005	<0.005	<0.005	<0.005
Magnesium	-	-	-	0.38	1.08	0.96	1.12	0.58	0.85	1.28	1.17	0.767	1.52	0.96	0.483	1.29	0.569	1.03
Manganese	-	-	1.5	0.0074	0.00598	0.004	0.009	0.008	0.004	0.033	0.022	0.0263	0.0215	0.00719	0.0102	0.0159	0.006	0.0121
Mercury	0.00025	**0.002**	0.001	<0.00006	-	0.00004	ND	ND	0.00003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	10	**0.05**	0.25	0.0003	0.00053	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	0.000593	<0.001	<0.001	<0.001	<0.001
Nickel	0.25 - 1.5	**1**	0.08	<0.001	-	ND	ND	ND	0.001	0.001	0.001	<0.001	0.0013	0.00021	<0.001	<0.001	<0.001	<0.001
Phosphorus	-	-	-	-	0.007	-	-	-	-	0.03	0.017	0.02	0.012	<0.01	<0.01	<0.01	<0.01	0.01
Potassium	-	-	-	-	1.37	1.21	1.37	0.53	1.23	1.68	1.62	0.739	2.2	1.29	0.525	1.75	0.609	1.37
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	<0.001	<0.00004	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.000058	<0.0001	<0.0001	<0.0001	<0.0001
Silicon	-	-	-	-	2.65	3.43	3.05	2.5	2.82	4.14	4.14	2.82	3.01	2.85	2.18	3.15	2.66	3.22
Silver	0.0005 - 0.015	-	0.02	<0.00008	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	0.000007	<0.00002	<0.00002	<0.00002	<0.00002
Sodium	-	-	200	0.93	2.25	2.28	2.86	1.09	2.02	2.91	3.25	1.1	4.53	1.82	0.715	3.1	0.961	2.65
Strontium	-	-	2.5	-	0.0576	0.053	0.05	0.042	0.045	0.043	0.042	0.0337	0.0607	0.0465	0.0301	0.0688	0.0341	0.0446
Sulfur	-	-	-	-	<3	ND	ND	ND	ND	<3	<3	<3	<3	<3	<3	<3	<3	<3
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	<0.0001	<0.000002	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	-	<0.00001	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00056	<0.005	<0.005	<0.005	<0.005
Titanium	1	-	-	<0.02	0.0015	ND	ND	ND	ND	0.028	0.018	0.0222	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	<0.0001	0.000078	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.00006	<0.0001	<0.0001	<0.0001	<0.0001
Vanadium	-	**0.1**	0.02	<0.02	0.0003	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.075 - 38.1	**2**	3	0.018	0.0002	0.028	0.032	0.023	0.021	<0.005	<0.005	<0.005	0.0053	0.0015	<0.005	<0.005	<0.005	<0.005
Zirconium	-	-	-	-	-	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Dissolved Metals																		
Aluminum	-	**5**	9.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	0.09	-	0.006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	0.05	**0.025**	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	10	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	0.0015	**0.1**	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	12	**5**	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0005 - 0.004 (d)	**0.08**	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	**1000**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	0.01 (e)	**0.05**	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	0.04	**1**	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.02 - 0.09 (d, f)	**0.3**	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	0.04 - 0.16 (d, f)	**0.1**	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	**5**	0.008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	0.00025	**0.002**	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	10	**0.05**	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	0.25 - 1.5 (d, f)	**1**	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	0.02	**0.03**	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	0.0005 - 0.015 (d)	-	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.085	**0.2**	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	**0.1**	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.075 - 2.4 (d)	**2**	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES

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

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

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	SW-6 - 31-Mar-15 -	SW-6 - 11-Aug-15 -	SW-6 - 4-Nov-15 -	SW-6 - 22-Mar-16 -	SW-6 - 25-Jul-16 -	SW-6 - 13-Oct-16 -	SW-6 - 28-Mar-17 -	SW-6 - 24-Aug-17 -	SW-6 L2070515-3 19-Mar-18 -	SW-6 L2124909-3 4-Jul-18 -	SW-6 L2163156-3 10-Sep-18 -
Field Observations														
pH	-	-	-	-	-	-	-	-	-	-	-	-	7.37	7.11
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	11.6	11.3
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	83.3	137
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	6.9	6.1
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	293.4	145.6
Conventional Parameters														
Conductivity	-	-	-	86	128	115	121	156	128	71.6	112	72.1	108	191
Hardness (Total as CaCO3)	-	-	-	38.8	64.7	-	59.8	73.3	56.9	26.7	51.8	31.9	52.3	74.1
pH	-	-	-	7.6	7.8	7.7	7.6	7.7	7.7	7.1	7.8	7.64	7.99	8.02
Total Suspended Solids	-	-	-	9.6	<1.0	1.3	<1.0	<1.0	<1.0	5.4	2.7	5.6	<3.0	10.2
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	30.2	55.7	85.8
Ammonia, Total (as N)	1.3 - 18.5	-	-	ND	<0.03	0.15	0.27	0.036	<0.03	0.16	<0.03	0.0331	<0.0050	0.015
Chloride (Cl)	1500	-	-	1.97	1.3	1.9	3.6	3.3	1.7	3.6	1.3	2.02	0.66	5.93
Fluoride (F)	2.0-3.0 (e)	-	-	ND	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.042	0.02	0.033
Nitrate (as N)	400	**100**	10	0.33	0.05	0.3	0.5	0.26	0.055	0.07	0.1	0.161	0.0641	0.314
Nitrite (as N)	0.2 - 0.8	**10**	1	ND	-	<0.01	<0.01	<0.01	0.018	<0.01	<0.01	0.0016	<0.0010	0.0043
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	0.277	0.078	0.296
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0206
Sulfate (SO4)	128 - 429	**1000**	500	1.9	1.8	-	2.5	2.8	2.5	1.6	1.7	1.52	1.74	2.99
Biological Oxygen Demand (BOD)	-	-	-	ND	<4.0	<4.0	<4.0	<4.0	<4.0	0.004	<4.0	<2.0	<2.0	<2.0
Chemical Oxygen Demand (COD)	-	-	-	ND	<20	<20	<20	<20	<20	0.0004	<20	<20	<20	<20
Total Metals														
Aluminum	-	**5**	9.5	0.962	0.079	-	0.135	0.054	0.037	0.725	0.0927	0.615	0.0668	0.306
Antimony	0.09	-	0.006	ND	<0.0001	-	<0.0001	0.0001	0.0002	<0.0001	<0.00020	<0.00010	<0.00010	<0.00010
Arsenic	0.05	**0.025**	0.01	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00034	0.00016	0.00047
Barium	10	-	1	0.021	0.019	-	0.021	0.024	0.017	0.02	0.0169	0.0152	0.0186	0.0287
Beryllium	0.0015	**0.1**	0.008	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	ND	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	12	**5**	5	0.072	0.063	-	0.052	0.045	0.017	0.039	0.0222	<0.020	0.012	0.104
Cadmium	0.0005 - 0.004	**0.08**	0.005	0.00001	<0.00001	-	0.00001	0.00005	<0.00001	0.00001	0.000019	0.0000121	<0.0000050	0.0000061
Calcium	-	**1000**	-	13.8	24.3	-	21.6	27.1	21.3	10.9	19.3	9.56	19.2	27.3
Cesium	-	-	-	-	-	-	-	-	-	-	-	0.000049	0.00001	0.000032
Chromium	0.01	**0.05**	0.05	0.001	<0.0005	-	<0.0005	<0.0005	<0.0005	0.0008	<0.00050	0.00064	<0.00010	0.00034
Cobalt	0.04	**1**	0.001	0.00044	0.00008	-	0.00009	0.0001	<0.00005	0.00033	<0.00010	0.00032	<0.00010	0.00027
Copper	0.02 - 0.09	**0.3**	1.5	0.0028	0.0011	-	0.0009	0.001	0.0009	0.002	0.00144	0.00174	0.00076	0.00158
Iron	-	-	6.5	0.97	0.16	-	0.18	0.21	0.1	0.73	0.132	0.713	0.119	0.516
Lead	0.04 - 0.16	**0.1**	0.01	0.0002	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0002	<0.00020	0.000124	<0.000050	0.000101
Lithium	-	**5**	0.008	0.0007	0.0001	-	0.0001	<0.0001	<0.0001	0.0004	<0.00010	<0.0010	<0.0010	<0.0010
Magnesium	-	-	-	1.05	0.95	-	1.4	1.38	0.92	1.16	0.886	1.23	0.752	1.92
Manganese	-	-	1.5	0.0289	0.0143	-	0.0128	0.0173	0.0093	0.0353	0.00947	0.115	0.0116	0.0357
Mercury	0.00025	**0.002**	0.001	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	10	**0.05**	0.25	0.0006	0.0006	-	0.0011	0.0008	0.0007	0.0003	0.00057	0.000829	0.000616	0.000711
Nickel	0.25 - 1.5	**1**	0.08	0.0011	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0009	<0.00040	0.0007	<0.00050	0.00057
Phosphorus	-	-	-	0.024	0.06	-	0.04	<0.02	<0.02	<0.05	<0.050	<0.050	<0.050	<0.050
Potassium	-	-	-	1.22	1.03	-	2.17	1.84	0.87	1.17	0.98	1.2	0.947	3.54
Rubidium	-	-	-	-	-	-	-	-	-	-	-	0.00106	0.00132	0.00311
Selenium	0.02	**0.03**	0.01	ND	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000069	<0.000050	0.00007
Silicon	-	-	-	4.2	3.7	-	3.8	3.4	2.8	3.6	3.1	3.73	2.69	3.58
Silver	0.0005 - 0.015	-	0.02	ND	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	-	-	200	2.19	1.95	-	4.49	3.53	1.5	3.52	1.64	2.45	1.46	7.72
Strontium	-	-	2.5	0.041	0.06	-	0.057	0.074	0.054	0.037	0.0493	0.033	0.0484	0.0853
Sulfur	-	-	-	ND	1	-	1	1	<1	<1	<3.0	0.7	<0.50	0.99
Tellurium	-	-	-	-	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	0.003	-	-	ND	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	ND	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00010	<0.00010	<0.00010
Titanium	1	-	-	0.029	<0.005	-	<0.005	<0.005	<0.005	0.021	<0.0050	0.0159	0.00182	0.0108
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	0.00013	<0.00010	<0.00010
Uranium	0.085	**0.2**	0.02	0.00007	0.00009	-	0.00007	0.00011	0.00009	0.00004	0.000077	0.000194	0.000069	0.000164
Vanadium	-	**0.1**	0.02	0.002	<0.001	-	0.001	<0.001	<0.001	0.002	<0.0010	0.00149	0.00066	0.00134
Zinc	0.075 - 38.1	**2**	3	0.005	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.0040	0.0038	<0.0030	<0.0030
Zirconium	-	-	-	0.0003	<0.0001	-	0.0002	<0.0001	<0.0001	0.0003	<0.00010	0.000294	<0.000060	0.000174
Dissolved Metals														
Aluminum	-	**5**	9.5	-	-	-	-	-	-	-	-	0.112	0.0253	0.0382
Antimony	0.09	-	0.006	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Arsenic	0.05	**0.025**	0.01	-	-	-	-	-	-	-	-	0.00023	0.00014	0.00035
Barium	10	-	1	-	-	-	-	-	-	-	-	0.0118	0.0177	0.0282
Beryllium	0.0015	**0.1**	0.008	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	12	**5**	5	-	-	-	-	-	-	-	-	0.015	<0.010	0.105
Cadmium	0.0005 - 0.004 (d)	**0.08**	0.005	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Calcium	-	**1000**	-	-	-	-	-	-	-	-	-	10.7	19.6	26.7
Cesium	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	0.01 (e)	**0.05**	0.05	-	-	-	-	-	-	-	-	0.00015	<0.00010	<0.00010
Cobalt	0.04	**1**	0.001	-	-	-	-	-	-	-	-	<0.00010	<0.00010	0.00015
Copper	0.02 - 0.09 (d, f)	**0.3**	1.5	-	-	-	-	-	-	-	-	0.00109	0.00072	0.00105
Iron	-	-	6.5	-	-	-	-	-	-	-	-	0.251	0.064	0.227
Lead	0.04 - 0.16 (d, f)	**0.1**	0.01	-	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Lithium	-	**5**	0.008	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	-	-	-	-	-	-	-	-	-	-	-	1.26	0.826	1.8
Manganese	-	-	1.5	-	-	-	-	-	-	-	-	0.00334	0.00994	0.0316
Mercury	0.00025	**0.002**	0.001	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	10	**0.05**	0.25	-	-	-	-	-	-	-	-	0.000787	0.000586	0.000712
Nickel	0.25 - 1.5 (d, f)	**1**	0.08	-	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Potassium	-	-	-	-	-	-	-	-	-	-	-	1.22	0.985	3.63
Rubidium	-	-	-	-	-	-	-	-	-	-	-	0.00085	0.00125	0.00285
Selenium	0.02	**0.03**	0.01	-	-	-	-	-	-	-	-	0.000064	<0.000050	0.000072
Silicon	-	-	-	-	-	-	-	-	-	-	-	2.98	2.57	3.18
Silver	0.0005 - 0.015 (d)	-	0.02	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-	-	200	-	-	-	-	-	-	-	-	2.47	1.52	7.69
Strontium	-	-	2.5	-	-	-	-	-	-	-	-	0.0352	0.0482	0.0786
Sulfur	-	-	-	-	-	-	-	-	-	-	-	<0.50	0.5	0.86
Tellerium	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	0.003	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-	-	2.5	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Titanium	1	-	-	-	-	-	-	-	-	-	-	0.0049	0.00051	<0.0012
Tungsten	-	-	0.003	-	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	0.085	**0.2**	0.02	-	-	-	-	-	-	-	-	0.00017	0.000077	0.000146
Vanadium	-	**0.1**	0.02	-	-	-	-	-	-	-	-	0.00051	0.00054	0.00054
Zinc	0.075 - 2.4 (d)	**2**	3	-	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Zirconium	-	-	-	-	-	-	-	-	-	-	-	0.000276	<0.000060	0.000064

NOTES

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

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

Table D-12: Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units
Field Observations							
pH	-		-		-		-
Temperature	-		-		-		°C
Conductivity	-		-		-		uS/cm
Water level	-		-		-		m
Dissolved Oxygen	-		-		-		mg/L
Oxidation Reduction Potential	-		-		-		mV
Conventional Parameters							
Conductivity	-		-		-		uS/cm
Hardness (Total as CaCO3)	-		-		-		mg/L
pH	6.5-9.0		-		6.5 - 8.5		-
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L
Alkalinity, Total (as CaCO3)	<10, 10-20, >20	Ca	-		-		mg/L
Ammonia, Total (as N)	0.37 - 1.86	pH/T*	2.4 - 22.9	pH/T*	-		mg/L
Chloride (Cl)	150		600		<250	AO	mg/L
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L
Nitrate (as N)	3		32.8		10		mg/L
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L
Total Kjeldahl Nitrogen	-		-		-		mg/L
Phosphorus (P)-Total	-		-		-		mg/L
Orthophosphate - Dissolved (as P)	-		-		-		mg/L
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L
Biological Oxygen Demand (BOD)	-		-		-		mg/L
Chemical Oxygen Demand (COD)	-		-		-		mg/L
Total Metals							
Aluminum	0.05	pH	0.1	pH	9.5		mg/L
Antimony	0.009		-		-		mg/L
Arsenic	0.005		-		0.01		mg/L
Barium	1		-		-		mg/L
Beryllium	0.00013		-		-		mg/L
Bismuth	-		-		-		mg/L
Boron	1.2		-		5		mg/L
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L
Calcium	-		-		-		mg/L
Cesium	-		-		-		mg/L
Chromium	0.001 $^{\text{Cr VI}}$ 0.0089 $^{\text{Cr III}}$	V	-		-		mg/L
Cobalt	0.004		0.11		-		mg/L
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L
Iron	-		1		<0.3	AO	mg/L
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L
Lithium	-		-		-		mg/L
Magnesium	-		-		-		mg/L
Manganese	0.67 - 1.7	H	0.71 - 3.27	H	<0.05	AO	mg/L
Mercury	0.0001		-		0.001		mg/L
Molybdenum	2		-		0.25		mg/L
Nickel	0.025-0.15		-		-		mg/L
Phosphorus	0.005-0.015		-		0.01	AO	mg/L
Potassium	-		-		-		mg/L
Rubidium	-		-		-		mg/L
Selenium	0.002		-		0.01	MAC	mg/L
Silicon	-		-		-		mg/L
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L
Sodium	-		-		<200	AO	mg/L
Strontium	-		-		-		mg/L
Sulfur	-		-		-		mg/L
Tellurium	-		-		-		mg/L
Thallium	0.0008		-		-		mg/L
Thorium	-		-		-		mg/L
Tin	-		-		-		mg/L
Titanium	-		-		-		mg/L
Tungsten	-		-		-		mg/L
Uranium	0.0085		-		-		mg/L
Vanadium	-		-		-		mg/L
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L
Zirconium	-		-		-		mg/L
Dissolved Metals							
Aluminum	0.05	pH	0.1	pH/T	9.5		mg/L
Antimony	0.009		-		-		mg/L
Arsenic	0.005		-		0.01		mg/L
Barium	1		-		-		mg/L
Beryllium	0.00013		-		-		mg/L
Bismuth	-		-		-		mg/L
Boron	1.2		-		5		mg/L
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L
Calcium	-		-		-		mg/L
Cesium	-		-		-		mg/L
Chromium	0.001 $^{\text{Cr VI}}$ 0.0089 $^{\text{Cr III}}$		-		-		mg/L
Cobalt	0.004		0.11		-		mg/L
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L
Iron	-		0.35		<0.3	AO	mg/L
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L
Lithium	-		-		-		mg/L
Magnesium	-		-		-		mg/L
Manganese	0.75 - 0.93	H	0.89 - 1.36	H	<0.05	AO	mg/L
Mercury	0.0001		-		0.001		mg/L
Molybdenum	2		-		0.25		mg/L
Nickel	-		-		-		mg/L
Phosphorus	0.005-0.015		-		0.01	AO	mg/L
Potassium	-		-		-		mg/L
Rubidium	-		-		-		mg/L
Selenium	0.002		-		0.01	MAC	mg/L
Silicon	-		-		-		mg/L
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L
Sodium	-		-		<200	AO	mg/L
Strontium	-		-		-		mg/L
Sulfur	-		-		-		mg/L
Tellerium	-		-		-		mg/L
Thallium	0.0008		-		-		mg/L
Thorium	-		-		-		mg/L
Tin	-		-		-		mg/L
Titanium	-		-		-		mg/L
Tungsten	-		-		-		mg/L
Uranium	0.0085		-		-		mg/L
Vanadium	-		-		-		mg/L
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L
Zirconium	-		-		-		mg/L

Sample Date	1-Jun-96	1-Oct-96	1-Jun-97	4-Dec-97	4-May-98		24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	20-Dec-00	7-May-01	1-Dec-01
Location	Thornhill Landfill														
Site Name	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	SW-6
Laboratory ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC	-	-	-	-	FDA	FD	-	-	-	-	-	-	-	-	-
Field Observations															
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters															
Conductivity	-	131	92	103	75	28	136	-	80	-	77	-	-	60	97
Hardness (Total as CaCO3)	-	57.6	40.2	43.7	35.3	15.1	63.4	48.5	36	39	34	48	43	42	41
pH	-	7.5	7.35	7.2	7.43	7.59	7.88	-	-	-	7.25	7.65	7.49	8.1	7.1
Total Suspended Solids	<5	4	5	<1	23	-	19	-	-	-	-	-	-	-	-
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	<0.1	0.04	<0.005	0.04	0.007	<0.005	0.008	0.237	<0.02	0.11	0.03	0.29	0.03	-	0.11
Chloride (Cl)	0.4	1.9	0.6	2.5	1	0.33	2.5	2.8	0.7	1.7	3.2	1.7	2.4	0.3	1.3
Fluoride (F)	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	< 0.05
Nitrate (as N)	-	0.139	0.022	0.478	0.047	0.046	0.135	0.44	0.1	0.24	-	0.18	0.06	0.24	0.16
Nitrite (as N)	-	0.006	0.001	0.006	0.003	<0.005	0.002	<0.005	<0.002	0.004	-	<0.002	0.004	0.004	< 0.002
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	1.6	2.2	2	3	2	0.79	3	2.2	1.7	1.8	2.1	1.8	2.3	1.3	2
Biological Oxygen Demand (BOD)	-	-	<5	<5	<5	5	<5	-	<10	<10	<10	<10	<10	<10	< 10
Chemical Oxygen Demand (COD)	-	-	<20	<20	<20	14	<20	<10	<25	-	<25	<25	<25	<25	< 25
Total Metals															
Aluminum	<0.1	0.05	<0.05	0.05	0.062	0.08	0.01	0.02	0.037	0.041	0.14	0.016	0.027	0.062	0.022
Antimony	<0.001	-	<0.02	<0.0001	0.0001	<0.05	<0.0001	<0.015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Arsenic	<0.001	0.0002	<0.2	0.0001	0.0001	<0.0005	0.0002	<0.04	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Barium	<0.1	0.02	0.01	0.02	0.01	0.009	0.02	0.017	0.011	0.013	0.044	0.013	0.016	0.012	0.013
Beryllium	<0.001	<0.005	<0.005	<0.005	<0.005	>0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	<0.1	-	-	-	<0.01	-	0.034	<0.05	<0.05	0.06	<0.05	<0.05	0.11	0.05
Cadmium	0.005	<0.0002	<0.002	<0.0002	<0.0002	<0.005	0.0002	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	< 0.0002
Calcium	19	21.5	15.3	15.6	13.3	12.9	23.1	16.8	13.4	13.9	11.7	18.1	15.2	15.1	14.8
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	<0.02	<0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Cobalt	<0.02	<0.02	<0.01	<0.01	<0.01	<0.005	<0.01	<0.003	,0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Copper	<0.01	0.001	<0.01	<0.001	0.002	0.0006	0.001	0.002	0.002	<0.001	0.001	<0.001	<0.001	0.001	< 0.001
Iron	<0.1	0.08	0.04	0.12	0.05	0.046	0.12	0.06	<0.05	0.11	0.2	0.2	0.12	0.09	0.13
Lead	0.001	0.001	<0.01	<0.001	<0.001	<0.0005	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Lithium	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	0.6	0.97	0.51	1.18	0.5	0.5	1.4	1.59	0.7	1.09	1.19	0.68	1.18	0.93	1.01
Manganese	<0.01	<0.005	0.008	0.19	0.007	0.004	<0.005	0.017	0.007	0.006	0.035	0.015	0.008	0.006	0.016
Mercury	-	<0.00005	<0.00005	<0.00001	<0.00001	-	<0.00001	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	< 0.00002
Molybdenum	<0.01	<0.03	<0.03	<0.03	<0.03	<0.01	<0.03	<0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Nickel	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	< 0.001
Phosphorus	-	-	-	-	-	-	-	-	-	-	0.01	<0.01	0.06	0.05	0.05
Potassium	<5.0	-	-	-	-	0.5	-	1.9	0.69	1.39	1.54	0.75	1.44	0.96	1.08
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	<0.0005	<0.01	<0.0005	<0.0005	<0.05	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	< 0.002
Silicon	-	-	-	-	-	-	-	-	-	-	3.98	6.6	5.97	5.21	6.11
Silver	<0.01	<0.0001	<0.001	<0.0001	<0.0001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Sodium	<1.0	3	-	-	-	0.8	-	4.27	1.09	2.27	3.07	1.23	2.06	1.67	1.75
Strontium	-	-	-	-	-	-	-	-	-	-	0.042	0.051	0.045	0.039	0.041
Sulfur	-	-	-	-	-	0.49	-	1.19	-	-	-	-	-	-	-
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	< 0.0001
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	< 0.001
Titanium	<0.01	-	-	<0.01	<0.01	<0.002	<0.01	<0.003	0.001	0.001	0.002	<0.001	<0.001	<0.001	< 0.001
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	0.00005	0.00005	-	0.00007	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	< 0.0005
Vanadium	<0.01	<0.03	-	<0.03	<0.03	<0.01	<0.03	<0.003	<0.001	<0.001	0.001	0.001	<0.001	<0.001	< 0.001
Zinc	<0.01	<0.005	<0.005	<0.005	<0.005	<0.002	<0.005	0.004	<0.005	<0.005	<0.005	0.006	<0.005	0.006	< 0.005
Zirconium	-	-	-	-	-	-	-	-	-	-	<0.1	<0.01	<0.01	0.02	< 0.01
Dissolved Metals															
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03	-	3-Aug-03	18-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08
Site Name	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	SW-6
Laboratory ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations															
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters															
Conductivity	76	76	42	121	127	155	106	97	109	85	92	500	1280	68	66.1
Hardness (Total as CaCO3)	24	31	19	45	-	64	31	37	51.8	37.9	46	40	248	29	26.5
pH	7.27	7.35	6.94	7.51	7.4	7.85	6.97	7.6	7.1	7.58	6.8	6.42	7.44	7.58	7.7
Total Suspended Solids	-	-	-	-	<4	-	-	-	<4	-	<4	-	17.6	<0.01	-
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	<0.005	<0.005	<0.005	<0.01	<0.005	<0.01	0.11	0.01	0.108	0.04	0.207	0.13	17.6	<0.01	<0.03
Chloride (Cl)	3.4	1.7	0.8	5.9	5.4	5.3	8.9	2.2	1.6	0.45	1.4	16.3	68.3	0.33	1
Fluoride (F)	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	-	<0.05	-	<0.1	<0.05	<0.50	<0.1
Nitrate (as N)	0.7	<0.05	0.15	0.65	0.62	<0.05	0.49	<0.05	0.135	<0.05	0.128	<0.002	2.75	<0.05	<0.1
Nitrite (as N)	0.012	<0.002	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.01	0.03	<0.002	<0.01
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	34.8	2.3	1	2.8	2.6	3	3	2	2	1.5	1.7	13.3	16.1	0.8	1.1
Biological Oxygen Demand (BOD)	<10	<10	11	<10	<6	<10	<10	<10	<10	<10	-	23	<10	<10	<6
Chemical Oxygen Demand (COD)	<25	<25	38	<25	<10	<25	<25	<25	<10	50	12	<20	<20	<20	<30
Total Metals															
Aluminum	0.11	0.025	0.13	0.07	0.0305	0.02	0.44	0.022	0.0311	0.026	0.0739	< 0.005	0.017	0.034	0.05
Antimony	<0.001	<0.001	<0.001	<0.001	0.000023	<0.001	< 0.001	< 0.001	0.000016	< 0.0002	0.000023	< 0.001	<0.001	<0.001	<0.0006
Arsenic	<0.001	<0.001	<0.001	<0.001	0.0002	<0.001	< 0.001	< 0.001	0.0002	< 0.0002	0.0001	< 0.001	<0.001	<0.001	<0.001
Barium	0.01	0.009	0.008	0.015	0.0183	0.023	0.021	0.012	0.0153	0.01	0.0123	0.012	0.2	0.007	0.01
Beryllium	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	<0.0004
Bismuth	-	-	-	-	-	<0.001	-	< 0.001	<0.00002	< 0.0002	0.00002	< 0.001	<0.001	<0.001	-
Boron	<0.05	0.08	<0.05	0.07	-	<0.05	< 0.05	< 0.05	0.019	0.03	0.018	< 0.05	0.96	< 0.05	0.004
Cadmium	<0.0002	<0.0002	<0.0002	<0.0002	<0.00001	0.0009	< 0.0002	< 0.0002	<0.00001	< 0.00004	0.00001	< 0.0002	<0.0002	<0.0002	0.0003
Calcium	7.62	11.2	6.49	14.7	-	22.7	9.74	13.5	19.1	13.9	16.7	15.1	77.2	10.9	11.8
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	<0.001	<0.001	1	<0.001	<0.0002	<0.001	< 0.001	< 0.001	<0.0002	< 0.0002	0.0002	< 0.001	<0.001	<0.001	0.001
Cobalt	<0.001	<0.001	<0.001	<0.001	0.000113	<0.001	< 0.001	< 0.001	0.00004	< 0.0002	0.000052	< 0.001	0.001	<0.001	<0.0001
Copper	<0.001	0.001	<0.001	0.002	0.00067	<0.001	0.002	< 0.001	0.0008	0.0006	0.00098	< 0.001	0.003	<0.001	0.01
Iron	0.14	0.1	0.08	0.15	-	0.36	0.95	< 0.05	0.053	0.08	0.08	< 0.05	0.08	<0.05	0.06
Lead	<0.001	<0.001	<0.001	<0.001	0.00009	<0.001	< 0.001	< 0.001	<0.00001	< 0.0002	0.00001	< 0.001	<0.001	<0.001	<0.0002
Lithium	-	<0.05	<0.05	<0.05	0.00038	<0.001	-	< 0.001	<0.00005	< 0.0002	0.00005	< 0.001	<0.001	<0.005	<0.0004
Magnesium	1.18	0.61	0.56	1.88	-	1.81	1.61	0.7	0.99	0.79	0.96	0.5	13.4	0.32	0.38
Manganese	0.017	0.003	0.009	0.011	0.0227	0.023	0.078	0.009	0.0066	0.0041	0.00547	0.002	0.72	0.004	0.0074
Mercury	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.00002	< 0.02	<0.00005	< 0.02	0.00005	< 0.02	<0.00002	<0.00002	<0.00006
Molybdenum	<0.001	<0.001	<0.001	0.0016	0.00055	0.0008	< 0.0005	< 0.0005	0.00041	0.0004	0.00031	< 0.0005	<0.0005	<0.0005	0.0003
Nickel	<0.001	<0.001	<0.001	<0.001	<0.00005	<0.001	0.001	< 0.001	0.00024	0.0007	0.00011	< 0.001	0.004	< 0.001	<0.001
Phosphorus	0.04	0.11	0.04	0.07	-	0.09	0.45	*< 0.15*	*<0.1*	0.03	0.1	*< 0.15*	*<0.15*	*<0.15*	-
Potassium	1.61	0.48	0.77	2.12	-	1.89	1.43	0.5	1	0.96	1	0.5	30.4	0.4	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	<0.002	<0.002	<0.002	<0.002	<0.0002	<0.001	< 0.001	< 0.001	<0.0002	0.0005	0.0002	< 0.001	<0.001	<0.001	<0.001
Silicon	4.83	2.84	3.27	5.67	-	6.76	5.8	4.5	-	6.25	-	2.1	3.7	1.5	-
Silver	<0.0001	<0.0001	<0.0001	<0.0001	<0.00002	<0.0001	< 0.0001	< 0.00025	<0.00002	< 0.00005	0.00002	< 0.00025	<0.00025	<0.00025	<0.00008
Sodium	3.32	1.77	1.28	6.3	-	5.46	5.71	1.8	1.96	1.81	2.12	0.77	58.2	0.61	0.93
Strontium	0.44	0.026	0.018	0.053	0.00625	0.073	0.044	0.031	0.0457	0.039	0.0367	0.031	0.51	0.02	-
Sulfur	-	-	-	-	-	-	-	-	0.7	-	0.6	-	-	-	-
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	<0.0001	<0.0001	<0.0001	<0.0001	0.000004	<0.0001	< 0.0001	< 0.0001	0.000002	< 0.00002	0.002	< 0.0001	<0.0001	<0.0001	<0.0001
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	<0.001	<0.001	<0.001	<0.001	0.00003	<0.001	< 0.001	< 0.001	0.00001	< 0.0002	-	< 0.001	<0.001	<0.001	-
Titanium	0.003	<0.001	0.001	0.002	-	0.001	0.015	< 0.001	<0.003	0.0006	0.003	< 0.001	<0.001	<0.001	<0.02
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	<0.0005	<0.0005	<0.0005	<0.0005	0.000079	<0.0005	< 0.0005	< 0.0005	0.000062	< 0.0001	0.000043	< 0.0005	<0.0005	<0.0005	<0.0001
Vanadium	<0.001	<0.001	<0.001	<0.001	0.00028	<0.001	0.001	< 0.001	0.00039	0.0004	0.00043	< 0.001	<0.001	<0.001	<0.02
Zinc	<0.005	0.006	< 0.005	<0.005	0.006	<0.005	0.008	< 0.005	<0.0001	< 0.001	0.0001	< 0.005	<0.005	<0.005	0.018
Zirconium	<0.01	<0.01	<0.01	<0.01	-	<0.01	< 0.01	< 0.01	<0.005	< 0.002	0.005	< 0.01	<0.01	<0.01	-
Dissolved Metals															
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	10-Oct-08	24-Sep-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12	4-Jan-13	15-Apr-13	6-Jun-13	22-Oct-13	6-May-14	29-Oct-14	31-Mar-15
Site Name	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	SW-6
Laboratory ID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Observations															
pH	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Temperature	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water level	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters															
Conductivity	130	111	99	94.5	108	79.8	90	75.6	126	104	64.1	156	89.9	101	86
Hardness (Total as CaCO3)	61.6	51.3	41.6	41	49.2	34.7	33.4	36.2	48.6	47.2	35.1	73.6	39.7	44.3	38.8
pH	8	7.6	7	7.2	7.8	7.4	7.4	7.5	7.1	8.4	7.7	7.4	7.5	7.4	7.6
Total Suspended Solids	<4	-	-	-	-	-	-	-	<1	-	4.5	<1	3.9	2.3	9.6
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	0.2	<0.03	<0.03	<0.03	0.18	<0.03	0.18	0.04	0.24	<0.03	<0.03	0.04	<0.03	<0.03	ND
Chloride (Cl)	2.4	1.8	2.8	1.1	1.2	2.2	3.3	<1	5.8	2.1	<1	3.5	1	7.4	1.97
Fluoride (F)	<0.005	ND	ND	ND	0.03	<0.1	<0.1	<0.1	<0.1	0.026	<0.1	<0.1	<0.1	<0.1	ND
Nitrate (as N)	-	ND	0.6	ND	0.17	0.4	0.44	<0.1	0.8	0.2	<0.1	0.28	0.1	0.212	0.33
Nitrite (as N)	0.002	ND	ND	ND	ND	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthophosphate - Dissolved (as P)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	<0.5	2	2.5	18.1	0.6	1.8	<1	0.97	1.36	1.84	1.02	6.08	0.7	<0.5	1.9
Biological Oxygen Demand (BOD)	<10	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	ND
Chemical Oxygen Demand (COD)	15	<30	<30	<30	<30	33	<30	<30	<20	<20	<20	<20	<20	<20	ND
Total Metals															
Aluminum	0.037	0.022	0.029	0.022	0.042	0.828	0.489	0.514	0.218	0.0516	0.178	0.0402	0.141	0.312	0.962
Antimony	<0.00002	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000123	<0.0005	<0.0005	<0.0005	<0.0005	ND
Arsenic	0.00013	0.0001	ND	ND	ND	0.0001	0.0001	0.00024	<0.0001	0.000098	<0.0001	0.00013	0.00011	0.00022	ND
Barium	0.018	0.069	0.051	0.061	0.017	0.02	0.018	0.0146	0.0205	0.0156	0.0111	0.0215	0.0123	0.0173	0.021
Beryllium	<0.00001	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND
Bismuth	<0.000005	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND
Boron	<0.05	ND	ND	ND	ND	0.055	0.054	<0.05	0.056	<0.05	<0.05	<0.05	<0.05	<0.05	0.072
Cadmium	<0.000005	0.00001	0.00004	0.00002	0.00009	0.00002	0.00002	0.000016	0.00006	0.000011	<0.00001	<0.00001	<0.00001	<0.00001	0.00001
Calcium	20.1	19.4	15.7	16.2	16.5	11.8	11.4	13.2	16.9	17.3	13.3	27.4	15	16.1	13.8
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	<0.0001	ND	ND	ND	ND	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Cobalt	0.000045	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	0.000048	<0.0005	<0.0005	<0.0005	<0.0005	0.00044
Copper	0.00058	0.0015	0.0015	0.0049	0.0048	0.0031	0.0031	0.00213	0.0021	0.00082	0.00091	0.00066	0.00079	0.00169	0.0028
Iron	0.151	0.153	0.077	0.042	0.055	0.947	0.607	0.65	0.314	0.0895	0.209	0.157	0.158	0.34	0.97
Lead	0.000013	ND	0.0004	ND	0.0022	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002
Lithium	<0.0005	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.0017	<0.005	<0.005	<0.005	<0.005	0.0007
Magnesium	1.08	0.96	1.12	0.58	0.85	1.28	1.17	0.767	1.52	0.96	0.483	1.29	0.569	1.03	1.05
Manganese	0.00598	0.004	0.009	0.008	0.004	0.033	0.022	0.0263	0.0215	0.00719	0.0102	0.0159	0.006	0.0121	0.0289
Mercury	-	0.00004	ND	ND	0.00003	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND
Molybdenum	0.00053	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	0.000593	<0.001	<0.001	<0.001	<0.001	0.0006
Nickel	-	ND	ND	ND	0.001	0.001	0.001	<0.001	0.0013	0.00021	<0.001	<0.001	<0.001	<0.001	0.0011
Phosphorus	0.007	-	-	-	-	0.03	0.017	0.02	0.012	<0.01	<0.01	<0.01	<0.01	0.01	0.024
Potassium	1.37	1.21	1.37	0.53	1.23	1.68	1.62	0.739	2.2	1.29	0.525	1.75	0.609	1.37	1.22
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	<0.00004	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.000058	<0.0001	<0.0001	<0.0001	<0.0001	ND
Silicon	2.65	3.43	3.05	2.5	2.82	4.14	4.14	2.82	3.01	2.85	2.18	3.15	2.66	3.22	4.2
Silver	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.00002	0.000007	<0.00002	<0.00002	<0.00002	<0.00002	ND
Sodium	2.25	2.28	2.86	1.09	2.02	2.91	3.25	1.1	4.53	1.82	0.715	3.1	0.961	2.65	2.19
Strontium	0.0576	0.053	0.05	0.042	0.045	0.043	0.042	0.0337	0.0607	0.0465	0.0301	0.0688	0.0341	0.0446	0.041
Sulfur	<3	ND	ND	ND	ND	<3	<3	<3	<3	<3	<3	<3	<3	<3	ND
Tellurium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	<0.000002	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	ND
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	<0.00001	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.00056	<0.005	<0.005	<0.005	<0.005	ND
Titanium	0.0015	ND	ND	ND	ND	0.028	0.018	0.0222	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005	0.029
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	0.000078	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	0.00006	<0.0001	<0.0001	<0.0001	<0.0001	0.00007
Vanadium	0.0003	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002
Zinc	0.0002	0.028	0.032	0.023	0.021	<0.005	<0.005	<0.005	0.0053	0.0015	<0.005	<0.005	<0.005	<0.005	0.005
Zirconium	-	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003
Dissolved Metals															
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tellerium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample Date	11-Aug-15	4-Nov-15	22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17	24-Aug-17	19-Mar-18	4-Jul-18	10-Sep-18
Site Name	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6	SW-6
Laboratory ID	-	-	-	-	-	-	-	L2070515-3	L2124909-3	L2163156-3
QAQC	-	-	-	-	-	-	-	-	-	-
Field Observations										
pH	-	-	-	-	-	-	-	-	7.37	7.11
Temperature	-	-	-	-	-	-	-	-	11.6	11.3
Conductivity	-	-	-	-	-	-	-	-	83.3	137
Water level	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	-	-	-	-	-	-	-	-	6.9	6.1
Oxidation Reduction Potential	-	-	-	-	-	-	-	-	293.4	145.6
Conventional Parameters										
Conductivity	128	115	121	156	128	71.6	112	72.1	108	191
Hardness (Total as CaCO3)	64.7	-	59.8	73.3	56.9	26.7	51.8	31.9	52.3	74.1
pH	7.8	7.7	7.6	7.7	7.7	7.1	7.8	7.64	7.99	8.02
Total Suspended Solids	<1.0	1.3	<1.0	<1.0	<1.0	5.4	2.7	5.6	<3.0	10.2
Alkalinity, Total (as CaCO3)	-	-	-	-	-	-	-	30.2	55.7	85.8
Ammonia, Total (as N)	<0.03	0.15	0.27	0.036	<0.03	0.16	<0.03	0.0331	<0.0050	0.015
Chloride (Cl)	1.3	1.9	3.6	3.3	1.7	3.6	1.3	2.02	0.66	5.93
Fluoride (F)	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.042	0.02	0.033
Nitrate (as N)	0.05	0.3	0.5	0.26	0.055	0.07	0.1	0.161	0.0641	0.314
Nitrite (as N)	-	<0.01	<0.01	<0.01	0.018	<0.01	<0.01	0.0016	<0.0010	0.0043
Total Kjeldahl Nitrogen	-	-	-	-	-	-	-	0.277	0.078	0.296
Phosphorus (P)-Total	-	-	-	-	-	-	-	-	0.0062	0.0206
Orthophosphate - Dissolved (as P)	-	-	-	-	-	-	-	-	<0.0010	0.0031
Sulfate (SO4)	1.8	-	2.5	2.8	2.5	1.6	1.7	1.52	1.74	2.99
Biological Oxygen Demand (BOD)	<4.0	<4.0	<4.0	<4.0	<4.0	0.004	<4.0	<2.0	<2.0	<2.0
Chemical Oxygen Demand (COD)	<20	<20	<20	<20	<20	0.0004	<20	<20	<20	<20
Total Metals										
Aluminum	0.079	-	0.135	0.054	0.037	0.725	0.0927	0.615	0.0668	0.306
Antimony	<0.0001	-	<0.0001	0.0001	0.0002	<0.0001	<0.00020	<0.00010	<0.00010	<0.00010
Arsenic	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.00034	0.00016	0.00047
Barium	0.019	-	0.021	0.024	0.017	0.02	0.0169	0.0152	0.0186	0.0287
Beryllium	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.000050	<0.000050	<0.000050
Boron	0.063	-	0.052	0.045	0.017	0.039	0.0222	<0.020	0.012	0.104
Cadmium	<0.00001	-	0.00001	0.00005	<0.00001	0.00001	0.000019	0.0000121	<0.0000050	0.0000061
Calcium	24.3	-	21.6	27.1	21.3	10.9	19.3	9.56	19.2	27.3
Cesium	-	-	-	-	-	-	-	0.000049	0.00001	0.000032
Chromium	<0.0005	-	<0.0005	<0.0005	<0.0005	0.0008	<0.00050	0.00064	<0.00010	0.00034
Cobalt	0.00008	-	0.00009	0.0001	<0.00005	0.00033	<0.00010	0.00032	<0.00010	0.00027
Copper	0.0011	-	0.0009	0.001	0.0009	0.002	0.00144	0.00174	0.00076	0.00158
Iron	0.16	-	0.18	0.21	0.1	0.73	0.132	0.713	0.119	0.516
Lead	<0.0001	-	<0.0001	<0.0001	<0.0001	0.0002	<0.00020	0.000124	<0.000050	0.000101
Lithium	0.0001	-	0.0001	<0.0001	<0.0001	0.0004	<0.00010	<0.0010	<0.0010	<0.0010
Magnesium	0.95	-	1.4	1.38	0.92	1.16	0.886	1.23	0.752	1.92
Manganese	0.0143	-	0.0128	0.0173	0.0093	0.0353	0.00947	0.115	0.0116	0.0357
Mercury	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	<0.0000050	<0.0000050	<0.0000050
Molybdenum	0.0006	-	0.0011	0.0008	0.0007	0.0003	0.00057	0.000829	0.000616	0.000711
Nickel	<0.0002	-	<0.0002	<0.0002	<0.0002	0.0009	<0.00040	0.0007	<0.00050	0.00057
Phosphorus	0.06	-	0.04	*<0.02*	*<0.02*	*<0.05*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium	1.03	-	2.17	1.84	0.87	1.17	0.98	1.2	0.947	3.54
Rubidium	-	-	-	-	-	-	-	0.00106	0.00132	0.00311
Selenium	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	0.000069	<0.000050	0.00007
Silicon	3.7	-	3.8	3.4	2.8	3.6	3.1	3.73	2.69	3.58
Silver	<0.00005	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000010	<0.000010	<0.000010
Sodium	1.95	-	4.49	3.53	1.5	3.52	1.64	2.45	1.46	7.72
Strontium	0.06	-	0.057	0.074	0.054	0.037	0.0493	0.033	0.0484	0.0853
Sulfur	1	-	1	1	<1	<1	<3.0	0.7	<0.50	0.99
Tellurium	-	-	-	-	-	<0.0002	<0.00050	<0.00020	<0.00020	<0.00020
Thallium	<0.00002	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.000020	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010
Tin	<0.0002	-	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00010	<0.00010	<0.00010
Titanium	<0.005	-	<0.005	<0.005	<0.005	0.021	<0.0050	0.0159	0.00182	0.0108
Tungsten	-	-	-	-	-	-	-	0.00013	<0.00010	<0.00010
Uranium	0.00009	-	0.00007	0.00011	0.00009	0.00004	0.000077	0.000194	0.000069	0.000164
Vanadium	<0.001	-	0.001	<0.001	<0.001	0.002	<0.0010	0.00149	0.00066	0.00134
Zinc	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.0040	0.0038	<0.0030	<0.0030
Zirconium	<0.0001	-	0.0002	<0.0001	<0.0001	0.0003	<0.00010	0.000294	<0.000060	0.000174
Dissolved Metals										
Aluminum	-	-	-	-	-	-	-	0.112	0.0253	0.0382
Antimony	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Arsenic	-	-	-	-	-	-	-	0.00023	0.00014	0.00035
Barium	-	-	-	-	-	-	-	0.0118	0.0177	0.0282
Beryllium	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Bismuth	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Boron	-	-	-	-	-	-	-	0.015	<0.010	0.105
Cadmium	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Calcium	-	-	-	-	-	-	-	10.7	19.6	26.7
Cesium	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Chromium	-	-	-	-	-	-	-	0.00015	<0.00010	<0.00010
Cobalt	-	-	-	-	-	-	-	<0.00010	<0.00010	0.00015
Copper	-	-	-	-	-	-	-	0.00109	0.00072	0.00105
Iron	-	-	-	-	-	-	-	0.251	0.064	0.227
Lead	-	-	-	-	-	-	-	<0.000050	<0.000050	<0.000050
Lithium	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Magnesium	-	-	-	-	-	-	-	1.26	0.826	1.8
Manganese	-	-	-	-	-	-	-	0.00334	0.00994	0.0316
Mercury	-	-	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum	-	-	-	-	-	-	-	0.000787	0.000586	0.000712
Nickel	-	-	-	-	-	-	-	<0.00050	<0.00050	<0.00050
Phosphorus	-	-	-	-	-	-	-	<0.050	<0.050	<0.050
Potassium	-	-	-	-	-	-	-	1.22	0.985	3.63
Rubidium	-	-	-	-	-	-	-	0.00085	0.00125	0.00285
Selenium	-	-	-	-	-	-	-	0.000064	<0.000050	0.000072
Silicon	-	-	-	-	-	-	-	2.98	2.57	3.18
Silver	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Sodium	-	-	-	-	-	-	-	2.47	1.52	7.69
Strontium	-	-	-	-	-	-	-	0.0352	0.0482	0.0786
Sulfur	-	-	-	-	-	-	-	<0.50	0.5	0.86
Tellerium	-	-	-	-	-	-	-	<0.00020	<0.00020	<0.00020
Thallium	-	-	-	-	-	-	-	<0.000010	<0.000010	<0.000010
Thorium	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Tin	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Titanium	-	-	-	-	-	-	-	0.0049	0.00051	<0.0012
Tungsten	-	-	-	-	-	-	-	<0.00010	<0.00010	<0.00010
Uranium	-	-	-	-	-	-	-	0.00017	0.000077	0.000146
Vanadium	-	-	-	-	-	-	-	0.00051	0.00054	0.00054
Zinc	-	-	-	-	-	-	-	<0.0010	<0.0010	<0.0010
Zirconium	-	-	-	-	-	-	-	0.000276	<0.000060	0.000064

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table D-13: Quality Control Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Sampling Location		SW-3						SW-21						Trip Blank
Sample ID		SW-3	DUP	Laboratory Reporting Limit	Mean	Relative Percent Difference (%)	Difference Factor (-)	SW-21	DUP	Laboratory Reporting Limit	Mean	Relative Percent Difference (%)	Difference Factor (-)	Trip
Laboratory ID		L2124909-2	L2124909-6					L2163156-4	L2163156-5					L2124909-7
Sample Date		4-Jul-18	4-Jul-18					10-Sep-18	10-Sep-18					4-Jul-18
QAQC	Units	FDA	FD					FDA	FD					TB
Conventional Parameters														
Conductivity	uS/cm	1500	1500	2	1500	0%	NA	779	782	2	780.5	0%	NA	-
Hardness (Total as CaCO3)	mg/L	447	439	0.5	443	2%	NA	165	168	0.5	166.5	2%	NA	-
pH	-	8.16	8.15	0.1	8.155	0%	NA	8.47	8.5	0.1	8.485	0%	NA	-
Total Suspended Solids	mg/L	21	14.8	3	17.9	**35%**	NA	35	34.4	3	34.7	2%	NA	-
Alkalinity, Total (as CaCO3)	mg/L	717	726	1	721.5	1%	NA	300	301	1	300.5	0%	NA	-
Ammonia, Total (as N)	mg/L	41.7	38.7	0.005	40.2	7.5%	NA	4.15	3.99	0.005	4.07	3.9%	NA	<0.0050
Bromide (Br)	mg/L	0.76	0.78	0.05	0.77	3%	NA	-	-	-	NC	NC	NA	-
Chloride (Cl)	mg/L	85.6	88.1	0.5	86.85	3%	NA	65	65.9	0.5	65.45	1%	NA	-
Fluoride (F)	mg/L	0.1	0.11	0.02	0.105	10%	NA	0.1	0.1	0.02	0.1	0%	NA	-
Nitrate (as N)	mg/L	0.546	0.547	0.005	0.5465	0%	NA	1.66	1.67	0.005	1.665	1%	NA	-
Nitrite (as N)	mg/L	0.197	0.208	0.001	0.2025	5%	NA	0.181	0.182	0.001	0.1815	1%	NA	-
Total Kjeldahl Nitrogen	mg/L	41.7	40.4	0.05	41.05	3%	NA	5.9	6.07	0.05	5.985	3%	NA	<0.050
Phosphorus (P)-Total	mg/L	0.0318	0.0281	0.002	0.02995	12.4%	NA	0.146	0.163	0.002	0.1545	11.0%	NA	<0.0020
Orthophosphate - Dissolved (as P)	mg/L	<0.001	<0.0010	0.001	NC	NC	NA	0.0013	0.0014	0.001	0.00135	NC	0.1	-
Sulfate (SO4)	mg/L	4.5	4.7	0.3	4.6	4%	NA	8.1	8	0.3	8.05	1%	NA	-
Biological Oxygen Demand (BOD)	mg/L	5.8	4.7	2	5.25	NC	0.55	6.4	7	2	6.7	NC	0.3	-
Chemical Oxygen Demand (COD)	mg/L	122	121	20	121.5	0.8%	NA	113	116	20	114.5	2.6%	NA	<20
Total Metals														
Aluminum	mg/L	0.197	0.0568	0.003	0.1269	**110.5%**	NA	0.589	0.556	0.003	0.5725	5.8%	NA	<0.0030
Antimony	mg/L	0.00021	0.0002	0.0001	0.000205	NC	0.1	0.00032	0.00032	0.0001	0.00032	NC	0	<0.00010
Arsenic	mg/L	0.00205	0.00187	0.0001	0.00196	9.2%	NA	0.00365	0.0037	0.0001	0.003675	1.4%	NA	<0.00010
Barium	mg/L	0.402	0.388	0.0001	0.395	3.5%	NA	0.131	0.135	0.0001	0.133	3.0%	NA	<0.00010
Beryllium	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010
Bismuth	mg/L	<0.000050	<0.000050	0.00005	NC	NC	NA	<0.000050	<0.000050	0.00005	NC	NC	NA	<0.000050
Boron	mg/L	2.07	1.95	0.01	2.01	6.0%	NA	1.31	1.33	0.01	1.32	1.5%	NA	<0.010
Cadmium	mg/L	0.000018	0.0000142	0.000005	0.0000161	NC	0.76	0.0000302	0.0000285	0.000005	0.00002935	5.8%	NA	<0.0000050
Calcium	mg/L	121	119	0.05	120	2%	NA	35.5	36.4	0.05	35.95	3%	NA	<0.050
Cesium	mg/L	0.000243	0.000229	0.00001	0.000236	6%	NA	0.000089	0.00009	0.00001	0.0000895	1%	NA	<0.000010
Chromium	mg/L	0.00097	0.00072	0.0001	0.000845	30%	NA	0.00096	0.00098	0.0001	0.00097	2%	NA	<0.00010
Cobalt	mg/L	0.00363	0.00337	0.0001	0.0035	7%	NA	0.00192	0.00194	0.0001	0.00193	1%	NA	<0.00010
Copper	mg/L	0.00216	0.00174	0.0005	0.00195	NC	0.84	0.00409	0.00405	0.0005	0.00407	1%	NA	<0.00050
Iron	mg/L	1.8	1.18	0.01	1.49	**42%**	NA	1.91	1.89	0.01	1.9	1%	NA	<0.010
Lead	mg/L	0.000075	<0.000050	0.00005	0.000075	NC	NA	0.000405	0.000399	0.00005	0.000402	1%	NA	<0.000050
Lithium	mg/L	0.0014	0.0012	0.001	0.0013	NC	0.2	<0.0010	<0.0010	0.001	NC	NC	NA	<0.0010
Magnesium	mg/L	29.6	26.8	0.005	28.2	10%	NA	18.7	18.4	0.005	18.55	2%	NA	<0.0050
Manganese	mg/L	1.98	1.83	0.0001	1.905	8%	NA	0.303	0.306	0.0001	0.3045	1%	NA	<0.00010
Mercury	mg/L	<0.0000050	<0.0000050	0.000005	NC	NC	NA	<0.0000050	<0.0000050	0.000005	NC	NC	NA	<0.0000050
Molybdenum	mg/L	0.000726	0.000753	0.00005	0.0007395	4%	NA	0.00113	0.00115	0.00005	0.00114	2%	NA	<0.000050
Nickel	mg/L	0.00616	0.00564	0.0005	0.0059	9%	NA	0.004	0.00405	0.0005	0.004025	1%	NA	<0.00050
Phosphorus	mg/L	0.068	<0.050	0.05	0.068	NC	NA	0.167	0.132	0.05	0.1495	NC	0.7	<0.050
Potassium	mg/L	54.6	51.9	0.05	53.25	5%	NA	34.1	34.6	0.05	34.35	1%	NA	<0.050
Rubidium	mg/L	0.0382	0.0367	0.0002	0.03745	4%	NA	0.0199	0.0197	0.0002	0.0198	1%	NA	<0.00020
Selenium	mg/L	0.000245	0.000145	0.00005	0.000195	NC	2	0.000386	0.000309	0.00005	0.0003475	**22%**	NA	<0.000050
Silicon	mg/L	8.25	7.52	0.1	7.885	9%	NA	5.21	5.37	0.1	5.29	3%	NA	<0.10
Silver	mg/L	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010
Sodium	mg/L	108	103	0.05	105.5	5%	NA	73.6	74.2	0.05	73.9	1%	NA	<0.050
Strontium	mg/L	0.963	0.937	0.0002	0.95	3%	NA	0.406	0.408	0.0002	0.407	0%	NA	<0.00020
Sulfur	mg/L	2.96	2.75	0.5	2.855	7%	NA	3.64	3.62	0.5	3.63	1%	NA	<0.50
Tellurium	mg/L	<0.00020	0.00023	0.0002	0.00023	NC	NA	<0.00020	<0.00020	0.0002	NC	NC	NA	<0.00020
Thallium	mg/L	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010
Thorium	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010
Tin	mg/L	0.00017	0.00014	0.0001	0.000155	NC	0.3	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010
Titanium	mg/L	0.00511	<0.0015	0.0003	0.00511	NC	NA	0.0115	0.0119	0.0003	0.0117	3%	NA	<0.00030
Tungsten	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010
Uranium	mg/L	0.000226	0.000222	0.00001	0.000224	2%	NA	0.000359	0.000364	0.00001	0.0003615	1%	NA	<0.000010
Vanadium	mg/L	0.0008	<0.00050	0.0005	0.0008	NC	NA	0.00205	0.00204	0.0005	0.002045	NC	0.02	<0.00050
Zinc	mg/L	<0.0030	<0.0030	0.003	NC	NC	NA	0.0046	0.0043	0.003	0.00445	NC	0.1	<0.0030
Zirconium	mg/L	0.000433	0.000244	0.00006	0.0003385	**56%**	NA	0.000195	0.000191	0.00006	0.000193	NC	0.07	<0.000060
Dissolved Metals														
Aluminum	mg/L	0.0094	0.0102	0.001	0.0098	8%	NA	0.0346	0.0317	0.001	0.03315	9%	NA	-
Antimony	mg/L	0.00018	0.00017	0.0001	0.000175	NC	0.1	0.00027	0.00028	0.0001	0.000275	NC	0.1	-
Arsenic	mg/L	0.00175	0.00161	0.0001	0.00168	8%	NA	0.00258	0.00262	0.0001	0.0026	2%	NA	-
Barium	mg/L	0.378	0.377	0.0001	0.3775	0%	NA	0.115	0.114	0.0001	0.1145	1%	NA	-
Beryllium	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	-
Bismuth	mg/L	<0.000050	<0.000050	0.00005	NC	NC	NA	<0.000050	<0.000050	0.00005	NC	NC	NA	-
Boron	mg/L	2.05	2.1	0.01	2.075	2%	NA	1.32	1.41	0.01	1.365	7%	NA	-
Cadmium	mg/L	0.000013	0.0000095	0.000005	0.00001125	NC	0.7	0.0000128	0.0000132	0.000005	0.000013	NC	0.08	-
Calcium	mg/L	129	126	0.05	127.5	2%	NA	36.1	37.6	0.05	36.85	4%	NA	-
Cesium	mg/L	0.000224	0.000222	0.00001	0.000223	1%	NA	0.000043	0.000049	0.00001	0.000046	NC	0.6	-
Chromium	mg/L	0.00074	0.00061	0.0001	0.000675	19%	NA	0.00042	0.00043	0.0001	0.000425	NC	0.1	-
Cobalt	mg/L	0.00336	0.00334	0.0001	0.00335	1%	NA	0.00156	0.00157	0.0001	0.001565	1%	NA	-
Copper	mg/L	0.00173	0.00152	0.0002	0.001625	13%	NA	0.00235	0.00234	0.0002	0.002345	0%	NA	-
Iron	mg/L	0.062	0.048	0.01	0.055	**25%**	NA	0.418	0.424	0.01	0.421	1%	NA	-
Lead	mg/L	<0.000050	<0.000050	0.00005	NC	NC	NA	0.000086	0.000122	0.00005	0.000104	NC	0.72	-
Lithium	mg/L	0.0012	0.0012	0.001	0.0012	NC	0	<0.0010	<0.0010	0.001	NC	NC	NA	-
Magnesium	mg/L	30.4	30	0.005	30.2	1%	NA	18.1	18.1	0.005	18.1	0%	NA	-
Manganese	mg/L	1.92	1.94	0.0001	1.93	1%	NA	0.224	0.232	0.0001	0.228	4%	NA	-
Mercury	mg/L	<0.0000050	<0.0000050	0.000005	NC	NC	NA	<0.0000050	<0.0000050	0.000005	NC	NC	NA	-
Molybdenum	mg/L	0.000706	0.000702	0.00005	0.000704	1%	NA	0.00125	0.00126	0.00005	0.001255	1%	NA	-
Nickel	mg/L	0.00609	0.00577	0.0005	0.00593	5%	NA	0.00364	0.00379	0.0005	0.003715	4%	NA	-
Phosphorus	mg/L	<0.050	<0.050	0.05	NC	NC	NA	<0.050	<0.050	0.05	NC	NC	NA	-
Potassium	mg/L	60.7	59.9	0.05	60.3	1%	NA	35.8	36.8	0.05	36.3	3%	NA	-
Rubidium	mg/L	0.0391	0.038	0.0002	0.03855	3%	NA	0.0195	0.0206	0.0002	0.02005	5%	NA	-
Selenium	mg/L	0.000239	0.000176	0.00005	0.0002075	NC	1.26	0.000347	0.000317	0.00005	0.000332	9%	NA	-
Silicon	mg/L	7.66	7.68	0.05	7.67	0%	NA	4.52	4.61	0.05	4.565	2%	NA	-
Silver	mg/L	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010	<0.000010	0.00001	NC	NC	NA	-
Sodium	mg/L	115	113	0.05	114	2%	NA	74.8	77.8	0.05	76.3	4%	NA	-
Strontium	mg/L	0.964	0.95	0.0002	0.957	1%	NA	0.386	0.414	0.0002	0.4	7%	NA	-
Sulfur	mg/L	2.73	2.96	0.5	2.845	8%	NA	3.42	3.44	0.5	3.43	1%	NA	-
Tellerium	mg/L	<0.00020	<0.00020	0.0002	NC	NC	NA	<0.00020	<0.00020	0.0002	NC	NC	NA	-
Thallium	mg/L	<0.000010	<0.000010	0.00001	NC	NC	NA	<0.000010	<0.000010	0.00001	NC	NC	NA	-
Thorium	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	-
Tin	mg/L	0.00027	0.00014	0.0001	0.000205	NC	1.3	<0.00010	<0.00010	0.0001	NC	NC	NA	-
Titanium	mg/L	<0.00030	<0.00030	0.0003	NC	NC	NA	0.00169	0.00154	0.0003	0.001615	9%	NA	-
Tungsten	mg/L	<0.00010	<0.00010	0.0001	NC	NC	NA	<0.00010	<0.00010	0.0001	NC	NC	NA	-
Uranium	mg/L	0.000232	0.000227	0.00001	0.0002295	2%	NA	0.000342	0.00038	0.00001	0.000361	11%	NA	-
Vanadium	mg/L	<0.00050	<0.00050	0.0005	NC	NC	NA	0.0006	0.0006	0.0005	0.0006	NC	0	-
Zinc	mg/L	0.0013	0.001	0.001	0.00115	NC	0.3	<0.0010	<0.0010	0.001	NC	NC	NA	-
Zirconium	mg/L	0.000219	0.000215	0.00006	0.000217	NC	0.07	0.000197	0.000202	0.00006	0.0001995	NC	0.08	-

Notes:
QA/QC = quality assurance/quality control; FDA = field duplicate available; FD = field duplicate
Laboratory Reporting Limit indicates the minimum concentration that could be measured by laboratory instrumentation for a specific sample.
Mean indicates the mean or average value calculated of a field duplicate pair (the FDA and the FD).
Relative Percent Difference (RPD) is calculated when the mean value is greater than five times the laboratory reporting limit.
Difference Factor (DF) is calculated when the mean value is less than five times the laboratory reporting limit.
NC = not calculated; NA = Not Applicable
80% Indicates the parameter analyzed exceeds Golder's internal QA/QC targets.

APPENDIX E

2018 Certificates of Analysis

REGIONAL DISTRICT OF KITIMAT-STIKINE
ATTN: Chris Kerr
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1

Date Received: 21-MAR-18
Report Date: 03-APR-18 13:22 (MT)
Version: FINAL

Client Phone: 250-615-6100

Certificate of Analysis

Lab Work Order #: L2070518

Project P.O. #: NOT SUBMITTED
Job Reference: THORNHILL TRANSFER STATION
C of C Numbers: 10-334387
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070518-1				
	Description	Ground Water				
	Sampled Date	19-MAR-18				
	Sampled Time	11:54				
	Client ID	BH96-2				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	345				
	Hardness (as CaCO3) (mg/L)	133				
	Total Suspended Solids (mg/L)	15.4				
	Total Dissolved Solids (mg/L)	195				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	179				
	Ammonia, Total (as N) (mg/L)	0.0276				
	Bromide (Br) (mg/L)	<0.050				
	Chloride (Cl) (mg/L)	4.47				
	Fluoride (F) (mg/L)	0.172				
	Nitrate (as N) (mg/L)	0.762				
	Nitrite (as N) (mg/L)	0.0068				
	Total Kjeldahl Nitrogen (mg/L)	0.379				
	Sulfate (SO4) (mg/L)	3.28				
Total Metals	Aluminum (Al)-Total (mg/L)	0.529				
	Antimony (Sb)-Total (mg/L)	0.00017				
	Arsenic (As)-Total (mg/L)	0.00265				
	Barium (Ba)-Total (mg/L)	0.0239				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.119				
	Cadmium (Cd)-Total (mg/L)	0.00155				
	Calcium (Ca)-Total (mg/L)	25.0				
	Cesium (Cs)-Total (mg/L)	0.000053				
	Chromium (Cr)-Total (mg/L)	0.00105				
	Cobalt (Co)-Total (mg/L)	0.00034				
	Copper (Cu)-Total (mg/L)	0.00457				
	Iron (Fe)-Total (mg/L)	0.796				
	Lead (Pb)-Total (mg/L)	0.000387				
	Lithium (Li)-Total (mg/L)	0.0017				
	Magnesium (Mg)-Total (mg/L)	17.5				
	Manganese (Mn)-Total (mg/L)	0.0674				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00364				
	Nickel (Ni)-Total (mg/L)	0.00194				
	Phosphorus (P)-Total (mg/L)	0.112				
	Potassium (K)-Total (mg/L)	8.19				
	Rubidium (Rb)-Total (mg/L)	0.00080				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070518-1				
	Description	Ground Water				
	Sampled Date	19-MAR-18				
	Sampled Time	11:54				
	Client ID	BH96-2				
Grouping	**Analyte**					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.000057				
	Silicon (Si)-Total (mg/L)	5.70				
	Silver (Ag)-Total (mg/L)	0.000010				
	Sodium (Na)-Total (mg/L)	26.0				
	Strontium (Sr)-Total (mg/L)	0.209				
	Sulfur (S)-Total (mg/L)	0.74				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	0.00022				
	Titanium (Ti)-Total (mg/L)	0.0155				
	Tungsten (W)-Total (mg/L)	0.00011				
	Uranium (U)-Total (mg/L)	0.00184				
	Vanadium (V)-Total (mg/L)	0.00208				
	Zinc (Zn)-Total (mg/L)	0.0214				
	Zirconium (Zr)-Total (mg/L)	0.000116				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	LAB				
	Aluminum (Al)-Dissolved (mg/L)	0.0153				
	Antimony (Sb)-Dissolved (mg/L)	0.00011				
	Arsenic (As)-Dissolved (mg/L)	0.00247				
	Barium (Ba)-Dissolved (mg/L)	0.0227				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.116				
	Cadmium (Cd)-Dissolved (mg/L)	0.000610				
	Calcium (Ca)-Dissolved (mg/L)	20.6				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	<0.00010				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00118				
	Iron (Fe)-Dissolved (mg/L)	<0.010				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0013				
	Magnesium (Mg)-Dissolved (mg/L)	19.9				
	Manganese (Mn)-Dissolved (mg/L)	0.00228				
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070518-1
	Description	Ground Water
	Sampled Date	19-MAR-18
	Sampled Time	11:54
	Client ID	BH96-2
Grouping	**Analyte**	
WATER		
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.00381
	Nickel (Ni)-Dissolved (mg/L)	0.00077
	Phosphorus (P)-Dissolved (mg/L)	0.061
	Potassium (K)-Dissolved (mg/L)	8.98
	Rubidium (Rb)-Dissolved (mg/L)	0.00053
	Selenium (Se)-Dissolved (mg/L)	<0.000050
	Silicon (Si)-Dissolved (mg/L)	4.63
	Silver (Ag)-Dissolved (mg/L)	<0.000010
	Sodium (Na)-Dissolved (mg/L)	29.0
	Strontium (Sr)-Dissolved (mg/L)	0.205
	Sulfur (S)-Dissolved (mg/L)	0.77
	Tellurium (Te)-Dissolved (mg/L)	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030
	Tungsten (W)-Dissolved (mg/L)	0.00011
	Uranium (U)-Dissolved (mg/L)	0.000966
	Vanadium (V)-Dissolved (mg/L)	0.00054
	Zinc (Zn)-Dissolved (mg/L)	0.0042
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060
Aggregate Organics	COD (mg/L)	<20

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Aluminum (Al)-Dissolved	DUP-H	L2070518-1
Method Blank	Silver (Ag)-Total	MB-LOR	L2070518-1
Method Blank	Sulfur (S)-Total	MB-LOR	L2070518-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2070518-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2070518-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2070518-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2070518-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2070518-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2070518-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2070518-1
Matrix Spike	Potassium (K)-Total	MS-B	L2070518-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2070518-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2070518-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

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

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

10-334387

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: REGIONAL DISTRICT OF KITIMAT-STIKINE
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1
Contact: Chris Kerr

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Water**							
Batch R3994292								
WG2737682-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.6		%		85-115	23-MAR-18
WG2737682-1 MB								
Alkalinity, Total (as CaCO3)			1.0		mg/L		1	23-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Bromide (Br)			97.4		%		85-115	22-MAR-18
WG2737681-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	22-MAR-18
CL-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Chloride (Cl)			98.1		%		90-110	22-MAR-18
WG2737681-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-MAR-18
COD-COL-VA	**Water**							
Batch R3995768								
WG2739681-3 LCS								
COD			101.7		%		85-115	26-MAR-18
WG2739681-6 LCS								
COD			101.0		%		85-115	26-MAR-18
WG2739681-1 MB								
COD			<20		mg/L		20	26-MAR-18
WG2739681-5 MB								
COD			<20		mg/L		20	26-MAR-18
EC-PCT-VA	**Water**							
Batch R3994292								
WG2737682-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			96.7		%		90-110	23-MAR-18
WG2737682-1 MB								
Conductivity			<2.0		uS/cm		2	23-MAR-18
F-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Fluoride (F)			98.7		%		90-110	22-MAR-18
WG2737681-1 MB								

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	22-MAR-18
HG-D-CVAA-VA	**Water**							
Batch R3993706								
WG2737441-6 LCS								
Mercury (Hg)-Dissolved			102.0		%		80-120	22-MAR-18
HG-T-CVAA-VA	**Water**							
Batch R3997815								
WG2741489-3 DUP		**L2070518-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	28-MAR-18
WG2741489-2 LCS								
Mercury (Hg)-Total			95.9		%		80-120	28-MAR-18
WG2741489-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	28-MAR-18
MET-D-CCMS-VA	**Water**							
Batch R3996849								
WG2739880-2 LCS								
Aluminum (Al)-Dissolved			101.0		%		80-120	27-MAR-18
Antimony (Sb)-Dissolved			98.7		%		80-120	27-MAR-18
Arsenic (As)-Dissolved			97.6		%		80-120	27-MAR-18
Barium (Ba)-Dissolved			100.6		%		80-120	27-MAR-18
Beryllium (Be)-Dissolved			96.0		%		80-120	27-MAR-18
Bismuth (Bi)-Dissolved			97.8		%		80-120	27-MAR-18
Boron (B)-Dissolved			92.5		%		80-120	27-MAR-18
Cadmium (Cd)-Dissolved			104.9		%		80-120	27-MAR-18
Calcium (Ca)-Dissolved			98.9		%		80-120	27-MAR-18
Cesium (Cs)-Dissolved			99.2		%		80-120	27-MAR-18
Chromium (Cr)-Dissolved			98.4		%		80-120	27-MAR-18
Cobalt (Co)-Dissolved			97.6		%		80-120	27-MAR-18
Copper (Cu)-Dissolved			99.0		%		80-120	27-MAR-18
Iron (Fe)-Dissolved			97.9		%		80-120	27-MAR-18
Lead (Pb)-Dissolved			101.1		%		80-120	27-MAR-18
Lithium (Li)-Dissolved			93.6		%		80-120	27-MAR-18
Magnesium (Mg)-Dissolved			100.8		%		80-120	27-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3996849								
WG2739880-2 LCS								
Manganese (Mn)-Dissolved			99.1		%		80-120	27-MAR-18
Molybdenum (Mo)-Dissolved			100.0		%		80-120	27-MAR-18
Nickel (Ni)-Dissolved			98.4		%		80-120	27-MAR-18
Phosphorus (P)-Dissolved			108.8		%		80-120	27-MAR-18
Potassium (K)-Dissolved			102.5		%		80-120	27-MAR-18
Rubidium (Rb)-Dissolved			102.2		%		80-120	27-MAR-18
Selenium (Se)-Dissolved			100.7		%		80-120	27-MAR-18
Silicon (Si)-Dissolved			101.5		%		80-120	27-MAR-18
Silver (Ag)-Dissolved			96.0		%		80-120	27-MAR-18
Sodium (Na)-Dissolved			99.98		%		80-120	27-MAR-18
Strontium (Sr)-Dissolved			101.2		%		80-120	27-MAR-18
Sulfur (S)-Dissolved			97.0		%		80-120	27-MAR-18
Tellurium (Te)-Dissolved			96.3		%		80-120	27-MAR-18
Thallium (Tl)-Dissolved			102.6		%		80-120	27-MAR-18
Thorium (Th)-Dissolved			88.8		%		80-120	27-MAR-18
Tin (Sn)-Dissolved			98.2		%		80-120	27-MAR-18
Titanium (Ti)-Dissolved			92.9		%		80-120	27-MAR-18
Tungsten (W)-Dissolved			100.4		%		80-120	27-MAR-18
Uranium (U)-Dissolved			115.9		%		80-120	27-MAR-18
Vanadium (V)-Dissolved			100.9		%		80-120	27-MAR-18
Zinc (Zn)-Dissolved			91.9		%		80-120	27-MAR-18
Zirconium (Zr)-Dissolved			91.5		%		80-120	27-MAR-18
WG2739880-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	27-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	27-MAR-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	27-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	27-MAR-18
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R3996849								
WG2739880-1 MB		**LF**						
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	27-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	27-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	27-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	27-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	27-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	27-MAR-18
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	27-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	27-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	27-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	27-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	27-MAR-18
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	27-MAR-18
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	27-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-18
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	27-MAR-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	27-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	27-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	27-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	27-MAR-18
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	27-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3994932								
WG2738954-2 LCS								
Aluminum (Al)-Total			100.0		%		80-120	24-MAR-18
Antimony (Sb)-Total			106.3		%		80-120	24-MAR-18
Arsenic (As)-Total			98.7		%		80-120	24-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3994932								
WG2738954-2 LCS								
Barium (Ba)-Total			100.0		%		80-120	24-MAR-18
Beryllium (Be)-Total			100.1		%		80-120	24-MAR-18
Bismuth (Bi)-Total			98.5		%		80-120	24-MAR-18
Boron (B)-Total			97.2		%		80-120	24-MAR-18
Cadmium (Cd)-Total			101.3		%		80-120	24-MAR-18
Calcium (Ca)-Total			113.1		%		80-120	24-MAR-18
Cesium (Cs)-Total			99.8		%		80-120	24-MAR-18
Chromium (Cr)-Total			102.4		%		80-120	24-MAR-18
Cobalt (Co)-Total			102.2		%		80-120	24-MAR-18
Copper (Cu)-Total			101.7		%		80-120	24-MAR-18
Iron (Fe)-Total			100.9		%		80-120	24-MAR-18
Lead (Pb)-Total			95.6		%		80-120	24-MAR-18
Lithium (Li)-Total			102.7		%		80-120	24-MAR-18
Magnesium (Mg)-Total			97.8		%		80-120	24-MAR-18
Manganese (Mn)-Total			99.8		%		80-120	24-MAR-18
Molybdenum (Mo)-Total			99.5		%		80-120	24-MAR-18
Nickel (Ni)-Total			102.8		%		80-120	24-MAR-18
Phosphorus (P)-Total			103.4		%		80-120	24-MAR-18
Potassium (K)-Total			107.2		%		80-120	24-MAR-18
Rubidium (Rb)-Total			102.7		%		80-120	24-MAR-18
Selenium (Se)-Total			104.4		%		80-120	24-MAR-18
Silicon (Si)-Total			105.1		%		80-120	24-MAR-18
Silver (Ag)-Total			97.0		%		80-120	24-MAR-18
Sodium (Na)-Total			99.3		%		80-120	24-MAR-18
Strontium (Sr)-Total			101.1		%		80-120	24-MAR-18
Sulfur (S)-Total			90.9		%		80-120	24-MAR-18
Tellurium (Te)-Total			96.5		%		80-120	24-MAR-18
Thallium (Tl)-Total			94.4		%		80-120	24-MAR-18
Thorium (Th)-Total			90.7		%		80-120	24-MAR-18
Tin (Sn)-Total			99.8		%		80-120	24-MAR-18
Titanium (Ti)-Total			99.0		%		80-120	24-MAR-18
Tungsten (W)-Total			93.2		%		80-120	24-MAR-18
Uranium (U)-Total			96.7		%		80-120	24-MAR-18
Vanadium (V)-Total			102.2		%		80-120	24-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3994932								
WG2738954-2 LCS								
Zinc (Zn)-Total			95.6		%		80-120	24-MAR-18
Zirconium (Zr)-Total			96.5		%		80-120	24-MAR-18
WG2738954-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	24-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	24-MAR-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	24-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	24-MAR-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	24-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	24-MAR-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	24-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	24-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	24-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	24-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	24-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	24-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	24-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	24-MAR-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	24-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	24-MAR-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	24-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	24-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	24-MAR-18
Silver (Ag)-Total			0.000055	MB-LOR	mg/L		0.00001	24-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	24-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	24-MAR-18
Sulfur (S)-Total			<0.50	MB-LOR	mg/L		0.5	24-MAR-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	24-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	24-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3994932								
WG2738954-1 MB								
Thorium (Th)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	24-MAR-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	24-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	24-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	24-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	24-MAR-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	24-MAR-18
NH3-F-VA	**Water**							
Batch R3999669								
WG2741739-6 LCS								
Ammonia, Total (as N)			99.3		%		85-115	28-MAR-18
WG2741739-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	28-MAR-18
NO2-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Nitrite (as N)			98.5		%		90-110	22-MAR-18
WG2737681-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	22-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Nitrate (as N)			99.5		%		90-110	22-MAR-18
WG2737681-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	22-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Sulfate (SO4)			99.0		%		90-110	22-MAR-18
WG2737681-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-MAR-18
TDS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TDS-VA	**Water**							
Batch R3995559								
WG2738898-5 LCS								
Total Dissolved Solids			101.3		%		85-115	23-MAR-18
WG2738898-4 MB								
Total Dissolved Solids			<10		mg/L		10	23-MAR-18
TKN-F-VA	**Water**							
Batch R3993997								
WG2736884-6 LCS								
Total Kjeldahl Nitrogen			102.0		%		75-125	22-MAR-18
WG2736884-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	22-MAR-18
TSS-VA	**Water**							
Batch R3994691								
WG2738209-5 LCS								
Total Suspended Solids			104.8		%		85-115	23-MAR-18
WG2738209-4 MB								
Total Suspended Solids			<3.0		mg/L		3	23-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

10- 334387

L2070518-COFC

ALS Environmental

Chain of Custody / Analytical F
Canada Toll Free: 1 800 6
www.alsglobal.com

Page ____ of ____

Report To Roger Tooms	**Report Format / Distribution**	**Service Request:** (Rush subject to availability - Contact ALS to confirm TAT)
Company: Regional District of Kitimat Stikine	Standard: ✓ Other (specify):	✓ Regular (Standard Turnaround Times - Business Days)
Contact: CHRIS KERR	Select: PDF ✓ Excel Digital Fax	Priority(2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address: Suite 300 4545 Lazelle	Email 1: rtooms@rdks.bc.ca	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
Terrace B.C. V8G-4E1	Email 2: ckerr@rdks.bc.ca	Same Day or Weekend Emergency - Contact ALS to confirm TAT
Phone: 250-615-6100 Fax: 250-635-9222	mhuley@rdks.bc.ca	
Invoice To Same as Report ? (circle) Yes or No (if No, provide details)	**Client / Project Information**	**Analysis Request**
Copy of Invoice with Report? (circle) Yes or No	Job #: Thornhill Transfer Station	(Indicate Filtered or Preserved, F/P)
Company:	PO / AFE:	
Contact:	LSD:	
Address:		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only)	**ALS Contact:** **Sampler:**	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metal	Total Metal	Alkalinity	Dissolved Hardness	Ammonia	Chloride / Sulphate	Fluoride (Dissolved)	Conductivity / TSS	Nitrate / Nitrite	Total Kjeldahl		COD	Number of Containers
	BH 96-2	19/03/18	11:54 am	Ground Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	5

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

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

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	19/03/18	2:45pm		March 19	2:40	10 °C				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

JL MAR 21 2019 1120AM 2°C

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

GENF 18.01 Front

REGIONAL DISTRICT OF KITIMAT-STIKINE
ATTN: Chris Kerr
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1

Date Received: 21-MAR-18
Report Date: 06-APR-18 15:20 (MT)
Version: FINAL

Client Phone: 250-615-6100

Certificate of Analysis

Lab Work Order #: L2070515

Project P.O. #: NOT SUBMITTED
Job Reference: THORNHILL TRANSFER STATION
C of C Numbers: 15-588263
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070515-1	L2070515-2	L2070515-3	L2070515-4	
	Description	Surface	Surface	Surface	Surface	
	Sampled Date	19-MAR-18	19-MAR-18	19-MAR-18	19-MAR-18	
	Sampled Time	10:15	12:20	13:30	11:12	
	Client ID	SW-1 THORNHILL TRANSFER ST. TH. CREEK CREEK UPSTREAM	SW-3 LEACHATE SEEPAGE	SW-6 TH.CREEK DOWNSTREAM	SW-21 LEACHATE WEIR	
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	66.4	890	72.1	349	
	Hardness (as CaCO3) (mg/L)	30.2	289	31.9	141	
	pH (pH)	7.77	8.22	7.64	8.26	
	Total Suspended Solids (mg/L)	<3.0	21.4	5.6	<3.0	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	27.4	388	30.2	144	
	Ammonia, Total (as N) (mg/L)	0.0056	22.0	0.0331	3.91	
	Bromide (Br) (mg/L)	<0.050	0.27	<0.050	0.073	
	Chloride (Cl) (mg/L)	<0.50	34.6	2.02	9.60	
	Fluoride (F) (mg/L)	<0.020	<0.10 DLDS	0.042	0.061	
	Nitrate (as N) (mg/L)	0.172	2.49	0.161	1.56	
	Nitrite (as N) (mg/L)	<0.0010	0.0179	0.0016	0.0166	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	22.5	0.277	4.48	
	Sulfate (SO4) (mg/L)	1.30	10.5	1.52	7.19	
Total Metals	Aluminum (Al)-Total (mg/L)	0.0297	0.203	0.615	0.446	
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00010	<0.00010	<0.00010	
	Arsenic (As)-Total (mg/L)	<0.00010	0.00144	0.00034	0.00034	
	Barium (Ba)-Total (mg/L)	0.0191	0.262	0.0152	0.0773	
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Total (mg/L)	<0.010	0.945	<0.020 DLAI	0.332	
	Cadmium (Cd)-Total (mg/L)	<0.0000050	0.0000322	0.0000121	0.0000164	
	Calcium (Ca)-Total (mg/L)	10.1	80.7	9.56	39.2	
	Cesium (Cs)-Total (mg/L)	<0.000010	0.000102	0.000049	0.000047	
	Chromium (Cr)-Total (mg/L)	0.00047	0.00071	0.00064	0.00057	
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00177	0.00032	0.00051	
	Copper (Cu)-Total (mg/L)	<0.00050	0.00250	0.00174	0.00201	
	Iron (Fe)-Total (mg/L)	0.025	5.21	0.713	0.515	
	Lead (Pb)-Total (mg/L)	<0.000050	0.000058	0.000124	0.000100	
	Lithium (Li)-Total (mg/L)	<0.0010	0.0011	<0.0010	<0.0010	
	Magnesium (Mg)-Total (mg/L)	0.735	14.1	1.23	6.07	
	Manganese (Mn)-Total (mg/L)	0.00154	2.35	0.115	0.513	
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Total (mg/L)	0.000156	0.000319	0.000829	0.000245	
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00260	0.00070	0.00111	
	Phosphorus (P)-Total (mg/L)	<0.050	0.056	<0.050	<0.050	
	Potassium (K)-Total (mg/L)	0.609	23.7	1.20	8.29	
	Rubidium (Rb)-Total (mg/L)	0.00071	0.0164	0.00106	0.00478	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070515-1	L2070515-2	L2070515-3	L2070515-4	
	Description	Surface	Surface	Surface	Surface	
	Sampled Date	19-MAR-18	19-MAR-18	19-MAR-18	19-MAR-18	
	Sampled Time	10:15	12:20	13:30	11:12	
	Client ID	SW-1 THORNHILL TRANSFER ST. TH. CREEK CREEK UPSTREAM	SW-3 LEACHATE SEEPAGE	SW-6 TH.CREEK DOWNSTREAM	SW-21 LEACHATE WEIR	
Grouping	**Analyte**					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	<0.000050	0.000122	0.000069	0.000123	
	Silicon (Si)-Total (mg/L)	2.43	6.10	3.73	3.30	
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Total (mg/L)	0.988	46.0	2.45	14.3	
	Strontium (Sr)-Total (mg/L)	0.0417	0.469	0.0330	0.214	
	Sulfur (S)-Total (mg/L)	0.54	4.19	0.70	2.69	
	Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Total (mg/L)	0.00092	0.00534	0.0159	0.0111	
	Tungsten (W)-Total (mg/L)	0.00019	0.00027	0.00013	0.00022	
	Uranium (U)-Total (mg/L)	<0.000010	0.000078	0.000194	0.000082	
	Vanadium (V)-Total (mg/L)	<0.00050	0.00080	0.00149	0.00099	
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	0.0038	<0.0030	
	Zirconium (Zr)-Total (mg/L)	<0.000060	0.000226	0.000294	0.000206	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	LAB	LAB	LAB	LAB	
	Aluminum (Al)-Dissolved (mg/L)	0.0172	0.0023	0.112	0.0186	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00060	0.00023	0.00023	
	Barium (Ba)-Dissolved (mg/L)	0.0213	0.261	0.0118	0.0768	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010	0.961	0.015	0.353	
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.0000210	<0.0000050	0.0000118	
	Calcium (Ca)-Dissolved (mg/L)	10.7	88.3	10.7	44.9	
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	0.000103	<0.000010	0.000019	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00033	0.00015	0.00018	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00173	<0.00010	0.00029	
	Copper (Cu)-Dissolved (mg/L)	0.00034	0.00189	0.00109	0.00140	
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.020	0.251	0.027	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Magnesium (Mg)-Dissolved (mg/L)	0.818	16.8	1.26	7.08	
	Manganese (Mn)-Dissolved (mg/L)	0.00073	2.64	0.00334	0.295	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2070515-1	L2070515-2	L2070515-3	L2070515-4	
	Description	Surface	Surface	Surface	Surface	
	Sampled Date	19-MAR-18	19-MAR-18	19-MAR-18	19-MAR-18	
	Sampled Time	10:15	12:20	13:30	11:12	
	Client ID	SW-1 THORNHILL TRANSFER ST. TH. CREEK CREEK UPSTREAM	SW-3 LEACHATE SEEPAGE	SW-6 TH.CREEK DOWNSTREAM	SW-21 LEACHATE WEIR	
Grouping	**Analyte**					
WATER						
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.000161	0.000321	0.000787	0.000257	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00248	<0.00050	0.00082	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	0.641	27.6	1.22	9.60	
	Rubidium (Rb)-Dissolved (mg/L)	0.00073	0.0177	0.00085	0.00493	
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000160	0.000064	0.000137	
	Silicon (Si)-Dissolved (mg/L)	2.41	5.51	2.98	2.75	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	1.08	48.5	2.47	15.0	
	Strontium (Sr)-Dissolved (mg/L)	0.0471	0.512	0.0352	0.223	
	Sulfur (S)-Dissolved (mg/L)	<0.50	4.08	<0.50	2.59	
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	0.00490	0.00089	
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000078	0.000170	0.000085	
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	0.00051	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	<0.000060	0.000276	0.000069	
Aggregate Organics	BOD (mg/L)	<2.0	2.7	<2.0	<2.0	
	COD (mg/L)	<20	48	<20	22	

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

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Magnesium (Mg)-Dissolved	MES	L2070515-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Barium (Ba)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Calcium (Ca)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Iron (Fe)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Manganese (Mn)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Potassium (K)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Silicon (Si)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Sodium (Na)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Strontium (Sr)-Total	MS-B	L2070515-1, -2, -3, -4
Matrix Spike	Sulfur (S)-Total	MS-B	L2070515-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLAI	Detection limit raised due to low level analytical interference or background.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
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).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- BIOCHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

Reference Information

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

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

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

15-588263

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: REGIONAL DISTRICT OF KITIMAT-STIKINE
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1
Contact: Chris Kerr

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Water**							
Batch R4001767								
WG2743147-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	02-APR-18
Batch R4004395								
WG2742451-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			102.1		%		85-115	03-APR-18
WG2742451-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	03-APR-18
BOD5-VA	**Water**							
Batch R3996369								
WG2738144-2 LCS								
BOD			94.8		%		85-115	22-MAR-18
WG2738144-6 LCS								
BOD			91.4		%		85-115	22-MAR-18
WG2738144-1 MB								
BOD			<2.0		mg/L		2	22-MAR-18
WG2738144-5 MB								
BOD			<2.0		mg/L		2	22-MAR-18
BR-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Bromide (Br)			97.4		%		85-115	22-MAR-18
WG2737681-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Bromide (Br)			95.8		%		75-125	22-MAR-18
CL-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Chloride (Cl)			98.1		%		90-110	22-MAR-18
WG2737681-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Chloride (Cl)			97.8		%		75-125	22-MAR-18
COD-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COD-COL-VA	**Water**							
Batch R4000737								
WG2742758-3 LCS								
COD			98.6		%		85-115	31-MAR-18
WG2742758-6 LCS								
COD			98.5		%		85-115	31-MAR-18
WG2742758-1 MB								
COD			<20		mg/L		20	31-MAR-18
WG2742758-5 MB								
COD			<20		mg/L		20	31-MAR-18
WG2742758-4 MS		**L2070515-1**						
COD			94.6		%		75-125	31-MAR-18
EC-PCT-VA	**Water**							
Batch R3994955								
WG2737683-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			105.0		%		90-110	23-MAR-18
WG2737683-1 MB								
Conductivity			<2.0		uS/cm		2	23-MAR-18
F-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Fluoride (F)			98.7		%		90-110	22-MAR-18
WG2737681-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Fluoride (F)			98.9		%		75-125	22-MAR-18
HG-D-CVAA-VA	**Water**							
Batch R3993706								
WG2737441-12 DUP		**L2070515-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	22-MAR-18
WG2737441-10 LCS								
Mercury (Hg)-Dissolved			106.8		%		80-120	22-MAR-18
WG2737441-6 LCS								
Mercury (Hg)-Dissolved			102.0		%		80-120	22-MAR-18
WG2737441-11 MS		**L2070515-4**						
Mercury (Hg)-Dissolved			109.8		%		70-130	22-MAR-18
HG-T-CVAA-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R4003941								
WG2744045-8 DUP		**L2070515-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	03-APR-18
WG2744045-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	03-APR-18
WG2744045-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	03-APR-18
WG2744045-9 MS		**L2070515-2**						
Mercury (Hg)-Total			87.3		%		70-130	03-APR-18
MET-D-CCMS-VA	**Water**							
Batch R4001989								
WG2740862-2 LCS								
Aluminum (Al)-Dissolved			105.9		%		80-120	30-MAR-18
Antimony (Sb)-Dissolved			109.3		%		80-120	30-MAR-18
Arsenic (As)-Dissolved			106.1		%		80-120	30-MAR-18
Barium (Ba)-Dissolved			108.3		%		80-120	30-MAR-18
Beryllium (Be)-Dissolved			112.2		%		80-120	30-MAR-18
Bismuth (Bi)-Dissolved			108.6		%		80-120	30-MAR-18
Boron (B)-Dissolved			101.1		%		80-120	30-MAR-18
Cadmium (Cd)-Dissolved			116.0		%		80-120	30-MAR-18
Calcium (Ca)-Dissolved			109.7		%		80-120	30-MAR-18
Cesium (Cs)-Dissolved			113.9		%		80-120	30-MAR-18
Chromium (Cr)-Dissolved			109.8		%		80-120	30-MAR-18
Cobalt (Co)-Dissolved			108.9		%		80-120	30-MAR-18
Copper (Cu)-Dissolved			106.9		%		80-120	30-MAR-18
Iron (Fe)-Dissolved			107.1		%		80-120	30-MAR-18
Lead (Pb)-Dissolved			109.4		%		80-120	30-MAR-18
Lithium (Li)-Dissolved			96.0		%		80-120	30-MAR-18
Magnesium (Mg)-Dissolved			122.9	MES	%		80-120	30-MAR-18
Manganese (Mn)-Dissolved			108.3		%		80-120	30-MAR-18
Molybdenum (Mo)-Dissolved			109.6		%		80-120	30-MAR-18
Nickel (Ni)-Dissolved			109.3		%		80-120	30-MAR-18
Phosphorus (P)-Dissolved			113.9		%		80-120	30-MAR-18
Potassium (K)-Dissolved			103.7		%		80-120	30-MAR-18
Rubidium (Rb)-Dissolved			110.9		%		80-120	30-MAR-18
Selenium (Se)-Dissolved			106.8		%		80-120	30-MAR-18
Silicon (Si)-Dissolved			106.4		%		80-120	30-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4001989								
WG2740862-2 LCS								
Silver (Ag)-Dissolved			104.2		%		80-120	30-MAR-18
Sodium (Na)-Dissolved			111.0		%		80-120	30-MAR-18
Strontium (Sr)-Dissolved			106.3		%		80-120	30-MAR-18
Sulfur (S)-Dissolved			105.6		%		80-120	30-MAR-18
Tellurium (Te)-Dissolved			107.4		%		80-120	30-MAR-18
Thallium (Tl)-Dissolved			109.1		%		80-120	30-MAR-18
Thorium (Th)-Dissolved			104.9		%		80-120	30-MAR-18
Tin (Sn)-Dissolved			106.8		%		80-120	30-MAR-18
Titanium (Ti)-Dissolved			105.2		%		80-120	30-MAR-18
Tungsten (W)-Dissolved			106.8		%		80-120	30-MAR-18
Uranium (U)-Dissolved			109.0		%		80-120	30-MAR-18
Vanadium (V)-Dissolved			110.3		%		80-120	30-MAR-18
Zinc (Zn)-Dissolved			101.6		%		80-120	30-MAR-18
Zirconium (Zr)-Dissolved			110.1		%		80-120	30-MAR-18
WG2740862-1 MB		**LF**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	30-MAR-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Barium (Ba)-Dissolved			<0.000050		mg/L		0.00005	30-MAR-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	30-MAR-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	30-MAR-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	30-MAR-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	30-MAR-18
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	30-MAR-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	30-MAR-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	30-MAR-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	30-MAR-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	30-MAR-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	30-MAR-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	30-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4001989								
WG2740862-1 MB		**LF**						
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	30-MAR-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	30-MAR-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	30-MAR-18
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	30-MAR-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	30-MAR-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	30-MAR-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	30-MAR-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	30-MAR-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	30-MAR-18
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	30-MAR-18
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	30-MAR-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	30-MAR-18
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	30-MAR-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	30-MAR-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	30-MAR-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	30-MAR-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	30-MAR-18
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	30-MAR-18
MET-T-CCMS-VA	**Water**							
Batch R3996427								
WG2740326-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	27-MAR-18
Antimony (Sb)-Total			118.3		%		80-120	27-MAR-18
Arsenic (As)-Total			102.4		%		80-120	27-MAR-18
Barium (Ba)-Total			104.5		%		80-120	27-MAR-18
Beryllium (Be)-Total			103.0		%		80-120	27-MAR-18
Bismuth (Bi)-Total			103.0		%		80-120	27-MAR-18
Boron (B)-Total			96.2		%		80-120	27-MAR-18
Cadmium (Cd)-Total			105.5		%		80-120	27-MAR-18
Calcium (Ca)-Total			104.2		%		80-120	27-MAR-18
Cesium (Cs)-Total			105.8		%		80-120	27-MAR-18
Chromium (Cr)-Total			103.1		%		80-120	27-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3996427								
WG2740326-2 LCS								
Cobalt (Co)-Total			101.9		%		80-120	27-MAR-18
Copper (Cu)-Total			105.1		%		80-120	27-MAR-18
Iron (Fe)-Total			98.4		%		80-120	27-MAR-18
Lead (Pb)-Total			102.6		%		80-120	27-MAR-18
Lithium (Li)-Total			98.6		%		80-120	27-MAR-18
Magnesium (Mg)-Total			105.2		%		80-120	27-MAR-18
Manganese (Mn)-Total			103.7		%		80-120	27-MAR-18
Molybdenum (Mo)-Total			108.4		%		80-120	27-MAR-18
Nickel (Ni)-Total			105.9		%		80-120	27-MAR-18
Phosphorus (P)-Total			113.2		%		80-120	27-MAR-18
Potassium (K)-Total			107.2		%		80-120	27-MAR-18
Rubidium (Rb)-Total			105.8		%		80-120	27-MAR-18
Selenium (Se)-Total			102.1		%		80-120	27-MAR-18
Silicon (Si)-Total			106.5		%		80-120	27-MAR-18
Silver (Ag)-Total			106.0		%		80-120	27-MAR-18
Sodium (Na)-Total			107.2		%		80-120	27-MAR-18
Strontium (Sr)-Total			111.4		%		80-120	27-MAR-18
Sulfur (S)-Total			113.1		%		80-120	27-MAR-18
Tellurium (Te)-Total			101.3		%		80-120	27-MAR-18
Thallium (Tl)-Total			100.7		%		80-120	27-MAR-18
Thorium (Th)-Total			89.4		%		80-120	27-MAR-18
Tin (Sn)-Total			103.7		%		80-120	27-MAR-18
Titanium (Ti)-Total			103.6		%		80-120	27-MAR-18
Tungsten (W)-Total			104.1		%		80-120	27-MAR-18
Uranium (U)-Total			107.1		%		80-120	27-MAR-18
Vanadium (V)-Total			105.7		%		80-120	27-MAR-18
Zinc (Zn)-Total			99.9		%		80-120	27-MAR-18
Zirconium (Zr)-Total			100.6		%		80-120	27-MAR-18
WG2740326-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	27-MAR-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Barium (Ba)-Total			<0.000050		mg/L		0.00005	27-MAR-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	27-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R3996427								
WG2740326-1 MB								
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	27-MAR-18
Boron (B)-Total			<0.010		mg/L		0.01	27-MAR-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	27-MAR-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	27-MAR-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	27-MAR-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	27-MAR-18
Iron (Fe)-Total			<0.010		mg/L		0.01	27-MAR-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	27-MAR-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	27-MAR-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	27-MAR-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	27-MAR-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	27-MAR-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	27-MAR-18
Potassium (K)-Total			<0.050		mg/L		0.05	27-MAR-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	27-MAR-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	27-MAR-18
Silicon (Si)-Total			<0.10		mg/L		0.1	27-MAR-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	27-MAR-18
Sodium (Na)-Total			<0.050		mg/L		0.05	27-MAR-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	27-MAR-18
Sulfur (S)-Total			<0.50		mg/L		0.5	27-MAR-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	27-MAR-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	27-MAR-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	27-MAR-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	27-MAR-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	27-MAR-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	27-MAR-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	27-MAR-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	27-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R4004803								
WG2744464-2 LCS								
Ammonia, Total (as N)			101.0		%		85-115	04-APR-18
WG2744464-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	04-APR-18
NO2-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Nitrite (as N)			98.5		%		90-110	22-MAR-18
WG2737681-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Nitrite (as N)			97.9		%		75-125	22-MAR-18
NO3-L-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Nitrate (as N)			99.5		%		90-110	22-MAR-18
WG2737681-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Nitrate (as N)			98.6		%		75-125	22-MAR-18
PH-PCT-VA	**Water**							
Batch R3994955								
WG2737683-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	23-MAR-18
SO4-IC-N-VA	**Water**							
Batch R3994640								
WG2737681-2 LCS								
Sulfate (SO4)			99.0		%		90-110	22-MAR-18
WG2737681-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	22-MAR-18
WG2737681-4 MS		**L2070515-3**						
Sulfate (SO4)			98.4		%		75-125	22-MAR-18
TKN-F-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-F-VA	**Water**							
Batch R3995736								
WG2738612-2 LCS								
Total Kjeldahl Nitrogen			101.1		%		75-125	25-MAR-18
WG2738612-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	25-MAR-18
Batch R4000325								
WG2740885-2 LCS								
Total Kjeldahl Nitrogen			99.6		%		75-125	29-MAR-18
WG2740885-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	29-MAR-18
TSS-VA	**Water**							
Batch R3994691								
WG2738209-5 LCS								
Total Suspended Solids			104.8		%		85-115	23-MAR-18
WG2738209-4 MB								
Total Suspended Solids			<3.0		mg/L		3	23-MAR-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

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).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	19-MAR-18 10:15	23-MAR-18 12:48	0.25	99	hours	EHTR-FM
	2	19-MAR-18 12:20	23-MAR-18 12:48	0.25	96	hours	EHTR-FM
	3	19-MAR-18 13:30	23-MAR-18 12:48	0.25	95	hours	EHTR-FM
	4	19-MAR-18 11:12	23-MAR-18 12:48	0.25	98	hours	EHTR-FM
Anions and Nutrients							
Alkalinity Species by Titration							
	2	19-MAR-18 12:20	03-APR-18 08:30	14	15	days	EHT
	3	19-MAR-18 13:30	04-APR-18 10:45	14	16	days	EHT
	4	19-MAR-18 11:12	03-APR-18 08:30	14	15	days	EHT

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.
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).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2070515 were received on 21-MAR-18 11:20.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2070515-COFC

COC Number: 15 - 588263

Page of

Report To	Roger Tooms — Contact and company name below will appear on the final report
Company:	Reg Dist of Kitimat - Stikine.
Contact:	Chris Kerr
Phone:	250 - 615 - 6100
Company address below will appear on the final report	
Street:	Suite 300 4545 Lazelle Ave
City/Province:	Terrace B.C.
Postal Code:	V8G - 4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional Dist. of Kitimat - Stikine
Contact:	

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: rtooms@rdks.bc.ca
Email 2: ckerr@rdks.bc.ca
Email 3: MHaley@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:
Job #: Thornhill Transfer Station
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: J. Lacroix

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	Diss metal	Total metal	Alkalinity	Total & Dissolved Hardness	Ammonia	Flouride	Chloride	Conductivity	Nitrite, Nitrate	Total Kjeldahl Nitrogen	pH, TSS Sulphate	BOD	COD	Number of Containers
	SW-1 Thornhill Transfer St. TH Creek upstream	19/03/18	10:15am	Surface	/	/	/	/	/	/	/	/	/	/	/	/	/	5
	SW-3 Leachate seepage	19/03/18	12:20pm	Surface	/	/	/	/	/	/	/	/	/	/	/	/	/	5
	SW-6 TH. Creek Downstream	19/03/18	1:30pm	Surface	/	/	/	/	/	/	/	/	/	/	/	/	/	5
	SW-21 Leachate Weir	19/03/18	11:12am	Surface	/	/	/	/	/	/	/	/	/	/	/	/	/	5
	[illegible]			[illegible]														

Terrace Shipping x 1 Coolers

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

...uctions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

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: 10
FINAL COOLER TEMPERATURES °C: 2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: [signature]	Date: 19/03/18	Time: 2:45pm	Received by: [signature]	Date: March 19/18	Time: 2:46	Received by: JL	Date: MAR 21 2018	Time: 11:20AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY — OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

REGIONAL DISTRICT OF KITIMAT-STIKINE
ATTN: Chris Kerr
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1

Date Received: 06-JUL-18
Report Date: 26-JUL-18 14:55 (MT)
Version: FINAL

Client Phone: 250-615-6100

Certificate of Analysis

Lab Work Order #: L2124909

Project P.O. #: NOT SUBMITTED
Job Reference: THORNHILL TRANSFER STATION
C of C Numbers:
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2124909-1	L2124909-2	L2124909-3	L2124909-4	L2124909-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18
	Sampled Time	11:00	12:30	14:00	11:30	13:30
	Client ID	SW-1	SW-3	SW-6	SW-21	SW-17
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	52.8	1500	108	954	104
	Hardness (as CaCO3) (mg/L)	25.8	447	52.3	255	42.9
	pH (pH)	7.63	8.16	7.99	8.37	7.93
	Total Suspended Solids (mg/L)	<3.0	21.0	<3.0	3.6	<3.0
	Total Dissolved Solids (mg/L)	44				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	27.8	717	55.7	399	50.2
	Ammonia, Total (as N) (mg/L)	<0.0050	41.7	<0.0050	8.97	0.0053
	Bromide (Br) (mg/L)	<0.050	0.76	<0.050	0.59	<0.050
	Chloride (Cl) (mg/L)	<0.50	85.6	0.66	68.9	2.32
	Fluoride (F) (mg/L)	<0.020	0.10	0.020	<0.10 DLDS	0.022
	Nitrate (as N) (mg/L)	0.0238	0.546	0.0641	4.99	0.384
	Nitrite (as N) (mg/L)	<0.0010	0.197	<0.0010	0.220	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	41.7	0.078	12.4	0.192
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	0.0011
	Phosphorus (P)-Total (mg/L)	0.0023	0.0318	0.0062	0.0034	0.0081
	Sulfate (SO4) (mg/L)	0.77	4.5	1.74	7.9	1.24
Total Metals	Aluminum (Al)-Total (mg/L)	0.0364	0.197	0.0668	0.129	0.124
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00021	<0.00010	0.00024	<0.00010
	Arsenic (As)-Total (mg/L)	<0.00010	0.00205	0.00016	0.00117	0.00019
	Barium (Ba)-Total (mg/L)	0.0207	0.402	0.0186	0.139	0.0269
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.020 DLAI	2.07	0.012	1.53	0.053
	Cadmium (Cd)-Total (mg/L)	<0.0000050	0.0000180	<0.0000050	0.0000235	0.0000069
	Calcium (Ca)-Total (mg/L)	8.64	121	19.2	61.5	14.5
	Cesium (Cs)-Total (mg/L)	<0.000010	0.000243	0.000010	0.000090	0.000014
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00097	<0.00010	0.00058	0.00025
	Cobalt (Co)-Total (mg/L)	<0.00010	0.00363	<0.00010	0.00187	0.00013
	Copper (Cu)-Total (mg/L)	0.00051	0.00216	0.00076	0.00354	0.00104
	Iron (Fe)-Total (mg/L)	0.024	1.80	0.119	0.355	0.245
	Lead (Pb)-Total (mg/L)	<0.000050	0.000075	<0.000050	0.000076	<0.000050
	Lithium (Li)-Total (mg/L)	<0.0010	0.0014	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	0.692	29.6	0.752	20.4	1.34
	Manganese (Mn)-Total (mg/L)	0.00345	1.98	0.0116	0.209	0.0234
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000151	0.000726	0.000616	0.000948	0.000421
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00616	<0.00050	0.00509	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2124909-6	L2124909-7	L2124909-8		
	Description	Water	Water	Water		
	Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18		
	Sampled Time	12:00	12:00	12:00		
	Client ID	DUP	TRIP	BH96-2		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1500		365		
	Hardness (as CaCO3) (mg/L)	439		105		
	pH (pH)	8.15		8.28		
	Total Suspended Solids (mg/L)	14.8				
	Total Dissolved Solids (mg/L)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	726		194		
	Ammonia, Total (as N) (mg/L)	38.7	<0.0050	0.0473		
	Bromide (Br) (mg/L)	0.78		<0.050		
	Chloride (Cl) (mg/L)	88.1		3.36		
	Fluoride (F) (mg/L)	0.11		0.165		
	Nitrate (as N) (mg/L)	0.547		0.581		
	Nitrite (as N) (mg/L)	0.208		0.0024		
	Total Kjeldahl Nitrogen (mg/L)	40.4	<0.050	0.396		
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010				
	Phosphorus (P)-Total (mg/L)	0.0281	<0.0020			
	Sulfate (SO4) (mg/L)	4.7		3.65		
Total Metals	Aluminum (Al)-Total (mg/L)	0.0568	<0.0030	0.411		
	Antimony (Sb)-Total (mg/L)	0.00020	<0.00010	0.00016		
	Arsenic (As)-Total (mg/L)	0.00187	<0.00010	0.00273		
	Barium (Ba)-Total (mg/L)	0.388	<0.00010	0.0232		
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050		
	Boron (B)-Total (mg/L)	1.95	<0.010	0.148		
	Cadmium (Cd)-Total (mg/L)	0.0000142	<0.0000050	0.00121		
	Calcium (Ca)-Total (mg/L)	119	<0.050	17.2		
	Cesium (Cs)-Total (mg/L)	0.000229	<0.000010	0.000040		
	Chromium (Cr)-Total (mg/L)	0.00072	<0.00010	0.00057		
	Cobalt (Co)-Total (mg/L)	0.00337	<0.00010	0.00035		
	Copper (Cu)-Total (mg/L)	0.00174	<0.00050	0.00502		
	Iron (Fe)-Total (mg/L)	1.18	<0.010	0.659		
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050	0.000381		
	Lithium (Li)-Total (mg/L)	0.0012	<0.0010	0.0020		
	Magnesium (Mg)-Total (mg/L)	26.8	<0.0050	15.6		
	Manganese (Mn)-Total (mg/L)	1.83	<0.00010	0.0770		
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Total (mg/L)	0.000753	<0.000050	0.00423		
	Nickel (Ni)-Total (mg/L)	0.00564	<0.00050	0.00179		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2124909-1	L2124909-2	L2124909-3	L2124909-4	L2124909-5
Description	Water	Water	Water	Water	Water
Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18
Sampled Time	11:00	12:30	14:00	11:30	13:30
Client ID	SW-1	SW-3	SW-6	SW-21	SW-17
Grouping / **Analyte**					
WATER					
Total Metals Phosphorus (P)-Total (mg/L)	<0.050	0.068	<0.050	0.066	<0.050
Potassium (K)-Total (mg/L)	0.709	54.6	0.947	38.8	1.89
Rubidium (Rb)-Total (mg/L)	0.00085	0.0382	0.00132	0.0244	0.00160
Selenium (Se)-Total (mg/L)	<0.000050	0.000245	<0.000050	0.000217	<0.000050
Silicon (Si)-Total (mg/L)	2.40	8.25	2.69	3.84	2.85
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total (mg/L)	1.04	108	1.46	81.7	3.56
Strontium (Sr)-Total (mg/L)	0.0391	0.963	0.0484	0.582	0.0642
Sulfur (S)-Total (mg/L)	<0.50	2.96	<0.50	3.98	<0.50
Tellurium (Te)-Total (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total (mg/L)	<0.00010	0.00017	<0.00010	0.00010	<0.00010
Titanium (Ti)-Total (mg/L)	0.00089	0.00511	0.00182	<0.0036 DLM	0.00423
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium (U)-Total (mg/L)	0.000011	0.000226	0.000069	0.000395	0.000041
Vanadium (V)-Total (mg/L)	<0.00050	0.00080	0.00066	<0.00050	0.00076
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total (mg/L)	<0.000060	0.000433	<0.000060	0.000145	0.000095
Dissolved Metals Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved (mg/L)	0.0239	0.0094	0.0253	0.0338	0.0335
Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00018	<0.00010	0.00020	<0.00010
Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00175	0.00014	0.00112	0.00013
Barium (Ba)-Dissolved (mg/L)	0.0199	0.378	0.0177	0.133	0.0255
Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Dissolved (mg/L)	<0.010	2.05	<0.010	1.56	0.056
Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.0000130	<0.0000050	0.0000236	0.0000323 DTMF
Calcium (Ca)-Dissolved (mg/L)	9.19	129	19.6	64.3	14.9
Cesium (Cs)-Dissolved (mg/L)	<0.000010	0.000224	<0.000010	0.000076	<0.000010
Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00074	<0.00010	0.00050	<0.00010
Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00336	<0.00010	0.00184	<0.00010
Copper (Cu)-Dissolved (mg/L)	0.00039	0.00173	0.00072	0.00343	0.00106
Iron (Fe)-Dissolved (mg/L)	<0.010	0.062	0.064	0.091	0.113
Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0012	<0.0010	<0.0010	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2124909-6	L2124909-7	L2124909-8		
Description	Water	Water	Water		
Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18		
Sampled Time	12:00	12:00	12:00		
Client ID	DUP	TRIP	BH96-2		
Grouping / **Analyte**					
WATER					
Total Metals Phosphorus (P)-Total (mg/L)	<0.050	<0.050	0.090		
Potassium (K)-Total (mg/L)	51.9	<0.050	9.70		
Rubidium (Rb)-Total (mg/L)	0.0367	<0.00020	0.00071		
Selenium (Se)-Total (mg/L)	0.000145	<0.000050	<0.000050		
Silicon (Si)-Total (mg/L)	7.52	<0.10	4.86		
Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010		
Sodium (Na)-Total (mg/L)	103	<0.050	44.0		
Strontium (Sr)-Total (mg/L)	0.937	<0.00020	0.181		
Sulfur (S)-Total (mg/L)	2.75	<0.50	1.39		
Tellurium (Te)-Total (mg/L)	0.00023	<0.00020	<0.00020		
Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010		
Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
Tin (Sn)-Total (mg/L)	0.00014	<0.00010	0.00073		
Titanium (Ti)-Total (mg/L)	<0.0015 DLM	<0.00030	0.0117		
Tungsten (W)-Total (mg/L)	<0.00010	<0.00010	<0.00010		
Uranium (U)-Total (mg/L)	0.000222	<0.000010	0.00202		
Vanadium (V)-Total (mg/L)	<0.00050	<0.00050	0.00158		
Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030	0.0193		
Zirconium (Zr)-Total (mg/L)	0.000244	<0.000060	0.000082		
Dissolved Metals Dissolved Mercury Filtration Location	FIELD		FIELD		
Dissolved Metals Filtration Location	FIELD		FIELD		
Aluminum (Al)-Dissolved (mg/L)	0.0102		0.0141		
Antimony (Sb)-Dissolved (mg/L)	0.00017		0.00011		
Arsenic (As)-Dissolved (mg/L)	0.00161		0.00258		
Barium (Ba)-Dissolved (mg/L)	0.377		0.0202		
Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00010		
Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050		
Boron (B)-Dissolved (mg/L)	2.10		0.139		
Cadmium (Cd)-Dissolved (mg/L)	0.0000095		0.000392		
Calcium (Ca)-Dissolved (mg/L)	126		17.2		
Cesium (Cs)-Dissolved (mg/L)	0.000222		<0.000010		
Chromium (Cr)-Dissolved (mg/L)	0.00061		<0.00010		
Cobalt (Co)-Dissolved (mg/L)	0.00334		<0.00010		
Copper (Cu)-Dissolved (mg/L)	0.00152		0.00224		
Iron (Fe)-Dissolved (mg/L)	0.048		0.017		
Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		
Lithium (Li)-Dissolved (mg/L)	0.0012		0.0017		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2124909-1	L2124909-2	L2124909-3	L2124909-4	L2124909-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18	04-JUL-18
	Sampled Time	11:00	12:30	14:00	11:30	13:30
	Client ID	SW-1	SW-3	SW-6	SW-21	SW-17
Grouping	**Analyte**					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	0.682	30.4	0.826	22.8	1.41
	Manganese (Mn)-Dissolved (mg/L)	0.00217	1.92	0.00994	0.194	0.0171
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000152	0.000706	0.000586	0.000894	0.000381
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00609	<0.00050	0.00512	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	0.699	60.7	0.985	43.8	2.09
	Rubidium (Rb)-Dissolved (mg/L)	0.00098	0.0391	0.00125	0.0249	0.00163
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000239	<0.000050	0.000251	0.000064
	Silicon (Si)-Dissolved (mg/L)	2.21	7.66	2.57	3.60	2.75
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.03	115	1.52	90.2	3.85
	Strontium (Sr)-Dissolved (mg/L)	0.0383	0.964	0.0482	0.588	0.0629
	Sulfur (S)-Dissolved (mg/L)	<0.50	2.73	0.50	3.45	<0.50
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00027	<0.00010	0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	0.00051	0.00098	0.00080
	Tungsten (W)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000011	0.000232	0.000077	0.000421	0.000036
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	0.00054	<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0013	<0.0010	0.0013	0.0024
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	0.000219	<0.000060	0.000107	<0.000060
Aggregate Organics	BOD (mg/L)	<2.0	5.8	<2.0	5.4	<2.0
	COD (mg/L)	<20	122	<20	86	<20

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2124909-6	L2124909-7	L2124909-8		
Description	Water	Water	Water		
Sampled Date	04-JUL-18	04-JUL-18	04-JUL-18		
Sampled Time	12:00	12:00	12:00		
Client ID	DUP	TRIP	BH96-2		
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	30.0		15.2		
Manganese (Mn)-Dissolved (mg/L)	1.94		0.0303		
Mercury (Hg)-Dissolved (mg/L)	<0.0000050		<0.0000050		
Molybdenum (Mo)-Dissolved (mg/L)	0.000702		0.00419		
Nickel (Ni)-Dissolved (mg/L)	0.00577		0.00063		
Phosphorus (P)-Dissolved (mg/L)	<0.050		0.059		
Potassium (K)-Dissolved (mg/L)	59.9		10.2		
Rubidium (Rb)-Dissolved (mg/L)	0.0380		0.00055		
Selenium (Se)-Dissolved (mg/L)	0.000176		<0.000050		
Silicon (Si)-Dissolved (mg/L)	7.68		4.07		
Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		
Sodium (Na)-Dissolved (mg/L)	113		43.4		
Strontium (Sr)-Dissolved (mg/L)	0.950		0.186		
Sulfur (S)-Dissolved (mg/L)	2.96		1.25		
Tellurium (Te)-Dissolved (mg/L)	<0.00020		<0.00020		
Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		
Thorium (Th)-Dissolved (mg/L)	<0.00010		<0.00010		
Tin (Sn)-Dissolved (mg/L)	0.00014		0.00103 DTMF		
Titanium (Ti)-Dissolved (mg/L)	<0.00030		0.00032		
Tungsten (W)-Dissolved (mg/L)	<0.00010		0.00010		
Uranium (U)-Dissolved (mg/L)	0.000227		0.00206		
Vanadium (V)-Dissolved (mg/L)	<0.00050		<0.00050		
Zinc (Zn)-Dissolved (mg/L)	0.0010		0.0073		
Zirconium (Zr)-Dissolved (mg/L)	0.000215		<0.000060		
Aggregate Organics BOD (mg/L)	4.7				
COD (mg/L)	121	<20	<20		

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	BOD	LCS-ND	L2124909-1, -2, -3, -4, -5, -6
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Boron (B)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2124909-1, -2, -3, -4, -5, -6, -8
Matrix Spike	Aluminum (Al)-Total	MS-B	L2124909-8
Matrix Spike	Barium (Ba)-Total	MS-B	L2124909-1, -2, -3, -4, -5, -6
Matrix Spike	Calcium (Ca)-Total	MS-B	L2124909-1, -2, -3, -4, -5, -6
Matrix Spike	Strontium (Sr)-Total	MS-B	L2124909-1, -2, -3, -4, -5, -6
Matrix Spike	Ammonia, Total (as N)	MS-B	L2124909-2, -6

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLAI	Detection limit raised due to low level analytical interference or background.
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.
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- BIOCHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BR-L-IC-N-VA	Water	Bromide in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

Reference Information

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

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

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Reference Information

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: REGIONAL DISTRICT OF KITIMAT-STIKINE
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1
Contact: Chris Kerr

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Water**							
Batch R4129376								
WG2822973-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			98.1		%		85-115	17-JUL-18
WG2822973-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	17-JUL-18
Batch R4129511								
WG2823212-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			100.9		%		85-115	17-JUL-18
WG2823212-5 DUP		**L2124909-1**						
Alkalinity, Total (as CaCO3)		27.8	27.7		mg/L	0.4	20	17-JUL-18
WG2823212-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	17-JUL-18
Batch R4133954								
WG2827582-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			97.6		%		85-115	20-JUL-18
WG2827582-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	20-JUL-18
BOD5-VA	**Water**							
Batch R4123628								
WG2816529-2 LCS								
BOD			90.1		%		85-115	09-JUL-18
WG2816529-6 LCS								
BOD			76.9	LCS-ND	%		85-115	07-JUL-18
WG2816529-1 MB								
BOD			<2.0		mg/L		2	09-JUL-18
WG2816529-5 MB								
BOD			<2.0		mg/L		2	07-JUL-18
BR-L-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Bromide (Br)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	07-JUL-18
WG2816535-2 LCS								
Bromide (Br)			93.1		%		85-115	07-JUL-18
WG2816535-1 MB								
Bromide (Br)			<0.050		mg/L		0.05	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Bromide (Br)			100.6		%		75-125	07-JUL-18
CL-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Chloride (Cl)		<0.50	<0.50	RPD-NA	mg/L	N/A	20	07-JUL-18
WG2816535-2 LCS								
Chloride (Cl)			96.2		%		90-110	07-JUL-18
WG2816535-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Chloride (Cl)			101.7		%		75-125	07-JUL-18
COD-COL-VA	**Water**							
Batch R4122855								
WG2819394-10 LCS								
COD			100.3		%		85-115	11-JUL-18
WG2819394-7 LCS								
COD			101.3		%		85-115	11-JUL-18
WG2819394-5 MB								
COD			<20		mg/L		20	11-JUL-18
WG2819394-9 MB								
COD			<20		mg/L		20	11-JUL-18
Batch R4125243								
WG2822500-2 DUP		**L2124909-2**						
COD		122	124		mg/L	1.5	20	14-JUL-18
WG2822500-3 LCS								
COD			99.7		%		85-115	14-JUL-18
WG2822500-6 LCS								
COD			101.5		%		85-115	14-JUL-18
WG2822500-1 MB								
COD			<20		mg/L		20	14-JUL-18
WG2822500-5 MB								
COD			<20		mg/L		20	14-JUL-18
EC-PCT-VA	**Water**							
Batch R4129376								
WG2822973-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			103.1		%		90-110	17-JUL-18
WG2822973-1 MB								
Conductivity			<2.0		uS/cm		2	17-JUL-18

Quality Control Report

Workorder: L2124909 Report Date: 26-JUL-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-PCT-VA	**Water**							
Batch R4129511								
WG2823212-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			101.9		%		90-110	17-JUL-18
WG2823212-5 DUP		**L2124909-1**						
Conductivity		52.8	52.9		uS/cm	0.2	10	17-JUL-18
WG2823212-1 MB								
Conductivity			<2.0		uS/cm		2	17-JUL-18
F-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	07-JUL-18
WG2816535-2 LCS								
Fluoride (F)			95.4		%		90-110	07-JUL-18
WG2816535-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Fluoride (F)			101.7		%		75-125	07-JUL-18
HG-D-CVAA-VA	**Water**							
Batch R4119110								
WG2817138-2 LCS								
Mercury (Hg)-Dissolved			98.6		%		80-120	10-JUL-18
WG2817138-6 LCS								
Mercury (Hg)-Dissolved			98.0		%		80-120	10-JUL-18
WG2817138-1 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	10-JUL-18
WG2817138-5 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	10-JUL-18
HG-T-CVAA-VA	**Water**							
Batch R4116907								
WG2817436-2 LCS								
Mercury (Hg)-Total			95.7		%		80-120	09-JUL-18
WG2817436-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	09-JUL-18
WG2817436-8 MS		**L2124909-8**						
Mercury (Hg)-Total			93.6		%		70-130	10-JUL-18
MET-D-CCMS-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4122844								
WG2816360-2 LCS								
Aluminum (Al)-Dissolved			102.9		%		80-120	11-JUL-18
Antimony (Sb)-Dissolved			94.3		%		80-120	11-JUL-18
Arsenic (As)-Dissolved			100.4		%		80-120	11-JUL-18
Barium (Ba)-Dissolved			99.2		%		80-120	11-JUL-18
Beryllium (Be)-Dissolved			97.2		%		80-120	11-JUL-18
Bismuth (Bi)-Dissolved			94.3		%		80-120	11-JUL-18
Boron (B)-Dissolved			105.0		%		80-120	11-JUL-18
Cadmium (Cd)-Dissolved			102.7		%		80-120	11-JUL-18
Calcium (Ca)-Dissolved			94.4		%		80-120	11-JUL-18
Cesium (Cs)-Dissolved			96.0		%		80-120	11-JUL-18
Chromium (Cr)-Dissolved			100.9		%		80-120	11-JUL-18
Cobalt (Co)-Dissolved			99.3		%		80-120	11-JUL-18
Copper (Cu)-Dissolved			101.7		%		80-120	11-JUL-18
Iron (Fe)-Dissolved			101.3		%		80-120	11-JUL-18
Lead (Pb)-Dissolved			95.5		%		80-120	11-JUL-18
Lithium (Li)-Dissolved			97.3		%		80-120	11-JUL-18
Magnesium (Mg)-Dissolved			99.7		%		80-120	11-JUL-18
Manganese (Mn)-Dissolved			101.2		%		80-120	11-JUL-18
Molybdenum (Mo)-Dissolved			92.8		%		80-120	11-JUL-18
Nickel (Ni)-Dissolved			101.9		%		80-120	11-JUL-18
Phosphorus (P)-Dissolved			107.1		%		80-120	11-JUL-18
Potassium (K)-Dissolved			101.6		%		80-120	11-JUL-18
Rubidium (Rb)-Dissolved			106.1		%		80-120	11-JUL-18
Selenium (Se)-Dissolved			103.1		%		80-120	11-JUL-18
Silicon (Si)-Dissolved			102.7		%		80-120	11-JUL-18
Silver (Ag)-Dissolved			95.0		%		80-120	11-JUL-18
Sodium (Na)-Dissolved			100.9		%		80-120	11-JUL-18
Strontium (Sr)-Dissolved			95.5		%		80-120	11-JUL-18
Sulfur (S)-Dissolved			109.0		%		80-120	11-JUL-18
Tellurium (Te)-Dissolved			96.4		%		80-120	11-JUL-18
Thallium (Tl)-Dissolved			94.0		%		80-120	11-JUL-18
Thorium (Th)-Dissolved			94.3		%		80-120	11-JUL-18
Tin (Sn)-Dissolved			97.1		%		80-120	11-JUL-18
Titanium (Ti)-Dissolved			94.0		%		80-120	11-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4122844								
WG2816360-2 LCS								
Tungsten (W)-Dissolved			96.1		%		80-120	11-JUL-18
Uranium (U)-Dissolved			100.3		%		80-120	11-JUL-18
Vanadium (V)-Dissolved			103.3		%		80-120	11-JUL-18
Zinc (Zn)-Dissolved			96.1		%		80-120	11-JUL-18
Zirconium (Zr)-Dissolved			96.3		%		80-120	11-JUL-18
WG2816360-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	11-JUL-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	11-JUL-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	11-JUL-18
Cadmium (Cd)-Dissolved			<0.0000050		mg/L		0.000005	11-JUL-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	11-JUL-18
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	11-JUL-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	11-JUL-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	11-JUL-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	11-JUL-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	11-JUL-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	11-JUL-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	11-JUL-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	11-JUL-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	11-JUL-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	11-JUL-18
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	11-JUL-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	11-JUL-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	11-JUL-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	11-JUL-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	11-JUL-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	11-JUL-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4122844								
WG2816360-1 MB		**NP**						
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	11-JUL-18
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	11-JUL-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	11-JUL-18
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	11-JUL-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	11-JUL-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	11-JUL-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	11-JUL-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	11-JUL-18
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	11-JUL-18
MET-T-CCMS-VA	**Water**							
Batch R4122181								
WG2817365-2 LCS								
Aluminum (Al)-Total			100.9		%		80-120	11-JUL-18
Antimony (Sb)-Total			100.3		%		80-120	11-JUL-18
Arsenic (As)-Total			99.1		%		80-120	11-JUL-18
Barium (Ba)-Total			99.7		%		80-120	11-JUL-18
Beryllium (Be)-Total			105.4		%		80-120	11-JUL-18
Bismuth (Bi)-Total			96.3		%		80-120	11-JUL-18
Boron (B)-Total			99.7		%		80-120	11-JUL-18
Cadmium (Cd)-Total			98.8		%		80-120	11-JUL-18
Calcium (Ca)-Total			98.3		%		80-120	11-JUL-18
Cesium (Cs)-Total			100.8		%		80-120	11-JUL-18
Chromium (Cr)-Total			100.6		%		80-120	11-JUL-18
Cobalt (Co)-Total			99.1		%		80-120	11-JUL-18
Copper (Cu)-Total			99.7		%		80-120	11-JUL-18
Iron (Fe)-Total			97.4		%		80-120	11-JUL-18
Lead (Pb)-Total			97.7		%		80-120	11-JUL-18
Lithium (Li)-Total			101.7		%		80-120	11-JUL-18
Magnesium (Mg)-Total			106.1		%		80-120	11-JUL-18
Manganese (Mn)-Total			99.2		%		80-120	11-JUL-18
Molybdenum (Mo)-Total			101.3		%		80-120	11-JUL-18
Nickel (Ni)-Total			98.0		%		80-120	11-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4122181								
WG2817365-2 LCS								
Phosphorus (P)-Total			99.0		%		80-120	11-JUL-18
Potassium (K)-Total			100.7		%		80-120	11-JUL-18
Rubidium (Rb)-Total			104.8		%		80-120	11-JUL-18
Selenium (Se)-Total			99.0		%		80-120	11-JUL-18
Silicon (Si)-Total			100.2		%		80-120	11-JUL-18
Silver (Ag)-Total			99.2		%		80-120	11-JUL-18
Sodium (Na)-Total			104.1		%		80-120	11-JUL-18
Strontium (Sr)-Total			96.3		%		80-120	11-JUL-18
Sulfur (S)-Total			98.9		%		80-120	11-JUL-18
Tellurium (Te)-Total			93.8		%		80-120	11-JUL-18
Thallium (Tl)-Total			96.8		%		80-120	11-JUL-18
Thorium (Th)-Total			96.7		%		80-120	11-JUL-18
Tin (Sn)-Total			99.2		%		80-120	11-JUL-18
Titanium (Ti)-Total			99.1		%		80-120	11-JUL-18
Tungsten (W)-Total			99.1		%		80-120	11-JUL-18
Uranium (U)-Total			100.4		%		80-120	11-JUL-18
Vanadium (V)-Total			101.1		%		80-120	11-JUL-18
Zinc (Zn)-Total			96.5		%		80-120	11-JUL-18
Zirconium (Zr)-Total			97.9		%		80-120	11-JUL-18
WG2817365-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	11-JUL-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	11-JUL-18
Boron (B)-Total			<0.010		mg/L		0.01	11-JUL-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	11-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	11-JUL-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	11-JUL-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	11-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	11-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4122181								
WG2817365-1 MB								
Lead (Pb)-Total			<0.000050		mg/L		0.00005	11-JUL-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	11-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	11-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	11-JUL-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	11-JUL-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	11-JUL-18
Potassium (K)-Total			<0.050		mg/L		0.05	11-JUL-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	11-JUL-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	11-JUL-18
Silicon (Si)-Total			<0.10		mg/L		0.1	11-JUL-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	11-JUL-18
Sodium (Na)-Total			<0.050		mg/L		0.05	11-JUL-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	11-JUL-18
Sulfur (S)-Total			<0.50		mg/L		0.5	11-JUL-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	11-JUL-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	11-JUL-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	11-JUL-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	11-JUL-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	11-JUL-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	11-JUL-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	11-JUL-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	11-JUL-18
Batch R4124899								
WG2817242-3 DUP		**L2124909-2**						
Aluminum (Al)-Total		0.197	0.199		mg/L	0.9	20	12-JUL-18
Antimony (Sb)-Total		0.00021	0.00022		mg/L	2.8	20	12-JUL-18
Arsenic (As)-Total		0.00205	0.00202		mg/L	1.5	20	12-JUL-18
Barium (Ba)-Total		0.402	0.409		mg/L	1.9	20	12-JUL-18
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUL-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUL-18
Boron (B)-Total		2.07	2.10		mg/L	1.2	20	12-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4124899								
WG2817242-3 DUP		**L2124909-2**						
Cadmium (Cd)-Total		0.0000180	0.0000193		mg/L	7.0	20	12-JUL-18
Calcium (Ca)-Total		121	122		mg/L	1.1	20	12-JUL-18
Cesium (Cs)-Total		0.000243	0.000242		mg/L	0.1	20	12-JUL-18
Chromium (Cr)-Total		0.00097	0.00092		mg/L	5.3	20	12-JUL-18
Cobalt (Co)-Total		0.00363	0.00363		mg/L	0.1	20	12-JUL-18
Copper (Cu)-Total		0.00216	0.00218		mg/L	1.0	20	12-JUL-18
Iron (Fe)-Total		1.80	1.79		mg/L	0.7	20	12-JUL-18
Lead (Pb)-Total		0.000075	0.000075		mg/L	0.4	20	12-JUL-18
Lithium (Li)-Total		0.0014	0.0014		mg/L	0.7	20	12-JUL-18
Magnesium (Mg)-Total		29.6	29.3		mg/L	0.8	20	12-JUL-18
Manganese (Mn)-Total		1.98	1.98		mg/L	0.0	20	12-JUL-18
Molybdenum (Mo)-Total		0.000726	0.000725		mg/L	0.1	20	12-JUL-18
Nickel (Ni)-Total		0.00616	0.00602		mg/L	2.4	20	12-JUL-18
Phosphorus (P)-Total		0.068	0.060		mg/L	12	20	12-JUL-18
Potassium (K)-Total		54.6	55.3		mg/L	1.3	20	12-JUL-18
Rubidium (Rb)-Total		0.0382	0.0387		mg/L	1.3	20	12-JUL-18
Selenium (Se)-Total		0.000245	0.000218		mg/L	12	20	12-JUL-18
Silicon (Si)-Total		8.25	8.40		mg/L	1.8	20	12-JUL-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUL-18
Sodium (Na)-Total		108	109		mg/L	0.3	20	12-JUL-18
Strontium (Sr)-Total		0.963	0.967		mg/L	0.5	20	12-JUL-18
Sulfur (S)-Total		2.96	3.09		mg/L	4.1	20	12-JUL-18
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUL-18
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUL-18
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUL-18
Tin (Sn)-Total		0.00017	0.00018		mg/L	3.8	20	12-JUL-18
Titanium (Ti)-Total		0.00511	0.00505		mg/L	1.2	20	12-JUL-18
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUL-18
Uranium (U)-Total		0.000226	0.000225		mg/L	0.2	20	12-JUL-18
Vanadium (V)-Total		0.00080	0.00077		mg/L	4.6	20	12-JUL-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	12-JUL-18
WG2817242-2 LCS								
Aluminum (Al)-Total			95.8		%		80-120	12-JUL-18
Antimony (Sb)-Total			104.5		%		80-120	12-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4124899								
WG2817242-2 LCS								
Arsenic (As)-Total			100.9		%		80-120	12-JUL-18
Barium (Ba)-Total			101.4		%		80-120	12-JUL-18
Beryllium (Be)-Total			99.3		%		80-120	12-JUL-18
Bismuth (Bi)-Total			101.5		%		80-120	12-JUL-18
Boron (B)-Total			103.0		%		80-120	12-JUL-18
Cadmium (Cd)-Total			101.2		%		80-120	12-JUL-18
Calcium (Ca)-Total			98.4		%		80-120	12-JUL-18
Cesium (Cs)-Total			103.3		%		80-120	12-JUL-18
Chromium (Cr)-Total			88.7		%		80-120	12-JUL-18
Cobalt (Co)-Total			97.2		%		80-120	12-JUL-18
Copper (Cu)-Total			97.6		%		80-120	12-JUL-18
Iron (Fe)-Total			96.2		%		80-120	12-JUL-18
Lead (Pb)-Total			101.3		%		80-120	12-JUL-18
Lithium (Li)-Total			100.0		%		80-120	12-JUL-18
Magnesium (Mg)-Total			94.1		%		80-120	12-JUL-18
Manganese (Mn)-Total			95.1		%		80-120	12-JUL-18
Molybdenum (Mo)-Total			101.2		%		80-120	12-JUL-18
Nickel (Ni)-Total			96.5		%		80-120	12-JUL-18
Phosphorus (P)-Total			97.3		%		80-120	12-JUL-18
Potassium (K)-Total			96.4		%		80-120	12-JUL-18
Rubidium (Rb)-Total			103.9		%		80-120	12-JUL-18
Selenium (Se)-Total			99.6		%		80-120	12-JUL-18
Silicon (Si)-Total			94.9		%		80-120	12-JUL-18
Silver (Ag)-Total			100.6		%		80-120	12-JUL-18
Sodium (Na)-Total			97.6		%		80-120	12-JUL-18
Strontium (Sr)-Total			106.0		%		80-120	12-JUL-18
Sulfur (S)-Total			90.3		%		80-120	12-JUL-18
Tellurium (Te)-Total			101.2		%		80-120	12-JUL-18
Thallium (Tl)-Total			102.3		%		80-120	12-JUL-18
Thorium (Th)-Total			94.3		%		80-120	12-JUL-18
Tin (Sn)-Total			100.2		%		80-120	12-JUL-18
Titanium (Ti)-Total			94.0		%		80-120	12-JUL-18
Tungsten (W)-Total			99.8		%		80-120	12-JUL-18
Uranium (U)-Total			98.9		%		80-120	12-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4124899								
WG2817242-2 LCS								
Vanadium (V)-Total			97.7		%		80-120	12-JUL-18
Zinc (Zn)-Total			98.4		%		80-120	12-JUL-18
Zirconium (Zr)-Total			98.7		%		80-120	12-JUL-18
WG2817242-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	12-JUL-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUL-18
Boron (B)-Total			<0.010		mg/L		0.01	12-JUL-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	12-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUL-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUL-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	12-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUL-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUL-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUL-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUL-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	12-JUL-18
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUL-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUL-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUL-18
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUL-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	12-JUL-18
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUL-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	12-JUL-18
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUL-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4124899								
WG2817242-1 MB								
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUL-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUL-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUL-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUL-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUL-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUL-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	12-JUL-18
WG2817242-4 MS		**L2124909-1**						
Aluminum (Al)-Total			100.5		%		70-130	12-JUL-18
Antimony (Sb)-Total			99.8		%		70-130	12-JUL-18
Arsenic (As)-Total			105.6		%		70-130	12-JUL-18
Barium (Ba)-Total			N/A	MS-B	%		-	12-JUL-18
Beryllium (Be)-Total			99.1		%		70-130	12-JUL-18
Bismuth (Bi)-Total			103.1		%		70-130	12-JUL-18
Boron (B)-Total			86.9		%		70-130	12-JUL-18
Cadmium (Cd)-Total			107.6		%		70-130	12-JUL-18
Calcium (Ca)-Total			N/A	MS-B	%		-	12-JUL-18
Cesium (Cs)-Total			101.5		%		70-130	12-JUL-18
Chromium (Cr)-Total			100.1		%		70-130	12-JUL-18
Cobalt (Co)-Total			105.2		%		70-130	12-JUL-18
Copper (Cu)-Total			104.7		%		70-130	12-JUL-18
Iron (Fe)-Total			104.1		%		70-130	12-JUL-18
Lead (Pb)-Total			100.1		%		70-130	12-JUL-18
Lithium (Li)-Total			99.3		%		70-130	12-JUL-18
Magnesium (Mg)-Total			98.5		%		70-130	12-JUL-18
Manganese (Mn)-Total			99.8		%		70-130	12-JUL-18
Molybdenum (Mo)-Total			98.9		%		70-130	12-JUL-18
Nickel (Ni)-Total			104.7		%		70-130	12-JUL-18
Phosphorus (P)-Total			106.8		%		70-130	12-JUL-18
Potassium (K)-Total			98.6		%		70-130	12-JUL-18
Rubidium (Rb)-Total			104.6		%		70-130	12-JUL-18
Selenium (Se)-Total			102.5		%		70-130	12-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4124899								
WG2817242-4 MS		**L2124909-1**						
Silicon (Si)-Total			100.4		%		70-130	12-JUL-18
Silver (Ag)-Total			101.3		%		70-130	12-JUL-18
Sodium (Na)-Total			99.1		%		70-130	12-JUL-18
Strontium (Sr)-Total			N/A	MS-B	%		-	12-JUL-18
Sulfur (S)-Total			102.1		%		70-130	12-JUL-18
Tellurium (Te)-Total			99.4		%		70-130	12-JUL-18
Thallium (Tl)-Total			99.7		%		70-130	12-JUL-18
Thorium (Th)-Total			100.9		%		70-130	12-JUL-18
Tin (Sn)-Total			100.0		%		70-130	12-JUL-18
Titanium (Ti)-Total			98.5		%		70-130	12-JUL-18
Tungsten (W)-Total			99.3		%		70-130	12-JUL-18
Uranium (U)-Total			99.0		%		70-130	12-JUL-18
Vanadium (V)-Total			103.9		%		70-130	12-JUL-18
Zinc (Zn)-Total			101.8		%		70-130	12-JUL-18
Zirconium (Zr)-Total			99.3		%		70-130	12-JUL-18
Batch R4125384								
WG2822375-3 DUP		**L2124909-2**						
Aluminum (Al)-Total		0.197	0.309		mg/L	0.2	20	14-JUL-18
Antimony (Sb)-Total		0.00021	0.00022		mg/L	1.5	20	14-JUL-18
Arsenic (As)-Total		0.00205	0.00195		mg/L	4.0	20	14-JUL-18
Barium (Ba)-Total		0.402	0.387		mg/L	0.1	20	14-JUL-18
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-JUL-18
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-JUL-18
Boron (B)-Total		2.07	2.22		mg/L	2.6	20	14-JUL-18
Cadmium (Cd)-Total		0.0000180	0.0000197		mg/L	10	20	14-JUL-18
Calcium (Ca)-Total		121	126		mg/L	0.5	20	14-JUL-18
Cesium (Cs)-Total		0.000243	0.000242		mg/L	4.9	20	14-JUL-18
Chromium (Cr)-Total		0.00097	0.00089		mg/L	5.4	20	14-JUL-18
Cobalt (Co)-Total		0.00363	0.00342		mg/L	4.0	20	14-JUL-18
Copper (Cu)-Total		0.00216	0.00203		mg/L	5.6	20	14-JUL-18
Iron (Fe)-Total		1.80	1.72		mg/L	1.1	20	14-JUL-18
Lead (Pb)-Total		0.000075	0.000078		mg/L	0.6	20	14-JUL-18
Lithium (Li)-Total		0.0014	0.0013		mg/L	4.3	20	14-JUL-18
Magnesium (Mg)-Total		29.6	29.7		mg/L	4.0	20	14-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4125384								
WG2822375-3 DUP		**L2124909-2**						
Manganese (Mn)-Total		1.98	1.99		mg/L	4.4	20	14-JUL-18
Molybdenum (Mo)-Total		0.000726	0.000755		mg/L	6.1	20	14-JUL-18
Nickel (Ni)-Total		0.00616	0.00582		mg/L	3.2	20	14-JUL-18
Phosphorus (P)-Total		0.068	0.064		mg/L	8.3	20	14-JUL-18
Potassium (K)-Total		54.6	56.5		mg/L	3.2	20	14-JUL-18
Rubidium (Rb)-Total		0.0382	0.0387		mg/L	1.2	20	14-JUL-18
Selenium (Se)-Total		0.000245	0.000188		mg/L	3.7	20	14-JUL-18
Silicon (Si)-Total		8.25	8.69		mg/L	0.8	20	14-JUL-18
Silver (Ag)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	14-JUL-18
Sodium (Na)-Total		108	107		mg/L	4.3	20	14-JUL-18
Strontium (Sr)-Total		0.963	0.950		mg/L	0.2	20	14-JUL-18
Sulfur (S)-Total		2.96	2.83		mg/L	2.1	20	14-JUL-18
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	14-JUL-18
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	14-JUL-18
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-JUL-18
Tin (Sn)-Total		0.00017	0.00018		mg/L	2.4	20	14-JUL-18
Titanium (Ti)-Total		0.00511	0.00930		mg/L	5.1	20	14-JUL-18
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	14-JUL-18
Uranium (U)-Total		0.000226	0.000236		mg/L	2.3	20	14-JUL-18
Vanadium (V)-Total		0.00080	0.00094		mg/L	0.2	20	14-JUL-18
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	14-JUL-18
Zirconium (Zr)-Total		0.000433	0.000316	J	mg/L	0.000117	0.00012	14-JUL-18
WG2822375-2 LCS								
Aluminum (Al)-Total			101.3		%		80-120	14-JUL-18
Antimony (Sb)-Total			101.0		%		80-120	14-JUL-18
Arsenic (As)-Total			101.6		%		80-120	14-JUL-18
Barium (Ba)-Total			103.8		%		80-120	14-JUL-18
Beryllium (Be)-Total			97.9		%		80-120	14-JUL-18
Bismuth (Bi)-Total			97.9		%		80-120	14-JUL-18
Boron (B)-Total			102.2		%		80-120	14-JUL-18
Cadmium (Cd)-Total			99.6		%		80-120	14-JUL-18
Calcium (Ca)-Total			97.4		%		80-120	14-JUL-18
Cesium (Cs)-Total			98.0		%		80-120	14-JUL-18
Chromium (Cr)-Total			98.3		%		80-120	14-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4125384								
WG2822375-2 LCS								
Cobalt (Co)-Total			99.9		%		80-120	14-JUL-18
Copper (Cu)-Total			100.5		%		80-120	14-JUL-18
Iron (Fe)-Total			97.8		%		80-120	14-JUL-18
Lead (Pb)-Total			98.7		%		80-120	14-JUL-18
Lithium (Li)-Total			99.1		%		80-120	14-JUL-18
Magnesium (Mg)-Total			107.9		%		80-120	14-JUL-18
Manganese (Mn)-Total			105.5		%		80-120	14-JUL-18
Molybdenum (Mo)-Total			96.5		%		80-120	14-JUL-18
Nickel (Ni)-Total			103.9		%		80-120	14-JUL-18
Phosphorus (P)-Total			103.2		%		80-120	14-JUL-18
Potassium (K)-Total			102.0		%		80-120	14-JUL-18
Rubidium (Rb)-Total			105.9		%		80-120	14-JUL-18
Selenium (Se)-Total			98.3		%		80-120	14-JUL-18
Silicon (Si)-Total			100.4		%		80-120	14-JUL-18
Silver (Ag)-Total			97.3		%		80-120	14-JUL-18
Sodium (Na)-Total			102.6		%		80-120	14-JUL-18
Strontium (Sr)-Total			99.0		%		80-120	14-JUL-18
Sulfur (S)-Total			91.0		%		80-120	14-JUL-18
Tellurium (Te)-Total			89.1		%		80-120	14-JUL-18
Thallium (Tl)-Total			97.2		%		80-120	14-JUL-18
Thorium (Th)-Total			98.4		%		80-120	14-JUL-18
Tin (Sn)-Total			98.6		%		80-120	14-JUL-18
Titanium (Ti)-Total			100.8		%		80-120	14-JUL-18
Tungsten (W)-Total			100.8		%		80-120	14-JUL-18
Uranium (U)-Total			100.1		%		80-120	14-JUL-18
Vanadium (V)-Total			102.7		%		80-120	14-JUL-18
Zinc (Zn)-Total			98.1		%		80-120	14-JUL-18
Zirconium (Zr)-Total			93.8		%		80-120	14-JUL-18
WG2822375-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-JUL-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	14-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4125384								
WG2822375-1 MB								
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-JUL-18
Boron (B)-Total			<0.010		mg/L		0.01	14-JUL-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	14-JUL-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-JUL-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	14-JUL-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-JUL-18
Iron (Fe)-Total			<0.010		mg/L		0.01	14-JUL-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-JUL-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-JUL-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-JUL-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	14-JUL-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-JUL-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	14-JUL-18
Potassium (K)-Total			<0.050		mg/L		0.05	14-JUL-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	14-JUL-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-JUL-18
Silicon (Si)-Total			<0.10		mg/L		0.1	14-JUL-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	14-JUL-18
Sodium (Na)-Total			<0.050		mg/L		0.05	14-JUL-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	14-JUL-18
Sulfur (S)-Total			<0.50		mg/L		0.5	14-JUL-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	14-JUL-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-JUL-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-JUL-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	14-JUL-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-JUL-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-JUL-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-JUL-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	14-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R4122679								
WG2819068-6 LCS								
Ammonia, Total (as N)			93.6		%		85-115	11-JUL-18
WG2819068-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	11-JUL-18
Batch R4124062								
WG2820761-6 LCS								
Ammonia, Total (as N)			92.0		%		85-115	13-JUL-18
WG2820761-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	13-JUL-18
Batch R4125105								
WG2822362-2 LCS								
Ammonia, Total (as N)			97.8		%		85-115	14-JUL-18
WG2822362-1 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	14-JUL-18
NO2-L-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Nitrite (as N)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	07-JUL-18
WG2816535-2 LCS								
Nitrite (as N)			94.6		%		90-110	07-JUL-18
WG2816535-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Nitrite (as N)			98.5		%		75-125	07-JUL-18
NO3-L-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Nitrate (as N)		0.0238	0.0231		mg/L	2.9	20	07-JUL-18
WG2816535-2 LCS								
Nitrate (as N)			97.2		%		90-110	07-JUL-18
WG2816535-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Nitrate (as N)			102.7		%		75-125	07-JUL-18
P-T-PRES-COL-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-PRES-COL-VA	**Water**							
Batch R4122243								
WG2819018-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.6		%		80-120	11-JUL-18
WG2819018-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			90.6		%		80-120	11-JUL-18
WG2819018-7 DUP		**L2124909-2**						
Phosphorus (P)-Total		0.0318	0.0305		mg/L	4.1	20	11-JUL-18
WG2819018-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	11-JUL-18
WG2819018-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	11-JUL-18
WG2819018-8 MS		**L2124909-3**						
Phosphorus (P)-Total			104.8		%		70-130	11-JUL-18
PH-PCT-VA	**Water**							
Batch R4129376								
WG2822973-2 CRM		**VA-PH7-BUF**						
pH			7.01		pH		6.9-7.1	17-JUL-18
Batch R4129511								
WG2823212-2 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	17-JUL-18
WG2823212-5 DUP		**L2124909-1**						
pH		7.63	7.64	J	pH	0.01	0.3	17-JUL-18
PO4-DO-COL-VA	**Water**							
Batch R4114759								
WG2816392-10 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			105.7		%		80-120	07-JUL-18
WG2816392-9 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	07-JUL-18
SO4-IC-N-VA	**Water**							
Batch R4117307								
WG2816535-3 DUP		**L2124909-1**						
Sulfate (SO4)		0.77	0.78		mg/L	0.3	20	07-JUL-18
WG2816535-2 LCS								
Sulfate (SO4)			97.4		%		90-110	07-JUL-18
WG2816535-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-JUL-18
WG2816535-4 MS		**L2124909-3**						
Sulfate (SO4)			101.9		%		75-125	07-JUL-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TDS-VA	**Water**							
Batch R4122887								
WG2818745-2 LCS								
Total Dissolved Solids			104.7		%		85-115	10-JUL-18
WG2818745-1 MB								
Total Dissolved Solids			<10		mg/L		10	10-JUL-18
TKN-F-VA	**Water**							
Batch R4123451								
WG2819887-6 LCS								
Total Kjeldahl Nitrogen			103.8		%		75-125	12-JUL-18
WG2819887-5 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	12-JUL-18
Batch R4124165								
WG2820989-2 LCS								
Total Kjeldahl Nitrogen			100.7		%		75-125	13-JUL-18
WG2820989-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	13-JUL-18
Batch R4125041								
WG2821305-10 LCS								
Total Kjeldahl Nitrogen			100.0		%		75-125	14-JUL-18
WG2821305-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	14-JUL-18
TSS-VA	**Water**							
Batch R4122341								
WG2818550-5 LCS								
Total Suspended Solids			86.7		%		85-115	10-JUL-18
WG2818550-4 MB								
Total Suspended Solids			<3.0		mg/L		3	10-JUL-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-ND	Lab Control Sample recovery was slightly outside ALS DQO. Reported non-detect results for associated samples were unaffected.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	04-JUL-18 11:00	17-JUL-18 08:35	0.25	310	hours	EHTR-FM
	2	04-JUL-18 12:30	17-JUL-18 08:35	0.25	308	hours	EHTR-FM
	3	04-JUL-18 14:00	17-JUL-18 08:35	0.25	306	hours	EHTR-FM
	4	04-JUL-18 11:30	17-JUL-18 08:35	0.25	309	hours	EHTR-FM
	5	04-JUL-18 13:30	17-JUL-18 08:35	0.25	307	hours	EHTR-FM
	6	04-JUL-18 12:00	17-JUL-18 08:35	0.25	309	hours	EHTR-FM
	8	04-JUL-18 12:00	17-JUL-18 07:48	0.25	308	hours	EHTR-FM
Anions and Nutrients							
Alkalinity Species by Titration							
	5	04-JUL-18 13:30	22-JUL-18 11:28	14	18	days	EHT
Aggregate Organics							
Biochemical Oxygen Demand- 5 day							
	1	04-JUL-18 11:00	09-JUL-18 10:51	3	5	days	EHT
	2	04-JUL-18 12:30	09-JUL-18 10:51	3	5	days	EHT
	3	04-JUL-18 14:00	09-JUL-18 10:51	3	5	days	EHT
	4	04-JUL-18 11:30	09-JUL-18 10:51	3	5	days	EHT
	5	04-JUL-18 13:30	09-JUL-18 10:51	3	5	days	EHT
	6	04-JUL-18 12:00	09-JUL-18 10:51	3	5	days	EHT

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.
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).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2124909 were received on 06-JUL-18 09:15.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Terrace Shipping X 3 Coolers

ALS Chain of Custody (COC) / Analytical Request Form

L2124909-COFC

COC Number: 17 -

Report		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Regional District of Kitimat-Stikine	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)		Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Chris Kerr	Quality Control (QC) Report with Report ☑ YES ☐ NO		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)] ☐
Phone:	250-641-4141	☑ Compare Results to Criteria on Report - provide details below if box checked		
	Company address below will appear on the final report	Select Distribution: - ☑ EMAIL ☐ MAIL ☐ FAX		Date and Time Required for all E&P TATs:
Street:	4545 Lazell Avenue	Email 1 or Fax rtooms@rdks.bc.ca		For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Terrace/BC	Email 2 ckerr@rdks.bc.ca		
Postal Code:	V8G4E1	Email 3 mhaley@rdks.bc.ca		
Invoice To	Same as Report To ☑ YES ☐ NO	Invoice Distribution		Analysis Request
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	Regional District of Kitimat-Stikine	Email 1 or Fax rtooms@rdks.bc.ca		
Contact:	Roger Tooms	Email 2 ckerr@rdks.bc.ca; mhaley@rdks.bc.ca		
Project Information		Oil and Gas Required Fields (client use)		
ALS Account # / Quote #:		AFE/Cost Center:	PO#	
Job #:	Thornhill Transfer Station	Major/Minor Code:	Routing Code:	
PO / AFE:		Requisitioner:		
LSD:		Location:		
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler: Chris Kerr	

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 metal	Total metals	alkilinity (as CaCO3)	Total Hardness	Dissolved Hardness -	Ammonia	Fluoride	Chloride	Conductivity	Nitrate	Nitrite	total Kjeldahl nitrogen	pH	Total phosphorus	ortho-phosphorus	SAMPLES ON HOLD	Sample is hazardous (please provide further detail	NUMBER OF CONTAINERS
					F/P	F/P				P						P		P				
	SW-1	4-Jul-18	11:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	SW-3	4-Jul-18	12:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	SW-6	4-Jul-18	2:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	SW-21	4-Jul-18	11:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	SW-17	4-Jul-18	1:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			
	DUP	4-Jul-18	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			6
	~~BLANK~~ TRIP	4-Jul-18	12:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R			3
	BH96-2	4-Jul-18	12:00	Water	R	R	R		R	R	R	R	R	R	R	R	R					6

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)	SAMPLE CONDITION AS RECEIVED (lab use only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	British Columbia Approved and Working Water Quality Guidelines (MAY, 2015)	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human consumption/ use? ☐ YES ☑ NO		Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C		
9.7	9.3	9.4		8.7	8	

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:
	July 4/18	2:35	Jennifer Broussard	July 4/18	2:35	JC	07/06/18	915Hr

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytic Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2124909-COFC

COC Number: 17 -

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Chris Kerr
Phone:	250-641-4141
	Company address below will appear on the final report
Street:	4545 Lazell 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:	Roger Tooms

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 rtooms@rdks.bc.ca
Email 2 ckerr@rdks.bc.ca
Email 3 mhaley@rdks.bc.ca

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax rtooms@rdks.bc.ca
Email 2 ckerr@rdks.bc.ca; mhaley@rdks.bc.ca

Project Information

ALS Account # / Quote #:	
Job #:	Thornhill Transfer Station
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: Chris Kerr

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	TSS	sulphate	BOD	COD	TDS	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS
	SW-1	4-Jul-18		Water	R	R	R	R				
	SW-3	4-Jul-18		Water	R	R	R	R				
	SW-6	4-Jul-18		Water	R	R	R	R				
	SW-21	4-Jul-18		Water	R	R	R	R				
	SW-17	4-Jul-18		Water	R	R	R	R				
	DUP	4-Jul-18		Water	R	R	R	R				
	Blank TRIP	4-Jul-18		Water	R	R	R	R				
	BH96-2	4-Jul-18		Water		R		R	R			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

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	8	8

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: JC	Date: 7/6/18	Time: 915Am

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

REGIONAL DISTRICT OF KITIMAT-STIKINE
ATTN: Chris Kerr
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1

Date Received: 12-SEP-18
Report Date: 24-SEP-18 15:51 (MT)
Version: FINAL

Client Phone: 250-615-6100

Certificate of Analysis

Lab Work Order #: L2163156

Project P.O. #: NOT SUBMITTED
Job Reference: THORNHILL TRANSFER STATION
C of C Numbers: 17-668818
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2163156-1 WATER 10-SEP-18 13:00 SW-1	L2163156-2 WATER 10-SEP-18 13:00 SW-3	L2163156-3 WATER 10-SEP-18 13:00 SW-6	L2163156-4 WATER 10-SEP-18 13:00 SW-21	L2163156-5 WATER 10-SEP-18 13:00 DUP
WATER						
Physical Tests	Conductivity (uS/cm)	87.6	2020	191	779	782
	Hardness (as CaCO3) (mg/L)	39.3	540	74.1	165	168
	pH (pH)	7.57	7.44	8.02	8.47	8.50
	Total Suspended Solids (mg/L)	3.0	122	10.2	35.0	34.4
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	36.9	962	85.8	300	301
	Ammonia, Total (as N) (mg/L)	0.0137	67.1	0.0150	4.15	3.99
	Chloride (Cl) (mg/L)	<0.50	117 DLDS	5.93	65.0	65.9
	Fluoride (F) (mg/L)	<0.020	<0.20 DLDS	0.033	0.10	0.10
	Nitrate (as N) (mg/L)	0.999	0.211	0.314	1.66	1.67
	Nitrite (as N) (mg/L)	0.0018	0.025	0.0043	0.181	0.182
	Total Kjeldahl Nitrogen (mg/L)	0.211	71.7	0.296	5.90	6.07
	Orthophosphate-Dissolved (as P) (mg/L)	<0.0010	<0.0010	0.0031	0.0013	0.0014
	Phosphorus (P)-Total (mg/L)	0.0083	0.326	0.0206	0.146	0.163
	Sulfate (SO4) (mg/L)	3.33	<3.0 DLDS	2.99	8.1	8.0
Total Metals	Aluminum (Al)-Total (mg/L)	0.0940	0.122	0.306	0.589	0.556
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00014	<0.00010	0.00032	0.00032
	Arsenic (As)-Total (mg/L)	0.00017	0.0142	0.00047	0.00365	0.00370
	Barium (Ba)-Total (mg/L)	0.0337	0.902	0.0287	0.131	0.135
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Total (mg/L)	<0.010	2.06	0.104	1.31	1.33
	Cadmium (Cd)-Total (mg/L)	0.0000065	0.0000090	0.0000061	0.0000302	0.0000285
	Calcium (Ca)-Total (mg/L)	14.2	162	27.3	35.5	36.4
	Cesium (Cs)-Total (mg/L)	<0.000010	0.000329	0.000032	0.000089	0.000090
	Chromium (Cr)-Total (mg/L)	0.00013	0.00136	0.00034	0.00096	0.00098
	Cobalt (Co)-Total (mg/L)	0.00015	0.00373	0.00027	0.00192	0.00194
	Copper (Cu)-Total (mg/L)	0.00164	0.00051	0.00158	0.00409	0.00405
	Iron (Fe)-Total (mg/L)	0.196	53.0	0.516	1.91	1.89
	Lead (Pb)-Total (mg/L)	<0.000050	0.000061	0.000101	0.000405	0.000399
	Lithium (Li)-Total (mg/L)	<0.0010	0.0029	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Total (mg/L)	1.04	33.3	1.92	18.7	18.4
	Manganese (Mn)-Total (mg/L)	0.0536	3.07	0.0357	0.303	0.306
	Mercury (Hg)-Total (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Total (mg/L)	0.000227	0.000528	0.000711	0.00113	0.00115
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00553	0.00057	0.00400	0.00405
	Phosphorus (P)-Total (mg/L)	<0.050	0.356	<0.050	0.167	0.132
	Potassium (K)-Total (mg/L)	1.13	66.9	3.54	34.1	34.6

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2163156-1 WATER 10-SEP-18 13:00 SW-1	L2163156-2 WATER 10-SEP-18 13:00 SW-3	L2163156-3 WATER 10-SEP-18 13:00 SW-6	L2163156-4 WATER 10-SEP-18 13:00 SW-21	L2163156-5 WATER 10-SEP-18 13:00 DUP
WATER						
Total Metals	Rubidium (Rb)-Total (mg/L)	0.00174	0.0530	0.00311	0.0199	0.0197
	Selenium (Se)-Total (mg/L)	0.000095	0.000147	0.000070	0.000386	0.000309
	Silicon (Si)-Total (mg/L)	3.03	12.2	3.58	5.21	5.37
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)	1.34	121	7.72	73.6	74.2
	Strontium (Sr)-Total (mg/L)	0.0636	1.15	0.0853	0.406	0.408
	Sulfur (S)-Total (mg/L)	1.13	1.16	0.99	3.64	3.62
	Tellurium (Te)-Total (mg/L)	<0.00020	0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Total (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Total (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Total (mg/L)	<0.00010	0.00022	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)	<0.0030 DLM	0.00604	0.0108	0.0115	0.0119
	Tungsten (W)-Total (mg/L)	<0.00010	0.00013	<0.00010	<0.00010	<0.00010
	Uranium (U)-Total (mg/L)	0.000023	0.000048	0.000164	0.000359	0.000364
	Vanadium (V)-Total (mg/L)	0.00066	0.00257	0.00134	0.00205	0.00204
	Zinc (Zn)-Total (mg/L)	<0.0030	0.0057	<0.0030	0.0046	0.0043
	Zirconium (Zr)-Total (mg/L)	<0.000060	0.000532	0.000174	0.000195	0.000191
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0430	0.0086	0.0382	0.0346	0.0317
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00012	<0.00010	0.00027	0.00028
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.0123	0.00035	0.00258	0.00262
	Barium (Ba)-Dissolved (mg/L)	0.0372	0.861	0.0282	0.115	0.114
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	2.11	0.105	1.32	1.41
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.0000090	<0.0000050	0.0000128	0.0000132
	Calcium (Ca)-Dissolved (mg/L)	14.1	162	26.7	36.1	37.6
	Cesium (Cs)-Dissolved (mg/L)	<0.000010	0.000325	<0.000010	0.000043	0.000049
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00109	<0.00010	0.00042	0.00043
	Cobalt (Co)-Dissolved (mg/L)	0.00014	0.00358	0.00015	0.00156	0.00157
	Copper (Cu)-Dissolved (mg/L)	0.00133	<0.00020	0.00105	0.00235	0.00234
	Iron (Fe)-Dissolved (mg/L)	0.121	50.4	0.227	0.418	0.424
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.000086	0.000122
	Lithium (Li)-Dissolved (mg/L)	<0.0010	0.0030	<0.0010	<0.0010	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)	0.979	33.2	1.80	18.1	18.1
	Manganese (Mn)-Dissolved (mg/L)	0.0628	3.14	0.0316	0.224	0.232

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L2163156-1 WATER 10-SEP-18 13:00 SW-1	L2163156-2 WATER 10-SEP-18 13:00 SW-3	L2163156-3 WATER 10-SEP-18 13:00 SW-6	L2163156-4 WATER 10-SEP-18 13:00 SW-21	L2163156-5 WATER 10-SEP-18 13:00 DUP
WATER						
Dissolved Metals	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000219	0.000540	0.000712	0.00125	0.00126
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00574	<0.00050	0.00364	0.00379
	Phosphorus (P)-Dissolved (mg/L)	<0.050	0.056	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.09	72.1	3.63	35.8	36.8
	Rubidium (Rb)-Dissolved (mg/L)	0.00155	0.0529	0.00285	0.0195	0.0206
	Selenium (Se)-Dissolved (mg/L)	0.000083	0.000217	0.000072	0.000347	0.000317
	Silicon (Si)-Dissolved (mg/L)	2.91	13.7	3.18	4.52	4.61
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	1.32	127	7.69	74.8	77.8
	Strontium (Sr)-Dissolved (mg/L)	0.0562	1.17	0.0786	0.386	0.414
	Sulfur (S)-Dissolved (mg/L)	0.94	1.50	0.86	3.42	3.44
	Tellurium (Te)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00021	<0.00010	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00088	0.00125	<0.0012 DLM	0.00169	0.00154
	Tungsten (W)-Dissolved (mg/L)	<0.00010	0.00014	<0.00010	<0.00010	<0.00010
	Uranium (U)-Dissolved (mg/L)	0.000019	0.000042	0.000146	0.000342	0.000380
	Vanadium (V)-Dissolved (mg/L)	<0.00050	0.00137	0.00054	0.00060	0.00060
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.000060	0.000498	0.000064	0.000197	0.000202
Aggregate Organics	BOD (mg/L)	<2.0	8.3	<2.0	6.4	7.0
	COD (mg/L)	<20	155	<20	113	116

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2163156-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2163156-1, -2, -3, -4, -5
Matrix Spike	Barium (Ba)-Total	MS-B	L2163156-5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2163156-1, -2, -3, -4, -5
Matrix Spike	Calcium (Ca)-Total	MS-B	L2163156-5
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2163156-5
Matrix Spike	Manganese (Mn)-Total	MS-B	L2163156-1, -2, -3, -4, -5
Matrix Spike	Manganese (Mn)-Total	MS-B	L2163156-5
Matrix Spike	Sodium (Na)-Total	MS-B	L2163156-5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2163156-1, -2, -3, -4, -5
Matrix Spike	Strontium (Sr)-Total	MS-B	L2163156-5
Matrix Spike	Sulfur (S)-Total	MS-B	L2163156-5
Matrix Spike	Uranium (U)-Total	MS-B	L2163156-5
Matrix Spike	Ammonia, Total (as N)	MS-B	L2163156-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BOD5-VA	Water	Biochemical Oxygen Demand- 5 day	APHA 5210 B- BIOCHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5210 B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

		Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Reference Information

MET-D-CCMS-VA Water

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-PRES-COL-VA Water Total P in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PO4-DO-COL-VA Water Diss. Orthophosphate in Water by Colour APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

SO4-IC-N-VA Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

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

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, TSS is determined by drying the filter at 104 degrees celsius.
Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-668818

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: REGIONAL DISTRICT OF KITIMAT-STIKINE
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1
Contact: Chris Kerr

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Water**							
Batch R4216611								
WG2874998-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			87.2		%		85-115	14-SEP-18
WG2874998-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	14-SEP-18
Batch R4216900								
WG2875993-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			104.1		%		85-115	14-SEP-18
WG2875993-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	14-SEP-18
BOD5-VA	**Water**							
Batch R4225249								
WG2876267-3 DUP		**L2163156-1**						
BOD		<2.0	<2.0	RPD-NA	mg/L	N/A	20	13-SEP-18
WG2876267-2 LCS								
BOD			90.7		%		85-115	13-SEP-18
WG2876267-1 MB								
BOD			<2.0		mg/L		2	13-SEP-18
CL-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Chloride (Cl)			102.9		%		90-110	13-SEP-18
WG2875186-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-18
Batch R4216509								
WG2876001-3 DUP		**L2163156-2**						
Chloride (Cl)		117	115		mg/L	1.8	20	13-SEP-18
WG2876001-2 LCS								
Chloride (Cl)			103.5		%		90-110	13-SEP-18
WG2876001-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-18
COD-COL-VA	**Water**							
Batch R4229132								
WG2881913-3 LCS								
COD			105.1		%		85-115	20-SEP-18
WG2881913-6 LCS								
COD			103.9		%		85-115	20-SEP-18
WG2881913-1 MB								
COD			<20		mg/L		20	20-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COD-COL-VA	**Water**							
Batch R4229132								
WG2881913-5 MB								
COD			<20		mg/L		20	20-SEP-18
WG2881913-4 MS		**L2163156-3**						
COD			108.8		%		75-125	20-SEP-18
EC-PCT-VA	**Water**							
Batch R4216611								
WG2874998-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			97.7		%		90-110	14-SEP-18
WG2874998-1 MB								
Conductivity			<2.0		uS/cm		2	14-SEP-18
Batch R4216900								
WG2875993-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			101.6		%		90-110	14-SEP-18
WG2875993-1 MB								
Conductivity			<2.0		uS/cm		2	14-SEP-18
F-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Fluoride (F)			107.8		%		90-110	13-SEP-18
WG2875186-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-SEP-18
Batch R4216509								
WG2876001-3 DUP		**L2163156-2**						
Fluoride (F)		<0.20	<0.20	RPD-NA	mg/L	N/A	20	13-SEP-18
WG2876001-2 LCS								
Fluoride (F)			100.4		%		90-110	13-SEP-18
WG2876001-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4214884								
WG2875236-10 LCS								
Mercury (Hg)-Dissolved			100.8		%		80-120	13-SEP-18
Batch R4215871								
WG2875236-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	14-SEP-18
	Water							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R4214884								
WG2875318-19 DUP		**L2163156-2**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	13-SEP-18
WG2875318-2 LCS								
Mercury (Hg)-Total			101.5		%		80-120	13-SEP-18
WG2875318-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	13-SEP-18
WG2875318-18 MS		**L2163156-1**						
Mercury (Hg)-Total			99.7		%		70-130	13-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-2 LCS								
Aluminum (Al)-Dissolved			100.1		%		80-120	13-SEP-18
Antimony (Sb)-Dissolved			98.4		%		80-120	13-SEP-18
Arsenic (As)-Dissolved			96.9		%		80-120	13-SEP-18
Barium (Ba)-Dissolved			104.9		%		80-120	13-SEP-18
Beryllium (Be)-Dissolved			95.2		%		80-120	13-SEP-18
Bismuth (Bi)-Dissolved			92.3		%		80-120	13-SEP-18
Boron (B)-Dissolved			95.9		%		80-120	13-SEP-18
Cadmium (Cd)-Dissolved			98.9		%		80-120	13-SEP-18
Calcium (Ca)-Dissolved			95.3		%		80-120	13-SEP-18
Cesium (Cs)-Dissolved			96.7		%		80-120	13-SEP-18
Chromium (Cr)-Dissolved			98.4		%		80-120	13-SEP-18
Cobalt (Co)-Dissolved			95.3		%		80-120	13-SEP-18
Copper (Cu)-Dissolved			95.2		%		80-120	13-SEP-18
Iron (Fe)-Dissolved			96.7		%		80-120	13-SEP-18
Lead (Pb)-Dissolved			97.2		%		80-120	13-SEP-18
Lithium (Li)-Dissolved			95.5		%		80-120	13-SEP-18
Magnesium (Mg)-Dissolved			94.9		%		80-120	13-SEP-18
Manganese (Mn)-Dissolved			102.4		%		80-120	13-SEP-18
Molybdenum (Mo)-Dissolved			99.1		%		80-120	13-SEP-18
Nickel (Ni)-Dissolved			97.9		%		80-120	13-SEP-18
Phosphorus (P)-Dissolved			97.8		%		70-130	13-SEP-18
Potassium (K)-Dissolved			99.0		%		80-120	13-SEP-18
Rubidium (Rb)-Dissolved			100.2		%		80-120	13-SEP-18
Selenium (Se)-Dissolved			98.4		%		80-120	13-SEP-18
Silicon (Si)-Dissolved			101.7		%		60-140	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-2 LCS								
Silver (Ag)-Dissolved			96.1		%		80-120	13-SEP-18
Sodium (Na)-Dissolved			96.4		%		80-120	13-SEP-18
Strontium (Sr)-Dissolved			95.8		%		80-120	13-SEP-18
Sulfur (S)-Dissolved			91.8		%		80-120	13-SEP-18
Tellurium (Te)-Dissolved			101.9		%		80-120	13-SEP-18
Thallium (Tl)-Dissolved			95.5		%		80-120	13-SEP-18
Thorium (Th)-Dissolved			97.0		%		80-120	13-SEP-18
Tin (Sn)-Dissolved			97.5		%		80-120	13-SEP-18
Titanium (Ti)-Dissolved			90.4		%		80-120	13-SEP-18
Tungsten (W)-Dissolved			96.1		%		80-120	13-SEP-18
Uranium (U)-Dissolved			96.9		%		80-120	13-SEP-18
Vanadium (V)-Dissolved			98.9		%		80-120	13-SEP-18
Zinc (Zn)-Dissolved			94.7		%		80-120	13-SEP-18
Zirconium (Zr)-Dissolved			98.2		%		80-120	13-SEP-18
WG2875851-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	13-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	13-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	13-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	13-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-1 MB		**NP**						
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	13-SEP-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	13-SEP-18
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	13-SEP-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	13-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	13-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4216322								
WG2875792-2 LCS								
Aluminum (Al)-Total			99.0		%		80-120	14-SEP-18
Antimony (Sb)-Total			103.0		%		80-120	14-SEP-18
Arsenic (As)-Total			95.7		%		80-120	14-SEP-18
Barium (Ba)-Total			95.7		%		80-120	14-SEP-18
Beryllium (Be)-Total			92.8		%		80-120	14-SEP-18
Bismuth (Bi)-Total			103.2		%		80-120	14-SEP-18
Boron (B)-Total			90.1		%		80-120	14-SEP-18
Cadmium (Cd)-Total			97.0		%		80-120	14-SEP-18
Calcium (Ca)-Total			93.1		%		80-120	14-SEP-18
Cesium (Cs)-Total			96.4		%		80-120	14-SEP-18
Chromium (Cr)-Total			97.9		%		80-120	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216322								
WG2875792-2 LCS								
Cobalt (Co)-Total			95.5		%		80-120	14-SEP-18
Copper (Cu)-Total			93.8		%		80-120	14-SEP-18
Iron (Fe)-Total			92.0		%		80-120	14-SEP-18
Lead (Pb)-Total			94.4		%		80-120	14-SEP-18
Lithium (Li)-Total			93.1		%		80-120	14-SEP-18
Magnesium (Mg)-Total			97.5		%		80-120	14-SEP-18
Manganese (Mn)-Total			95.2		%		80-120	14-SEP-18
Molybdenum (Mo)-Total			91.3		%		80-120	14-SEP-18
Nickel (Ni)-Total			97.7		%		80-120	14-SEP-18
Phosphorus (P)-Total			93.5		%		80-120	14-SEP-18
Potassium (K)-Total			98.1		%		80-120	14-SEP-18
Rubidium (Rb)-Total			99.6		%		80-120	14-SEP-18
Selenium (Se)-Total			93.5		%		80-120	14-SEP-18
Silicon (Si)-Total			95.6		%		80-120	14-SEP-18
Silver (Ag)-Total			94.8		%		80-120	14-SEP-18
Sodium (Na)-Total			102.9		%		80-120	14-SEP-18
Strontium (Sr)-Total			93.3		%		80-120	14-SEP-18
Sulfur (S)-Total			91.4		%		80-120	14-SEP-18
Tellurium (Te)-Total			94.2		%		80-120	14-SEP-18
Thallium (Tl)-Total			103.1		%		80-120	14-SEP-18
Thorium (Th)-Total			97.1		%		80-120	14-SEP-18
Tin (Sn)-Total			94.1		%		80-120	14-SEP-18
Titanium (Ti)-Total			91.2		%		80-120	14-SEP-18
Tungsten (W)-Total			96.0		%		80-120	14-SEP-18
Uranium (U)-Total			98.8		%		80-120	14-SEP-18
Vanadium (V)-Total			97.7		%		80-120	14-SEP-18
Zinc (Zn)-Total			94.6		%		80-120	14-SEP-18
Zirconium (Zr)-Total			91.1		%		80-120	14-SEP-18
WG2875792-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	14-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216322								
WG2875792-1 MB								
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	14-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	14-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-SEP-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	14-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	14-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	14-SEP-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	14-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	14-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	14-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	14-SEP-18
Sulfur (S)-Total			<0.50		mg/L		0.5	14-SEP-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	14-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-SEP-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	14-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-SEP-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-2 LCS								
Aluminum (Al)-Total			94.5		%		80-120	16-SEP-18
Antimony (Sb)-Total			93.0		%		80-120	16-SEP-18
Arsenic (As)-Total			96.7		%		80-120	16-SEP-18
Barium (Ba)-Total			95.7		%		80-120	16-SEP-18
Beryllium (Be)-Total			92.2		%		80-120	16-SEP-18
Bismuth (Bi)-Total			95.4		%		80-120	16-SEP-18
Boron (B)-Total			91.1		%		80-120	16-SEP-18
Cadmium (Cd)-Total			95.7		%		80-120	16-SEP-18
Calcium (Ca)-Total			93.9		%		80-120	16-SEP-18
Cesium (Cs)-Total			96.2		%		80-120	16-SEP-18
Chromium (Cr)-Total			94.5		%		80-120	16-SEP-18
Cobalt (Co)-Total			92.2		%		80-120	16-SEP-18
Copper (Cu)-Total			91.6		%		80-120	16-SEP-18
Iron (Fe)-Total			96.8		%		80-120	16-SEP-18
Lead (Pb)-Total			95.8		%		80-120	16-SEP-18
Lithium (Li)-Total			93.7		%		80-120	16-SEP-18
Magnesium (Mg)-Total			92.8		%		80-120	16-SEP-18
Manganese (Mn)-Total			95.2		%		80-120	16-SEP-18
Molybdenum (Mo)-Total			94.9		%		80-120	16-SEP-18
Nickel (Ni)-Total			93.0		%		80-120	16-SEP-18
Phosphorus (P)-Total			98.1		%		80-120	16-SEP-18
Potassium (K)-Total			93.9		%		80-120	16-SEP-18
Rubidium (Rb)-Total			93.5		%		80-120	16-SEP-18
Selenium (Se)-Total			93.9		%		80-120	16-SEP-18
Silicon (Si)-Total			91.5		%		80-120	16-SEP-18
Silver (Ag)-Total			92.6		%		80-120	16-SEP-18
Sodium (Na)-Total			96.1		%		80-120	16-SEP-18
Strontium (Sr)-Total			95.2		%		80-120	16-SEP-18
Sulfur (S)-Total			90.6		%		80-120	16-SEP-18
Tellurium (Te)-Total			94.4		%		80-120	16-SEP-18
Thallium (Tl)-Total			94.7		%		80-120	16-SEP-18
Thorium (Th)-Total			92.5		%		80-120	16-SEP-18
Tin (Sn)-Total			92.6		%		80-120	16-SEP-18
Titanium (Ti)-Total			93.4		%		80-120	16-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-2 LCS								
Tungsten (W)-Total			95.9		%		80-120	16-SEP-18
Uranium (U)-Total			90.6		%		80-120	16-SEP-18
Vanadium (V)-Total			95.9		%		80-120	16-SEP-18
Zinc (Zn)-Total			92.9		%		80-120	16-SEP-18
Zirconium (Zr)-Total			92.9		%		80-120	16-SEP-18
WG2877584-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	16-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	16-SEP-18
Cadmium (Cd)-Total			<0.0000050		mg/L		0.000005	16-SEP-18
Calcium (Ca)-Total			<0.050		mg/L		0.05	16-SEP-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	16-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	16-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	16-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	16-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	16-SEP-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	16-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	16-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	16-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	16-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	16-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4217619								
WG2877584-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	16-SEP-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	16-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	16-SEP-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	16-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	16-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	16-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	16-SEP-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	16-SEP-18
NH3-F-VA	**Water**							
Batch R4216541								
WG2876296-6 LCS								
Ammonia, Total (as N)			96.8		%		85-115	14-SEP-18
WG2876296-5 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	14-SEP-18
Batch R4216932								
WG2876599-10 LCS								
Ammonia, Total (as N)			90.1		%		85-115	15-SEP-18
WG2876599-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	15-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Nitrite (as N)			100.2		%		90-110	13-SEP-18
WG2875186-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-SEP-18
Batch R4216509								
WG2876001-3 DUP		**L2163156-2**						
Nitrite (as N)		0.025	0.029		mg/L	14	20	13-SEP-18
WG2876001-2 LCS								
Nitrite (as N)			98.7		%		90-110	13-SEP-18
WG2876001-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-SEP-18
NO3-L-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-L-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Nitrate (as N)			101.8		%		90-110	13-SEP-18
WG2875186-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-SEP-18
Batch R4216509								
WG2876001-3 DUP		**L2163156-2**						
Nitrate (as N)		0.211	0.213		mg/L	1.0	20	13-SEP-18
WG2876001-2 LCS								
Nitrate (as N)			104.0		%		90-110	13-SEP-18
WG2876001-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-SEP-18
P-T-PRES-COL-VA	**Water**							
Batch R4215780								
WG2875749-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.8		%		80-120	13-SEP-18
WG2875749-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	13-SEP-18
Batch R4219353								
WG2879204-2 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			99.9		%		80-120	18-SEP-18
WG2879204-1 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	18-SEP-18
PH-PCT-VA	**Water**							
Batch R4216611								
WG2874998-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	14-SEP-18
Batch R4216900								
WG2875993-2 CRM		**VA-PH7-BUF**						
pH			7.03		pH		6.9-7.1	14-SEP-18
PO4-DO-COL-VA	**Water**							
Batch R4214824								
WG2875250-26 CRM		**VA-OPO4-CONTROL**						
Orthophosphate-Dissolved (as P)			98.9		%		80-120	13-SEP-18
WG2875250-25 MB								
Orthophosphate-Dissolved (as P)			<0.0010		mg/L		0.001	13-SEP-18
SO4-IC-N-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Sulfate (SO4)			103.9		%		90-110	13-SEP-18
WG2875186-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-SEP-18
Batch R4216509								
WG2876001-3 DUP		**L2163156-2**						
Sulfate (SO4)		<3.0	<3.0	RPD-NA	mg/L	N/A	20	13-SEP-18
WG2876001-2 LCS								
Sulfate (SO4)			104.8		%		90-110	13-SEP-18
WG2876001-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-SEP-18
TKN-F-VA	**Water**							
Batch R4225456								
WG2879701-11 DUP		**L2163156-1**						
Total Kjeldahl Nitrogen		0.211	0.266	J	mg/L	0.055	0.1	19-SEP-18
WG2879701-10 LCS								
Total Kjeldahl Nitrogen			98.8		%		75-125	19-SEP-18
WG2879701-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	19-SEP-18
WG2879701-12 MS		**L2163156-3**						
Total Kjeldahl Nitrogen			98.7		%		70-130	19-SEP-18
TSS-VA	**Water**							
Batch R4217636								
WG2877409-8 LCS								
Total Suspended Solids			113.1		%		85-115	15-SEP-18
WG2877409-7 MB								
Total Suspended Solids			<3.0		mg/L		3	15-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	10-SEP-18 13:00	14-SEP-18 17:14	0.25	100	hours	EHTR-FM
	2	10-SEP-18 13:00	14-SEP-18 11:32	0.25	95	hours	EHTR-FM
	3	10-SEP-18 13:00	14-SEP-18 11:32	0.25	95	hours	EHTR-FM
	4	10-SEP-18 13:00	14-SEP-18 11:32	0.25	95	hours	EHTR-FM
	5	10-SEP-18 13:00	14-SEP-18 11:32	0.25	95	hours	EHTR-FM

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.
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).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2163156 were received on 12-SEP-18 12:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2163156-COFC

COC Number: 17 - 668818

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	Chris Kerr
Phone:	250-615-6100
	Company address below will appear on the final report
Street:	Suite 300 4545 Lazelle
City/Province:	Terrace B.C.
Postal Code:	V8G-4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Regional Dist. of Kitimat-Stikine
Contact:	Chris Kerr

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	CKERR@rdks.bc.ca
Email 2	MHaley@rdks.bc.ca
Email 3	Rtoombs@rdks.bc.ca

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	MHaley@rdks.bc.ca
Email 2	CKERR@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	Thornhill Transfer Station
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:

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 [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals[1]	Total Metals	Alkalinity	Total & Dissolved Hardness	Ammonia	Fluoride	Chloride	Conductivity	Nitrate/Nitrite	Total Kjeldahl Nitrogen	pH	Total Phosphorous	Ortho-phosphorous	TSS	B.O.D./C.O.D.	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	SW-1	10/9/18	1:00	Water	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	SW-3	"	11:40	"	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	SW-6	"	10:45	"	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	SW-21	"	12:15	"	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
	Dup	"	12:00	"	/	-	-	-	-	-	-	-	-	-	-	-	-	-	/			
			12:00																			

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	
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			
9.4						5	8

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:
	Sept 10/18	1:40	Jennifer Brousseau	Sept 10/18	1:40	HA	9/12	12:25p

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 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.**

REGIONAL DISTRICT OF KITIMAT-STIKINE
ATTN: Chris Kerr
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1

Date Received: 12-SEP-18
Report Date: 19-SEP-18 12:58 (MT)
Version: FINAL

Client Phone: 250-615-6100

Certificate of Analysis

Lab Work Order #: L2163155

Project P.O. #: NOT SUBMITTED
Job Reference: THORNHILL TRANSFER ST.
C of C Numbers: 17-668817
Legal Site Desc:

Amber Springer, B.Sc
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163155-1				
	Description	WATER				
	Sampled Date	10-SEP-18				
	Sampled Time	11:15				
	Client ID	BH96-2 (E231889)				
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	360				
	Hardness (as CaCO3) (mg/L)	79.6				
	pH (pH)	8.38				
	Total Dissolved Solids (mg/L)	229				
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	190				
	Ammonia, Total (as N) (mg/L)	0.0055				
	Chloride (Cl) (mg/L)	2.66				
	Fluoride (F) (mg/L)	0.170				
	Nitrate (as N) (mg/L)	0.508				
	Nitrite (as N) (mg/L)	<0.0010				
	Total Kjeldahl Nitrogen (mg/L)	0.277				
	Phosphorus (P)-Total (mg/L)	0.0962				
	Sulfate (SO4) (mg/L)	4.34				
Total Metals	Aluminum (Al)-Total (mg/L)	0.292				
	Antimony (Sb)-Total (mg/L)	0.00016				
	Arsenic (As)-Total (mg/L)	0.00239				
	Barium (Ba)-Total (mg/L)	0.0237				
	Beryllium (Be)-Total (mg/L)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.000050				
	Boron (B)-Total (mg/L)	0.147				
	Cadmium (Cd)-Total (mg/L)	0.000812				
	Calcium (Ca)-Total (mg/L)	13.5				
	Cesium (Cs)-Total (mg/L)	0.000023				
	Chromium (Cr)-Total (mg/L)	0.00034				
	Cobalt (Co)-Total (mg/L)	0.00019				
	Copper (Cu)-Total (mg/L)	0.00293				
	Iron (Fe)-Total (mg/L)	0.332				
	Lead (Pb)-Total (mg/L)	0.000256				
	Lithium (Li)-Total (mg/L)	0.0019				
	Magnesium (Mg)-Total (mg/L)	11.4				
	Manganese (Mn)-Total (mg/L)	0.0298				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	0.00481				
	Nickel (Ni)-Total (mg/L)	0.00113				
	Phosphorus (P)-Total (mg/L)	0.093				
	Potassium (K)-Total (mg/L)	10.1				
	Rubidium (Rb)-Total (mg/L)	0.00059				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163155-1				
	Description	WATER				
	Sampled Date	10-SEP-18				
	Sampled Time	11:15				
	Client ID	BH96-2 (E231889)				
Grouping	**Analyte**					
WATER						
Total Metals	Selenium (Se)-Total (mg/L)	0.000072				
	Silicon (Si)-Total (mg/L)	4.29				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	50.9				
	Strontium (Sr)-Total (mg/L)	0.152				
	Sulfur (S)-Total (mg/L)	1.44				
	Tellurium (Te)-Total (mg/L)	<0.00020				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Thorium (Th)-Total (mg/L)	<0.00010				
	Tin (Sn)-Total (mg/L)	0.00011				
	Titanium (Ti)-Total (mg/L)	0.00697				
	Tungsten (W)-Total (mg/L)	<0.00010				
	Uranium (U)-Total (mg/L)	0.00198				
	Vanadium (V)-Total (mg/L)	0.00119				
	Zinc (Zn)-Total (mg/L)	0.0105				
	Zirconium (Zr)-Total (mg/L)	0.000095				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD				
	Dissolved Metals Filtration Location	FIELD				
	Aluminum (Al)-Dissolved (mg/L)	0.0266				
	Antimony (Sb)-Dissolved (mg/L)	0.00012				
	Arsenic (As)-Dissolved (mg/L)	0.00212				
	Barium (Ba)-Dissolved (mg/L)	0.0194				
	Beryllium (Be)-Dissolved (mg/L)	<0.00010				
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050				
	Boron (B)-Dissolved (mg/L)	0.139				
	Cadmium (Cd)-Dissolved (mg/L)	0.000342				
	Calcium (Ca)-Dissolved (mg/L)	13.5				
	Cesium (Cs)-Dissolved (mg/L)	<0.000010				
	Chromium (Cr)-Dissolved (mg/L)	0.00011				
	Cobalt (Co)-Dissolved (mg/L)	<0.00010				
	Copper (Cu)-Dissolved (mg/L)	0.00117				
	Iron (Fe)-Dissolved (mg/L)	0.022				
	Lead (Pb)-Dissolved (mg/L)	<0.000050				
	Lithium (Li)-Dissolved (mg/L)	0.0016				
	Magnesium (Mg)-Dissolved (mg/L)	11.1				
	Manganese (Mn)-Dissolved (mg/L)	0.00184				
	Mercury (Hg)-Dissolved (mg/L)	0.0000157 DTC				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2163155-1
	Description	WATER
	Sampled Date	10-SEP-18
	Sampled Time	11:15
	Client ID	BH96-2 (E231889)
Grouping	**Analyte**	
WATER		
Dissolved Metals	Molybdenum (Mo)-Dissolved (mg/L)	0.00494
	Nickel (Ni)-Dissolved (mg/L)	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	0.072
	Potassium (K)-Dissolved (mg/L)	9.75
	Rubidium (Rb)-Dissolved (mg/L)	0.00045
	Selenium (Se)-Dissolved (mg/L)	<0.000050
	Silicon (Si)-Dissolved (mg/L)	3.94
	Silver (Ag)-Dissolved (mg/L)	<0.000010
	Sodium (Na)-Dissolved (mg/L)	49.1
	Strontium (Sr)-Dissolved (mg/L)	0.143
	Sulfur (S)-Dissolved (mg/L)	1.46
	Tellurium (Te)-Dissolved (mg/L)	<0.00020
	Thallium (Tl)-Dissolved (mg/L)	<0.000010
	Thorium (Th)-Dissolved (mg/L)	<0.00010
	Tin (Sn)-Dissolved (mg/L)	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00121
	Tungsten (W)-Dissolved (mg/L)	0.00011
	Uranium (U)-Dissolved (mg/L)	0.00192
	Vanadium (V)-Dissolved (mg/L)	0.00058
	Zinc (Zn)-Dissolved (mg/L)	0.0023
	Zirconium (Zr)-Dissolved (mg/L)	0.000115
Aggregate Organics	COD (mg/L)	<20

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2163155-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2163155-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2163155-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

CL-IC-N-VA	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COD-COL-VA	Water	Chemical Oxygen Demand by Colorimetric	APHA 5220 D. CHEMICAL OXYGEN DEMAND

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

F-IC-N-VA	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

HG-T-CVAA-VA	Water	Total Mercury in Water by CVAAS or CVAFS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-L-IC-N-VA	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

P-T-PRES-COL-VA	Water	Total P in Water by Colour	APHA 4500-P Phosphorus

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is determined colourimetrically after persulphate digestion of the sample.
Samples with very high dissolved solids (i.e. seawaters, brackish waters) may produce a negative bias by this method. Alternate methods are available for these types of samples.

Arsenic (5+), at elevated levels, is a positive interference on colourimetric phosphate analysis.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

TDS-VA	Water	Total Dissolved Solids by Gravimetric	APHA 2540 C - GRAVIMETRIC

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TKN-F-VA	Water	TKN in Water by Fluorescence	APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

17-668817

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour 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.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2163155 Report Date: 19-SEP-18

Client: REGIONAL DISTRICT OF KITIMAT-STIKINE
300 - 4545 Lazelle Avenue
Terrace BC V8G 4E1
Contact: Chris Kerr

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-TITR-VA	**Water**							
Batch R4216611								
WG2874998-3 CRM		**VA-ALK-TITR-CONTROL**						
Alkalinity, Total (as CaCO3)			87.2		%		85-115	14-SEP-18
WG2874998-1 MB								
Alkalinity, Total (as CaCO3)			<1.0		mg/L		1	14-SEP-18
CL-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Chloride (Cl)			102.9		%		90-110	13-SEP-18
WG2875186-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-18
COD-COL-VA	**Water**							
Batch R4220249								
WG2878955-3 LCS								
COD			103.2		%		85-115	17-SEP-18
WG2878955-1 MB								
COD			<20		mg/L		20	17-SEP-18
EC-PCT-VA	**Water**							
Batch R4216611								
WG2874998-4 CRM		**VA-EC-PCT-CONTROL**						
Conductivity			97.7		%		90-110	14-SEP-18
WG2874998-1 MB								
Conductivity			<2.0		uS/cm		2	14-SEP-18
F-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Fluoride (F)			107.8		%		90-110	13-SEP-18
WG2875186-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-SEP-18
HG-D-CVAA-VA	**Water**							
Batch R4214884								
WG2875236-10 LCS								
Mercury (Hg)-Dissolved			100.8		%		80-120	13-SEP-18
Batch R4215871								
WG2875236-9 MB		**NP**						
Mercury (Hg)-Dissolved			<0.000005		mg/L		0.000005	14-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-VA	**Water**							
Batch R4214884								
WG2875318-2 LCS								
Mercury (Hg)-Total			101.5		%		80-120	13-SEP-18
WG2875318-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	13-SEP-18
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-2 LCS								
Aluminum (Al)-Dissolved			100.1		%		80-120	13-SEP-18
Antimony (Sb)-Dissolved			98.4		%		80-120	13-SEP-18
Arsenic (As)-Dissolved			96.9		%		80-120	13-SEP-18
Barium (Ba)-Dissolved			104.9		%		80-120	13-SEP-18
Beryllium (Be)-Dissolved			95.2		%		80-120	13-SEP-18
Bismuth (Bi)-Dissolved			92.3		%		80-120	13-SEP-18
Boron (B)-Dissolved			95.9		%		80-120	13-SEP-18
Cadmium (Cd)-Dissolved			98.9		%		80-120	13-SEP-18
Calcium (Ca)-Dissolved			95.3		%		80-120	13-SEP-18
Cesium (Cs)-Dissolved			96.7		%		80-120	13-SEP-18
Chromium (Cr)-Dissolved			98.4		%		80-120	13-SEP-18
Cobalt (Co)-Dissolved			95.3		%		80-120	13-SEP-18
Copper (Cu)-Dissolved			95.2		%		80-120	13-SEP-18
Iron (Fe)-Dissolved			96.7		%		80-120	13-SEP-18
Lead (Pb)-Dissolved			97.2		%		80-120	13-SEP-18
Lithium (Li)-Dissolved			95.5		%		80-120	13-SEP-18
Magnesium (Mg)-Dissolved			94.9		%		80-120	13-SEP-18
Manganese (Mn)-Dissolved			102.4		%		80-120	13-SEP-18
Molybdenum (Mo)-Dissolved			99.1		%		80-120	13-SEP-18
Nickel (Ni)-Dissolved			97.9		%		80-120	13-SEP-18
Phosphorus (P)-Dissolved			97.8		%		70-130	13-SEP-18
Potassium (K)-Dissolved			99.0		%		80-120	13-SEP-18
Rubidium (Rb)-Dissolved			100.2		%		80-120	13-SEP-18
Selenium (Se)-Dissolved			98.4		%		80-120	13-SEP-18
Silicon (Si)-Dissolved			101.7		%		60-140	13-SEP-18
Silver (Ag)-Dissolved			96.1		%		80-120	13-SEP-18
Sodium (Na)-Dissolved			96.4		%		80-120	13-SEP-18
Strontium (Sr)-Dissolved			95.8		%		80-120	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-2 LCS								
Sulfur (S)-Dissolved			91.8		%		80-120	13-SEP-18
Tellurium (Te)-Dissolved			101.9		%		80-120	13-SEP-18
Thallium (Tl)-Dissolved			95.5		%		80-120	13-SEP-18
Thorium (Th)-Dissolved			97.0		%		80-120	13-SEP-18
Tin (Sn)-Dissolved			97.5		%		80-120	13-SEP-18
Titanium (Ti)-Dissolved			90.4		%		80-120	13-SEP-18
Tungsten (W)-Dissolved			96.1		%		80-120	13-SEP-18
Uranium (U)-Dissolved			96.9		%		80-120	13-SEP-18
Vanadium (V)-Dissolved			98.9		%		80-120	13-SEP-18
Zinc (Zn)-Dissolved			94.7		%		80-120	13-SEP-18
Zirconium (Zr)-Dissolved			98.2		%		80-120	13-SEP-18
WG2875851-1 MB		**NP**						
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	13-SEP-18
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	13-SEP-18
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	13-SEP-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	13-SEP-18
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	13-SEP-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-VA	**Water**							
Batch R4216446								
WG2875851-1 MB		**NP**						
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	13-SEP-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	13-SEP-18
Strontium (Sr)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	13-SEP-18
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	13-SEP-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	13-SEP-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	13-SEP-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	13-SEP-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	13-SEP-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	13-SEP-18
Zirconium (Zr)-Dissolved			<0.000060		mg/L		0.00006	13-SEP-18
MET-T-CCMS-VA	**Water**							
Batch R4216446								
WG2875326-2 LCS								
Aluminum (Al)-Total			103.1		%		80-120	13-SEP-18
Antimony (Sb)-Total			107.9		%		80-120	13-SEP-18
Arsenic (As)-Total			98.3		%		80-120	13-SEP-18
Barium (Ba)-Total			96.5		%		80-120	13-SEP-18
Beryllium (Be)-Total			96.4		%		80-120	13-SEP-18
Bismuth (Bi)-Total			98.4		%		80-120	13-SEP-18
Boron (B)-Total			89.9		%		80-120	13-SEP-18
Cadmium (Cd)-Total			101.9		%		80-120	13-SEP-18
Calcium (Ca)-Total			94.5		%		80-120	13-SEP-18
Cesium (Cs)-Total			96.3		%		80-120	13-SEP-18
Chromium (Cr)-Total			98.2		%		80-120	13-SEP-18
Cobalt (Co)-Total			97.1		%		80-120	13-SEP-18
Copper (Cu)-Total			98.5		%		80-120	13-SEP-18
Iron (Fe)-Total			96.6		%		80-120	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216446								
WG2875326-2 LCS								
Lead (Pb)-Total			98.2		%		80-120	13-SEP-18
Lithium (Li)-Total			97.7		%		80-120	13-SEP-18
Magnesium (Mg)-Total			94.8		%		80-120	13-SEP-18
Manganese (Mn)-Total			98.9		%		80-120	13-SEP-18
Molybdenum (Mo)-Total			98.6		%		80-120	13-SEP-18
Nickel (Ni)-Total			99.2		%		80-120	13-SEP-18
Phosphorus (P)-Total			96.1		%		80-120	13-SEP-18
Potassium (K)-Total			99.9		%		80-120	13-SEP-18
Rubidium (Rb)-Total			101.4		%		80-120	13-SEP-18
Selenium (Se)-Total			97.5		%		80-120	13-SEP-18
Silicon (Si)-Total			97.9		%		80-120	13-SEP-18
Silver (Ag)-Total			94.9		%		80-120	13-SEP-18
Sodium (Na)-Total			108.8		%		80-120	13-SEP-18
Strontium (Sr)-Total			92.4		%		80-120	13-SEP-18
Sulfur (S)-Total			89.6		%		80-120	13-SEP-18
Tellurium (Te)-Total			94.8		%		80-120	13-SEP-18
Thallium (Tl)-Total			97.5		%		80-120	13-SEP-18
Thorium (Th)-Total			96.6		%		80-120	13-SEP-18
Tin (Sn)-Total			97.1		%		80-120	13-SEP-18
Titanium (Ti)-Total			90.8		%		80-120	13-SEP-18
Tungsten (W)-Total			96.2		%		80-120	13-SEP-18
Uranium (U)-Total			100.8		%		80-120	13-SEP-18
Vanadium (V)-Total			100.5		%		80-120	13-SEP-18
Zinc (Zn)-Total			98.8		%		80-120	13-SEP-18
Zirconium (Zr)-Total			96.3		%		80-120	13-SEP-18
WG2875326-1 MB								
Aluminum (Al)-Total			<0.0030		mg/L		0.003	13-SEP-18
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Arsenic (As)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Barium (Ba)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	13-SEP-18
Boron (B)-Total			<0.010		mg/L		0.01	13-SEP-18
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	13-SEP-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-VA	**Water**							
Batch R4216446								
WG2875326-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	13-SEP-18
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	13-SEP-18
Chromium (Cr)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Copper (Cu)-Total			<0.00050		mg/L		0.0005	13-SEP-18
Iron (Fe)-Total			<0.010		mg/L		0.01	13-SEP-18
Lead (Pb)-Total			<0.000050		mg/L		0.00005	13-SEP-18
Lithium (Li)-Total			<0.0010		mg/L		0.001	13-SEP-18
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	13-SEP-18
Manganese (Mn)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	13-SEP-18
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	13-SEP-18
Phosphorus (P)-Total			<0.050		mg/L		0.05	13-SEP-18
Potassium (K)-Total			<0.050		mg/L		0.05	13-SEP-18
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	13-SEP-18
Selenium (Se)-Total			<0.000050		mg/L		0.00005	13-SEP-18
Silicon (Si)-Total			<0.10		mg/L		0.1	13-SEP-18
Silver (Ag)-Total			<0.000010		mg/L		0.00001	13-SEP-18
Sodium (Na)-Total			<0.050		mg/L		0.05	13-SEP-18
Strontium (Sr)-Total			<0.00020		mg/L		0.0002	13-SEP-18
Sulfur (S)-Total			<0.50		mg/L		0.5	13-SEP-18
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	13-SEP-18
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	13-SEP-18
Thorium (Th)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Tin (Sn)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	13-SEP-18
Tungsten (W)-Total			<0.00010		mg/L		0.0001	13-SEP-18
Uranium (U)-Total			<0.000010		mg/L		0.00001	13-SEP-18
Vanadium (V)-Total			<0.00050		mg/L		0.0005	13-SEP-18
Zinc (Zn)-Total			<0.0030		mg/L		0.003	13-SEP-18
Zirconium (Zr)-Total			<0.000060		mg/L		0.00006	13-SEP-18
NH3-F-VA	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-VA	**Water**							
Batch R4215720								
WG2875144-10 LCS								
Ammonia, Total (as N)			99.4		%		85-115	13-SEP-18
WG2875144-9 MB								
Ammonia, Total (as N)			<0.0050		mg/L		0.005	13-SEP-18
NO2-L-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Nitrite (as N)			100.2		%		90-110	13-SEP-18
WG2875186-1 MB								
Nitrite (as N)			<0.0010		mg/L		0.001	13-SEP-18
NO3-L-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Nitrate (as N)			101.8		%		90-110	13-SEP-18
WG2875186-1 MB								
Nitrate (as N)			<0.0050		mg/L		0.005	13-SEP-18
P-T-PRES-COL-VA	**Water**							
Batch R4215765								
WG2875574-6 CRM		**VA-ERA-PO4**						
Phosphorus (P)-Total			96.3		%		80-120	13-SEP-18
WG2875574-5 MB								
Phosphorus (P)-Total			<0.0020		mg/L		0.002	13-SEP-18
PH-PCT-VA	**Water**							
Batch R4216611								
WG2874998-2 CRM		**VA-PH7-BUF**						
pH			7.02		pH		6.9-7.1	14-SEP-18
SO4-IC-N-VA	**Water**							
Batch R4215509								
WG2875186-2 LCS								
Sulfate (SO4)			103.9		%		90-110	13-SEP-18
WG2875186-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-SEP-18
TDS-VA	**Water**							

Quality Control Report

Workorder: L2163155 Report Date: 19-SEP-18

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TDS-VA	**Water**							
Batch R4217531								
WG2877263-2 LCS								
Total Dissolved Solids			101.4		%		85-115	14-SEP-18
WG2877263-1 MB								
Total Dissolved Solids			<10		mg/L		10	14-SEP-18
TKN-F-VA	**Water**							
Batch R4218152								
WG2877254-10 LCS								
Total Kjeldahl Nitrogen			99.9		%		75-125	17-SEP-18
WG2877254-9 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	17-SEP-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Quality Control Report

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
pH by Meter (Automated)							
	1	10-SEP-18 11:15	14-SEP-18 17:14	0.25	102	hours	EHTR-FM

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.
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).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2163155 were received on 12-SEP-18 12:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes 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 pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2163155-COFC

COC Number: 17 - 668817

Page of

Report To	Contact and company name below will appear on the final report
Company:	Regional District of Kitimat-Stikine
Contact:	CHRIS KERR
Phone:	250-615-6100
	Company address below will appear on the final report
Street:	Suite 300 4545 LAZELLE AVE
City/Province:	TERRACE B.C.
Postal Code:	V8G-4E1
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☑ YES ☐ NO
Company:	Reg Dist of Kitimat-Stikine
Contact:	CHRIS KERR

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	CKerr@rdks.bc.ca
Email 2	mHaley@rdks.bc.ca
Email 3	rtooms@rdks.bc.ca
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	CKerr@rdks.bc.ca
Email 2	MHaley@rdks.bc.ca

Project Information	
ALS Account # / Quote #:	
Job #:	THORNHILL TRANSFER ST.
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:

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 [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	C.O.C.	Dissolved Metals	Total Alkalinity	Dissolved Hardness (CaCO3)	Ammonia	Chloride	Fluoride	Conductivity	Nitrate/Nitrite	TKN	Total phosphorus	pH	Total Dissolved Solids	Sulphate	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	BH 96-2 (E231889)	10/9/18	11:15	WATER	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			

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	
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		
9.8					5.8

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:
	Sept 10/18	1:45	Jennifer Boussoun	Sept. 10/18	1:40	HA	9/12	12:59

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 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 F

Historic Analytical Results

Table F-1: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location					Thornhill Landfill																					
Monitoring Well					BH96-3																					
Sample ID	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	15-Aug-00	8-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	1-Mar-03 FDA	1-Mar-03 FD	3-Aug-03	1-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																												
Conductivity	-	-	-	uS/cm	136	874	583	470	382	-	218	-	290	-	-	-	359	255	64	255	317	305	320	743	680	760	771	582	656
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	44.8	248	164	153	153	156	80	104	92	118	54	139	101	99	92	549	143	127	-	230	241	255	303	202	290
pH	-	-	-	-	6.54	6.48	6.26	7.38	6.92	-	-	-	6.41	6.58	7.97	6.58	6.62	6.41	7.34	6.40	6.60	6.44	7.20	6.95	6.20	6.63	6.5	6.59	7.2
Total Suspended Solids	-	-	-	mg/L	30	1,710	1,100	368	1,970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	337	-	136
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	0.82	24.8	9.73	6.45	3.99	1.8	1.9	-	1.7	1.4	0.03	1.5	1.1	1.4	1.24	0.94	1.00	1.10	0.77	4.60	5.80	6.97	7.17	5.81	3.89
Chloride (Cl)	1500	-	-	mg/L	2.3	71.2	35.4	19.3	16.1	11	8.1	7.5	6.8	15.2	0.9	7.7	6.3	4.7	4.7	0.7	9.4	9.6	8.9	55.6	63.3	43.8	35	24	24.4
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	-	-	-	-	-	-	<0.05	0.81	0.1	<0.05	<0.05	< 0.05	<0.05	0.17	<0.05	<0.05	-	4.1	0.06	<0.05	-	<0.05	-
Nitrate (as N)	400	**100**	10	mg/L	<0.005	0.021	0.009	0.045	<0.005	0.03	<0.05	<0.05	-	<0.05	0.25	<0.05	<0.05	< 0.05	<0.05	<0.05	<0.05	0.27	<0.02	<0.05	<0.05	<0.05	<0.002	<0.05	0.009
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	0.069	0.009	0.056	0.019	0.001	<0.034	<0.002	0.002	-	0.009	<0.002	0.28	0.008	0.003	<0.05	<0.05	0.006	0.027	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	0.009
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	16.4	1	3	11	8	7.8	8.8	19.8	16.3	3.1	8.8	16.5	13.5	15.1	14.9	4.2	5.9	10.9	9.1	1.4	1.1	2.5	26.7	10.3	15.8
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	-	-	-	58	-	13	<10	11	51	-	29	17	< 0.01	<0.01	19	30	28	<6	308	-	34	10	25	-
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	-	-	-	251	165	117	-	111	102	-	47	-	< 10	15	49	85	137	66	664	-	61	53	544	125
Dissolved Metals																												
Aluminum	-	**5**	9.5	mg/L	0.008	0.08	<0.005	<0.005	<0.005	0.11	0.01	0.007	0.11	0.006	0.078	0.006	0.11	0.008	0.019	0.008	0.013	0.016	0.0027	0.04	2.41	< 0.005	0.001	0.006	0.0004
Antimony	0.09	-	0.006	mg/L	-	*<0.2*	0.0003	0.0001	<0.0001	*<0.015*	<0.001	<0.001	<0.001	<0.001	-	<0.001	<.0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.0007	<0.001	< 0.001	< 0.001	0.000121	0.0003	0.000247
Arsenic	0.05	**0.025**	0.01	mg/L	0.0054	*<0.2*	0.0026	0.0021	0.001	*<0.04*	0.002	<0.001	0.012	0.003	-	0.001	0.005	< 0.001	0.001	0.001	<0.001	<0.001	**0.0302**	0.006	0.024	0.002	0.0015	0.003	0.0007
Barium	10	-	1	mg/L	0.02	0.23	0.12	0.1	0.08	0.062	0.033	0.033	0.68	0.036	0.016	0.031	0.033	0.028	0.026	0.4	0.038	0.032	0.0348	0.12	0.086	0.12	0.143	0.113	0.0965
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	<0.001	< 0.001	< 0.001	<0.00002	< 0.0002	<0.00002
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	< 0.001	<0.00002	< 0.0002	<0.00002
Boron	12	**5**	5	mg/L	<0.1	-	-	-	-	0.062	0.05	<0.05	0.13	<0.05	0.18	<0.05	0.07	< 0.05	<0.05	2.01	< 0.05	<0.05	-	<0.05	< 0.05	0.06	0.076	0.06	0.059
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	0.0004	< 0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00002	<0.0002	0.0028	< 0.0002	0.00002	0.00013	0.00027
Calcium	-	**1000**	-	mg/L	12.6	74.1	47.4	43.5	43.1	44	22.9	28	26.4	35.6	10.9	37.8	26.8	26.7	24.4	158	38.8	32.5	-	61.3	66	69.1	84.8	54.3	80.5
Chromium	0.01	**0.05**	0.05	mg/L	<0.001	*<0.01*	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	0.002	0.001	<0.001	<0.00002	<0.001	0.005	< 0.001	<0.0002	0.0004	0.0007
Cobalt	0.04	**1**	0.001	mg/L	<0.02	0.01	<0.01	<0.01	<0.01	<0.003	0.003	0.002	0.003	0.005	-	0.002	0.002	0.002	-	0.004	<0.001	0.001	0.00174	0.007	0.007	0.005	0.0048	0.0032	0.0047
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.001	<0.01	<0.001	0.002	<0.001	0.035	0.001	<0.001	0.003	0.002	-	<0.001	<0.001	< 0.001	<0.001	0.006	<0.001	<0.001	0.0025	<0.001	0.075	0.001	0.00046	0.0012	0.00245
Iron	-	-	6.5	mg/L	0.03	15	7.12	0.03	1.23	8.53	2.26	0.15	2.62	8.24	0.08	0.11	4.76	2.22	4.61	0.37	4.43	0.49	-	6.75	37.2	< 0.05	0.089	1.03	0.016
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.001	<0.01	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00014	<0.001	0.009	< 0.001	<0.00001	< 0.0002	<0.00001
Lithium	-	**5**	0.008	mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	0.002	0.001	0.002	0.00135	<0.001	-	0.002	0.00165	0.0016	0.00183
Magnesium	-	-	-	mg/L	3.24	15.4	11	10.8	11	11.3	5.52	8.29	6.43	7.13	6.43	10.7	8.28	7.8	7.56	37.4	11.3	11.00	-	18.60	18.40	20	22.2	16.2	21.0
Manganese	-	-	1.5	mg/L	1.65	13.5	0.61	8.39	7.64	6.88	3.05	2.89	2.7	5.0	0.015	2.66	2.61	2.77	2.13	3.4	3.8	2.74	3.04	10.3	10.4	9.13	12.4	8.6	8.1
Mercury	0.00025	**0.002**	0.001	mg/L	<0.00005	<0.00005	0.00004	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	-	<0.00002	<0.00002	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	<0.00002	< 0.00002	< *0.02*	0.00005	< *0.02*	<0.00005
Molybdenum	10	**0.05**	0.25	mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.004	<0.001	<0.001	0.002	<0.001	-	<0.001	<0.001	< 0.001	<0.001	0.0009	<0.001	0.0037	0.00637	0.0009	0.0013	0.0022	0.00071	0.0011	0.00053
Nickel	0.25 - 1.5	**1**	0.08	mg/L	<0.02	<0.02	0.02	<0.02	<0.05	0.014	0.004	0.002	0.004	0.006	-	0.004	0.002	0.003	0.007	0.008	0.013	0.009	0.00309	0.007	0.023	0.006	0.00532	0.0065	0.00465
Phosphorus	-	-	-	mg/L	-	-	-	-	-	-	-	-	0.11	<0.01	0.1	0.07	0.42	0.08	0.08	0.16	0.05	0.12	-	0.17	3.01	< 0.15	<0.1	0.05	<0.1
Potassium	-	-	-	mg/L	-	-	-	-	-	5.9	1.37	1.72	1.38	1.57	6.86	1.51	1.46	1.67	1.5	71	1.73	1.75	-	3.7	3.6	4.2	5.0	4.5	4.0
Selenium	0.02	**0.03**	0.01	mg/L	<0.0005	*<0.01*	<0.0005	<0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	0	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0002	<0.001	< 0.001	< 0.001	**0.3**	< 0.0002	0.0003
Silicon	-	-	-	mg/L	-	-	-	-	-	-	-	-	8.36	16.3	9.08	15.5	13.2	13.3	12.5	15	13.7	13.8	-	15.8	20.6	15.9	-	15.6	-
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.0001	<0.001	<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	<0.0001	< 0.0001	< 0.00025	<0.00002	< 0.00005	<0.00002
Sodium	-	-	200	mg/L	5	-	-	-	-	18.5	8.82	10	11.3	7.67	34.5	10.2	8.96	8.75	8.59	120	10.3	11.4	-	28.9	24.2	28.0	33.0	24.0	25.4
Strontium	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	0.19	0.026	0.13	0.2	0.17	0.17	0.15	1.05	0.18	0.17	0.213	0.44	0.41	0.44	0.481	0.366	0.368
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.003	-	-	mg/L	-	-	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	0.002	<0.001	<0.001	<0.001	<0.001	0.000002	<0.0001	< 0.0001	< 0.0001	0.000009	< 0.00002	0.000034
Tin	-	-	2.5	mg/L	-	-	-	-	-	-	-	-	<0.001	<0.001	-	<0.001	<0.001	0.0015	<0.0005	<0.0005	<0.0005	<0.0005	0.00004	<0.001	< 0.001	< 0.001	-	< 0.0002	-
Titanium	1	-	-	mg/L	-	-	<0.01	<0.01	<0.01	<0.003	<0.001	<0.001	0.002	<0.001	0.003	<0.001	0.002	< 0.001	<0.001	<0.001	<0.001	<0.001	-	0.001	0.046	< 0.001	<0.003	0.0006	<0.003
Uranium	0.085	**0.2**	0.02	mg/L	-	-	0.0011	0.00009	0.00004	-	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.0005	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000183	<0.0005	0.0006	0.0028	0.000644	0.0004	0.000569
Vanadium	-	**0.1**	0.02	mg/L	*<0.03*	-	*<0.03*	*<0.03*	*<0.03*	<0.003	<0.001	<0.001	0.002	<0.001	0.001	<0.001	<0.001	< 0.0005	<0.0005	0.004	<0.0005	<0.0005	0.00104	<0.001	0.012	< 0.001	0.00017	0.0003	0.00024
Zinc	0.075 - 2.4	**2**	3	mg/L	0.006	<0.005	<0.005	0.01	<0.005	0.026	0.007	0.007	0.35	0.005	-	0.007	<0.005	< 0.001	<0.001	<0.001	<0.001	0.011	0.0078	0.013	0.14	0.005	0.0048	0.011	0.0175
Zirconium	-	-	-	mg/L	-	-	-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	< 0.005	0.008	<0.01	<0.01	<0.01	-	<0.01	< 0.01	< 0.01	<0.005	< 0.002	<0.005

NOTES

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

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

Table F-1: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Monitoring Well Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	BH96-3 - 1-Jun-06 -	BH96-3 - 2-Jan-07 -	BH96-3 - 18-Jun-07 -	BH96-3 - 27-May-08 -	BH96-3 - 10-Oct-08 -	BH96-3 - 26-Aug-09 -	BH96-3 - 22-Feb-10 -	BH96-3 - 15-Jun-10 -	BH96-3 - 25-Oct-10 -	BH96-3 - 15-Feb-11 -	BH96-3 - 22-Feb-12 -	BH96-3 - 8-May-12 -	BH96-3 - 4-Jan-13 -	BH96-3 - 15-Apr-13 -	BH96-3 - 6-Jun-13 -	BH96-3 - 22-Oct-13 -	BH96-3 - 6-May-14 -	BH96-3 - 29-Oct-14 -	BH96-3 - 28-Mar-15 -	BH96-3 - 29-Aug-15 -	BH96-3 - 29-Nov-15 -
Conventional Parameters																										
Conductivity	-	-	-	uS/cm	500	547	451	528	880	815	617	734	840	686	574	475	609	572	539	675	862	774	592	767	644
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	153	174	154	195	390	367	288	246	327	277	194	187	230	226	220	269	373	295	249	503	254
pH	-	-	-	-	7.35	6.2	6.47	6.6	6.9	6.6	6.5	6.3	7.3	6.5	6.5	6.2	6.6	6.5	6.5	6.5	6.7	6.5	6.7	6.5	6.6
Total Suspended Solids	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	360	-	980	1,560	2,000	540	180	5500	22000
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	-	-	-	2.9	11.8	10.1	8.6	9.6	8.07	8	6.1	6.5	7.04	7.27	7.26	8.05	<0.03	11.1	-	7.62	0.66
Chloride (Cl)	1500	-	-	mg/L	16.4	17.9	14.9	42	69	53	39	41.3	35	28.7	19.7	16	18.5	12	13.6	16	37.4	33.9	22	80.8	99.4
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	<0.05	<0.05	0.06	<0.1	-	<0.1	<0.1	0.14	0.05	<0.1	<0.1	<0.1	ND	0.057	<0.1	<0.1	<0.1	<0.1	ND	<0.10	0.12
Nitrate (as N)	400	**100**	10	mg/L	<0.1	<0.05	<0.05	0.24	-	0.08	ND	<0.1	0.27	<0.1	<0.1	<0.1	ND	0.12	0.198	0.86	<0.02	0.022	0.54	0.28	0.06
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	<0.002	0.012	<0.002	0.016	0.005	0.08	ND	<0.01	0.026	<0.01	<0.01	<0.01	ND	0.083	0.016	<0.01	<0.01	ND	ND	<0.01	<0.01
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	12.8	17.8	12.4	8.1	13.0	8.8	9.3	11.2	21.0	16.3	5.5	13.4	31.1	27.9	33.0	26.9	36.3	ND	20.5	37	35
Biological Oxygen Demand (BOD)	-	-	-	mg/L	20	47	24.5	32	136	79	21	50	21	51	130	105	49	<4	50	46	220	130	9.9	<0.0001	380
Chemical Oxygen Demand (COD)	-	-	-	mg/L	284	351	4370	127	126	317	346	227	181	550	546	434	158	809	290	324	416	248	250	>1500	363
Dissolved Metals																										
Aluminum	-	**5**	9.5	mg/L	< 0.005	<0.005	0.013	<0.01	0.074	0.006	0.013	ND	0.012	0.008	0.006	0.007	<0.003	0.0068	<0.003	0.0053	<0.003	0.016	ND	<0.005	0.005
Antimony	0.09	-	0.006	mg/L	< 0.001	< 0.001	0.001	<0.0006	0.0003	ND	ND	ND	ND	<0.0005	<0.0005	0.00448	0.0023	0.000159	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	0.0011	0.0004
Arsenic	0.05	**0.025**	0.01	mg/L	0.002	0.003	**0.029**	0.002	0.0091	0.0039	0.0019	0.0011	0.001	0.0042	0.0027	0.00099	0.00173	0.00228	0.0159	0.0028	0.034	0.00864	0.0036	0.0045	0.0032
Barium	10	-	1	mg/L	0.1	0.12	0.12	0.103	0.253	0.355	0.193	0.226	0.237	0.202	0.194	0.128	0.141	0.0169	0.188	0.18	0.224	0.144	0.114	0.238	0.261
Beryllium	0.0015	**0.1**	0.008	mg/L	< 0.001	<0.001	<0.001	<0.0004	<0.00005	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	<0.0001
Bismuth	-	-	-	mg/L	< 0.001	<0.001	<0.001	-	0.00009	ND	ND	ND	ND	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	<0.0001
Boron	12	**5**	5	mg/L	0.08	0.1	0.09	0.066	<0.3	0.137	0.142	0.175	0.311	0.139	0.165	0.167	0.112	0.186	0.089	0.122	0.099	0.128	0.098	0.229	0.083
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	< 0.0002	<0.0002	<0.0002	0.00016	0.00005	0.00085	0.0003	0.00006	0.00113	0.00001	0.00016	0.000128	0.00008	0.000132	0.00001	0.000033	0.000015	0.000055	0.00003	0.0003	0.00024
Calcium	-	**1000**	-	mg/L	42.3	48.4	42.6	56.1	75.4	84.7	93.7	67.9	95.9	77.8	54.3	46.3	65.8	12.3	56.4	80.9	88.9	81.5	68	85	80
Chromium	0.01	**0.05**	0.05	mg/L	< 0.001	<0.001	0.001	<0.001	<0.0005	ND	ND	ND	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	<0.0005
Cobalt	0.04	**1**	0.001	mg/L	0.005	0.003	0.006	0.0019	0.00388	0.0036	0.0041	0.0033	0.0032	<0.0005	<0.0005	<0.0005	0.0078	0.000048	0.00285	0.00919	0.00994	0.00218	0.00079	0.00898	0.00539
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	< 0.001	0.001	0.004	0.0859	0.0037	0.149	0.0679	0.008	0.0557	0.0015	0.0017	0.0285	0.00494	0.00028	0.00025	0.00105	0.00062	0.00352	0.0005	0.0009	0.003
Iron	-	-	6.5	mg/L	< 0.05	0.55	0.11	0.25	12.2	6.11	3.33	0.026	0.066	13.6	6.02	0.287	3.5	<0.005	14.7	6.25	17.6	12.5	9.95	0.475	0.073
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	< 0.001	<0.001	<0.001	0.0002	0.00056	0.0002	0.0004	ND	0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00055	ND	<0.0001	0.0002
Lithium	-	**5**	0.008	mg/L	< 0.001	<0.001	<0.005	0.0009	<0.003	ND	ND	ND	ND	<0.005	<0.005	0.0052	<0.005	0.00156	<0.005	<0.005	<0.005	<0.005	0.0012	0.0014	0.0008
Magnesium	-	-	-	mg/L	11.6	12.9	11.6	11.4	19.9	21.1	23.1	16.8	22.1	20.0	13.3	11.8	16.7	10.5	15.1	19.8	26.1	21.8	16.8	19.7	13.2
Manganese	-	-	1.5	mg/L	7.8	9.0	7.6	7.4	14.9	14.1	14.5	12.9	16.6	13.5	11.4	7.9	11.4	0.025	9.7	13.8	15.7	12.2	9.1	16.4	5.79
Mercury	0.00025	**0.002**	0.001	mg/L	*< 0.02*	<0.00002	<0.00002	<0.00006	-	ND	0.00012	ND	ND	<0.00001	<0.00001	<0.00001	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	<0.00002
Molybdenum	10	**0.05**	0.25	mg/L	< 0.0005	0.0008	0.0037	0.0007	0.0014	0.001	ND	ND	ND	<0.001	<0.001	0.0011	<0.001	0.00591	0.0018	0.0021	0.0021	<0.001	0.0005	0.0028	0.0011
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.004	0.002	0.005	0.004	0.0081	0.005	0.005	0.003	0.008	0.004	0.005	0.003	0.006	0.00066	0.005	0.0067	0.0067	0.0075	0.0026	0.0094	0.0049
Phosphorus	-	-	-	mg/L	< 0.15	<0.15	<0.15	-	0.436	-	-	-	-	0.022	0.013	0.012	0.036	0.059	<0.01	0.024	0.632	0.076	ND	<0.02	<0.02
Potassium	-	-	-	mg/L	4.0	4.3	4.3	-	6.8	7.1	6.9	6.6	8.6	6.1	4.7	4.2	5.2	9.9	4.9	6.9	5.8	6.0	4.27	8.28	7.13
Selenium	0.02	**0.03**	0.01	mg/L	< 0.001	<0.001	<0.001	-	<0.0002	ND	0.0002	ND	0.0002	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	0.00013	0.00014	ND	<0.0005	<0.0005
Silicon	-	-	-	mg/L	4.9	5.2	5.1	-	6.2	6.8	7.5	5.8	8.4	8.1	6.5	5.8	7.3	3.8	7.2	8.6	9.8	8.5	8.7	8	5.4
Silver	0.0005 - 0.015	-	0.02	mg/L	< 0.00025	<0.00025	<0.00025	0.00008	<0.00003	ND	ND	ND	ND	<0.000005	<0.000005	<0.000005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00006	<0.00005	<0.00005
Sodium	-	-	200	mg/L	17.6	17.8	16.0	14.1	42.1	32.7	29.1	25.1	34.4	26.2	18.3	16.4	19.8	54.5	18.7	23.5	26.2	26.8	19.5	20.7	14.8
Strontium	-	-	2.5	mg/L	0.32	0.34	0.32	-	0.54	0.566	0.534	0.508	0.575	0.513	0.4	0.357	0.452	0.149	0.419	0.517	0.572	0.585	0.424	0.596	0.576
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.4	ND	4	3	11
Thallium	0.003	-	-	mg/L	< 0.0001	<0.0001	<0.0001	0.0001	<0.00001	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005	<0.00005	0.000003	<0.005	<0.005	<0.005	<0.005	ND	<0.00002	<0.00002
Tin	-	-	2.5	mg/L	< 0.001	<0.001	<0.001	-	0.00013	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0001	<0.0002
Titanium	1	-	-	mg/L	< 0.001	<0.001	<0.001	<0.02	0.008	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	<0.005
Uranium	0.085	**0.2**	0.02	mg/L	< 0.0005	<0.0005	0.0007	0.0003	0.0008	0.0008	0.0005	0.0005	0.0004	0.0005	0.0004	0.00034	0.00079	0.00244	0.00072	0.0012	0.00117	0.00023	0.00015	<0.005	0.00015
Vanadium	-	**0.1**	0.02	mg/L	< 0.001	<0.001	<0.001	<0.002	0.001	ND	ND	ND	ND	<0.005	ND	ND	<0.005	0.00074	<0.005	<0.005	<0.005	<0.005	ND	0.00141	<0.001
Zinc	0.075 - 2.4	**2**	3	mg/L	0.01	0.006	0.011	0.03	0.0046	0.091	0.075	0.021	0.476	0.011	0.028	0.0171	0.016	0.0016	0.0104	0.0141	0.0067	0.0095	0.007	<0.001	0.063
Zirconium	-	-	-	mg/L	< 0.01	<0.01	<0.01	-	-	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	0.055	<0.0001

NOTES

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

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

Table F-2: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3
Monitoring Well								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample ID								1-Oct-96	1-Jun-97	4-Dec-97	4-May-98	24-Sep-98	27-Jan-99	1-Apr-99	1-Nov-99	17-Mar-00	15-Aug-00	15-Aug-00	8-Dec-00	7-May-01	1-Dec-01	1-Apr-02	1-Jun-02	1-Jan-03	FDA	1-Mar-03	FD
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																											
Conductivity	-		-		-		uS/cm	136	874	583	470	382	-	218	-	290	-	-	-	359	255	64	255	317	305	320
Hardness (Total as CaCO3)	-		-		-		mg/L	44.8	248	164	153	153	156	80	104	92	118	54	139	101	99	92	549	143	127	-
pH	6.5-9.0		-		6.5 - 8.5		-	6.54	6.48	6.26	7.38	6.92	-	-	-	6.41	6.58	7.97	6.58	6.62	6.41	7.34	6.4	6.6	6.44	7.2	
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	**30**	**1710**	**1100**	**368**	**1970**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, (as N)	1.13 - 1.85	pH/T*	5.86 - 25.5	pH/T*	-		mg/L	0.82	24.8	9.73	6.45	3.99	1.8	1.9	-	1.7	1.4	0.03	1.5	1.1	1.4	1.24	0.94	1	1.1	0.765
Chloride (Cl)	150		600		<250	AO	mg/L	2.3	71.2	35.4	19.3	16.1	11	8.1	7.5	6.8	15.2	0.9	7.7	6.3	4.7	4.7	0.7	9.4	9.6	8.9
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	-	-	-	-	-	-	-	-	<0.05	**0.81**	0.1	<0.05	<0.05	< 0.05	<0.05	0.17	<0.05	<0.05	-	
Nitrate (as N)	3		32.8		10		mg/L	<0.005	0.021	0.009	0.045	<0.005	0.03	<0.05	<0.05	-	<0.05	0.25	<0.05	<0.05	< 0.05	<0.05	<0.05	<0.05	0.27	<0.02	
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	0.069	0.009	0.056	0.019	0.001	<0.034	<0.002	0.002	-	0.009	<0.002	0.28	0.008	0.003	<0.05	<0.05	0.006	0.027	0.006	
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	16.4	1	3	11	8	7.8	8.8	19.8	16.3	3.1	8.8	16.5	13.5	15.1	14.9	4.2	5.9	10.9	9.1	
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	-	-	-	58	-	13	<10	11	51	-	29	17	< 0.01	<0.01	19	30	28	<6	
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	-	-	-	251	165	117	-	111	102	-	47	-	< 10	15	49	85	137	66	
Dissolved Metals																											
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.008	0.08	<0.005	<0.005	<0.005	**0.11**	0.01	0.007	**0.11**	0.006	0.078	0.006	**0.11**	0.008	0.019	0.008	0.013	0.016	0.0027	
Antimony	0.009		-		-		mg/L	-	*<0.2*	0.0003	0.0001	<0.0001	*<0.015*	<0.001	<0.001	<0.001	<0.001	-	<0.001	<.0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000699	
Arsenic	0.005		-		0.01		mg/L	0.0054	*<0.2*	0.0026	0.0021	0.001	*<0.04*	0.002	<0.001	0.012	0.003	-	0.001	0.005	< 0.001	0.001	0.001	<0.001	<0.001	**0.0302**	
Barium	1		-		-		mg/L	0.02	0.23	0.12	0.1	0.08	0.062	0.033	0.033	0.68	0.036	0.016	0.031	0.033	0.028	0.026	0.4	0.038	0.032	0.0348	
Beryllium	0.00013		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	<0.00002	
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	1.2		-		5		mg/L	<0.1	-	-	-	-	0.062	0.05	<0.05	0.13	<0.05	0.18	<0.05	0.07	< 0.05	<0.05	2.01	< 0.05	<0.05	-	
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	<0.0002	<0.002	<0.0002	<0.0002	<0.0002	<0.0001	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	0.0004	< 0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00002	
Calcium	-		-		-		mg/L	12.6	74.1	47.4	43.5	43.1	44	22.9	28	26.4	35.6	10.9	37.8	26.8	26.7	24.4	158	38.8	32.5	-	
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.001	*<0.01*	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	0.002	0.001	<0.001	<0.00002	
Cobalt	0.004		0.11		-		mg/L	<0.02	0.01	<0.01	<0.01	<0.01	<0.003	0.003	0.002	0.003	0.005	-	0.002	0.002	0.002	-	0.004	<0.001	0.001	0.00174	
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.001	<0.01	<0.001	0.002	<0.001	0.035	0.001	<0.001	0.003	0.002	-	<0.001	<0.001	< 0.001	<0.001	0.006	<0.001	<0.001	0.0025	
Iron	-		0.35		<0.3	AO	mg/L	0.03	**15**	**7.12**	0.03	**1.23**	**8.53**	**2.26**	0.15	**2.62**	**8.24**	0.08	0.11	**4.76**	**2.22**	**4.61**	**0.37**	**4.43**	**0.49**	-	
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	<0.001	<0.01	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	< 0.001	<0.001	<0.001	<0.001	<0.001	0.00014	
Lithium	-		-		-		mg/L	<0.02	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	0.002	0.001	0.002	0.00135	
Magnesium	-		-		-		mg/L	3.24	15.4	11	10.8	11	11.3	5.52	8.29	6.43	7.13	6.43	10.7	8.28	7.8	7.56	37.4	11.3	11	-	
Manganese	0.8 - 3.02	H	1.03 - 6.59	H	<0.05	AO	mg/L	**1.65**	**13.5**	0.61	**8.39**	**7.64**	**6.88**	**3.05**	**2.89**	**2.7**	**5**	0.015	**2.66**	**2.61**	**2.77**	**2.13**	3.4	**3.8**	**2.74**	3.04	
Mercury	0.0001		-		0.001		mg/L	<0.00005	<0.00005	0.00004	<0.00001	<0.00001	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	-	<0.00002	<0.00002	< 0.00002	<0.00002	<0.00002	<0.00002	<0.00002	-	
Molybdenum	2		-		0.25		mg/L	<0.03	<0.03	<0.03	<0.03	<0.03	<0.004	<0.001	<0.001	0.002	<0.001	-	<0.001	<0.001	< 0.001	<0.001	0.0009	<0.001	0.0037	0.00637	
Nickel	0.025-0.15		-		-		mg/L	<0.02	<0.02	0.02	<0.02	<0.05	0.014	0.004	0.002	0.004	0.006	-	0.004	0.002	0.003	0.007	0.008	0.013	0.009	0.00309	
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	-	-	-	-	-	-	0.11	<0.01	0.1	0.07	0.42	0.08	0.08	0.16	0.05	0.12	-	
Potassium	-		-		-		mg/L	-	-	-	-	-	5.9	1.37	1.72	1.38	1.57	6.86	1.51	1.46	1.67	1.5	71	1.73	1.75	-	
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005	*<0.01*	<0.0005	<0.0005	<0.0005	<0.001	<0.002	<0.002	<0.002	<0.002	#VALUE!	<0.002	<0.002	< 0.002	<0.002	<0.002	<0.002	<0.002	<0.0002	
Silicon	-		-		-		mg/L	-	-	-	-	-	-	-	-	8.36	16.3	9.08	15.5	13.2	13.3	12.5	15	13.7	13.8	-	
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.0001	<0.001	<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	
Sodium	-		-		<200	AO	mg/L	5	-	-	-	-	18.5	8.82	10	11.3	7.67	34.5	10.2	8.96	8.75	8.59	120	10.3	11.4	-	
Strontium	-		-		-		mg/L	-	-	-	-	-	-	-	-	0.19	0.026	0.13	0.2	0.17	0.17	0.15	1.05	0.18	0.17	0.213	
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	0.0008		-		-		mg/L	-	-	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.000002	
Tin	-		-		-		mg/L	-	-	-	-	-	-	-	-	<0.001	<0.001	-	<0.001	<0.001	0.0015	<0.0005	<0.0005	<0.0005	<0.0005	0.00004	
Titanium	-		-		-		mg/L	-	-	<0.01	<0.01	<0.01	<0.003	<0.001	<0.001	0.002	<0.001	0.003	<0.001	0.002	< 0.001	<0.001	<0.001	<0.001	<0.001	-	
Uranium	0.0085		-		-		mg/L	-	-	0.0011	0.00009	0.00004	-	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.0005	< 0.001	<0.001	<0.001	<0.001	<0.001	0.000183	
Vanadium	-		-		-		mg/L	*<0.03*	-	*<0.03*	*<0.03*	*<0.03*	<0.003	<0.001	<0.001	0.002	<0.001	0.001	<0.001	<0.001	< 0.0005	<0.0005	0.004	<0.0005	<0.0005	0.00104	
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653		<5.0	AO	mg/L	0.006	<0.005	<0.005	0.01	<0.005	0.026	0.007	0.007	**0.35**	0.005	-	0.007	<0.005	< 0.001	<0.001	<0.001	<0.001	0.011	0.0078	
Zirconium	-		-		-		mg/L	-	-	-	-	-	-	-	-	<0.01	<0.01	-	<0.01	<0.01	< 0.005	0.008	<0.01	<0.01	<0.01	-	

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-2: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill															
Monitoring Well								BH96-3															
Sample ID								BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3	BH96-3
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								3-Aug-03	1-Dec-03	14-May-04	18-Oct-04	1-Jun-05	1-Nov-05	1-Jun-06	2-Jan-07	18-Jun-07	27-May-08	10-Oct-08	26-Aug-09	22-Feb-10	15-Jun-10	25-Oct-10	15-Feb-11	22-Feb-12	8-May-12
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																							
Conductivity	-		-		-		uS/cm	743	680	760	771	582	656	500	547	451	528	880	815	617	734	840	686	574	475
Hardness (Total as CaCO3)	-		-		-		mg/L	230	241	255	303	202	290	153	174	154	195	390	367	288	246	327	277	194	187
pH	6.5-9.0		-		6.5 - 8.5		-	6.95	6.2	6.63	6.5	6.59	7.2	7.35	6.2	6.47	6.6	6.9	6.6	6.5	6.3	7.3	6.5	6.5	6.2
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	-	-	-	337	-	136	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, (as N)	1.13 - 1.85	pH/T*	5.86 - 25.5	pH/T*	-		mg/L	4.6	5.8	6.97	7.17	5.81	3.89	-	-	-	2.9	11.8	10.1	8.6	9.6	8.07	8	6.1	6.5
Chloride (Cl)	150		600		<250	AO	mg/L	55.6	63.3	43.8	35	24	24.4	16.4	17.9	14.9	42	69	53	39	41.3	35	28.7	19.7	16
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	4.1	0.06	<0.05	-	<0.05	-	<0.05	<0.05	0.06	<0.1	-	<0.1	<0.1	0.14	0.05	<0.1	<0.1	<0.1
Nitrate (as N)	3		32.8		10		mg/L	<0.05	<0.05	<0.05	<0.002	<0.05	0.009	<0.1	<0.05	<0.05	0.24	-	0.08	ND	<0.1	0.27	<0.1	<0.1	<0.1
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	0.009	<0.002	0.012	<0.002	0.016	0.005	0.08	ND	<0.01	0.026	<0.01	<0.01	<0.01
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	1.4	1.1	2.5	26.7	10.3	15.8	12.8	17.8	12.4	8.1	13	8.8	9.3	11.2	21	16.3	5.52	13.4
Biological Oxygen Demand (BOD)	-		-		-		mg/L	308	-	34	10	25	-	20	47	24.5	32	136	79	21	50	21	51	130	105
Chemical Oxygen Demand (COD)	-		-		-		mg/L	664	-	61	53	544	125	284	351	4370	127	126	317	346	227	181	550	546	434
Dissolved Metals																							
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	0.04	2.41	< 0.005	0.001	0.006	0.0004	< 0.005	<0.005	0.013	<0.01	0.074	0.006	0.013	ND	0.012	0.008	0.006	0.007
Antimony	0.009		-		-		mg/L	<0.001	< 0.001	< 0.001	0.000121	0.0003	0.000247	< 0.001	< 0.001	0.001	<0.0006	0.0003	ND	ND	ND	ND	<0.0005	<0.0005	0.00448
Arsenic	0.005		-		0.01		mg/L	0.006	0.024	0.002	0.0015	0.003	0.0007	0.002	0.003	0.029	0.002	0.0091	0.0039	0.0019	0.0011	0.001	0.0042	0.0027	0.00099
Barium	1		-		-		mg/L	0.12	0.086	0.12	0.143	0.113	0.0965	0.1	0.12	0.12	0.103	0.253	0.355	0.193	0.226	0.237	0.202	0.194	0.128
Beryllium	0.00013		-		-		mg/L	<0.001	< 0.001	< 0.001	<0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	<0.0004	<0.00005	ND	ND	ND	ND	<0.0001	<0.0001	<0.0001
Bismuth	-		-		-		mg/L	<0.001	-	< 0.001	<0.00002	< 0.0002	<0.00002	< 0.001	<0.001	<0.001	-	0.00009	ND	ND	ND	ND	<0.001	<0.001	<0.001
Boron	1.2		-		5		mg/L	<0.05	< 0.05	0.06	0.076	0.06	0.059	0.08	0.1	0.09	0.066	<0.3	0.137	0.142	0.175	0.311	0.139	0.165	0.167
Cadmium	0.00013 - 0.00026	H	0.00031 - 0.00079	H	0.005		mg/L	<0.0002	0.0028	< 0.0002	0.00002	0.00013	0.00027	< 0.0002	<0.0002	<0.0002	0.00016	0.00005	0.00085	0.0003	0.00006	0.00113	0.00001	0.00016	0.000128
Calcium	-		-		-		mg/L	61.3	66	69.1	84.8	54.3	80.5	42.3	48.4	42.6	56.1	75.4	84.7	93.7	67.9	95.9	77.8	54.3	46.3
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.001	0.005	< 0.001	<0.0002	0.0004	0.0007	< 0.001	<0.001	0.001	<0.001	<0.0005	ND	ND	ND	0.002	<0.001	<0.001	<0.001
Cobalt	0.004		0.11		-		mg/L	0.007	0.007	0.005	0.00478	0.0032	0.0047	0.005	0.003	0.006	0.0019	0.00388	0.0036	0.0041	0.0033	0.0032	<0.0005	<0.0005	<0.0005
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	<0.001	0.075	0.001	0.00046	0.0012	0.00245	< 0.001	0.001	0.004	0.0859	0.0037	0.149	0.0679	0.008	0.0557	0.0015	0.0017	0.0285
Iron	-		0.35		<0.3	AO	mg/L	6.75	37.2	< 0.05	0.089	1.03	0.016	< 0.05	0.55	0.11	0.25	12.2	6.11	3.33	0.026	0.066	13.6	6.02	0.287
Lead	0.0048 - 0.0079	H	0.0373 - 0.1174	H	0.01		mg/L	<0.001	0.009	< 0.001	<0.00001	< 0.0002	<0.00001	< 0.001	<0.001	<0.001	0.0002	0.00056	0.0002	0.0004	ND	0.001	<0.0002	<0.0002	<0.0002
Lithium	-		-		-		mg/L	<0.001	-	0.002	0.00165	0.0016	0.00183	< 0.001	<0.001	<0.005	0.0009	<0.003	ND	ND	ND	ND	<0.005	<0.005	0.0052
Magnesium	-		-		-		mg/L	18.6	18.4	20	22.2	16.2	21	11.6	12.9	11.6	11.4	19.9	21.1	23.1	16.8	22.1	20	13.3	11.8
Manganese	0.8 - 3.02	H	1.03 - 6.59	H	<0.05	AO	mg/L	10.3	10.4	9.13	12.4	8.64	8.07	7.78	8.97	7.6	7.39	14.9	14.1	14.5	12.9	16.6	13.5	11.4	7.91
Mercury	0.0001		-		0.001		mg/L	<0.00002	< 0.00002	< 0.02	0.00005	< 0.02	<0.00005	< 0.02	<0.00002	<0.00002	<0.00006	-	ND	0.00012	ND	ND	<0.00001	<0.00001	<0.00001
Molybdenum	2		-		0.25		mg/L	0.0009	0.0013	0.0022	0.00071	0.0011	0.00053	< 0.0005	0.0008	0.0037	0.0007	0.0014	0.001	ND	ND	ND	<0.001	<0.001	0.0011
Nickel	0.025-0.15		-		-		mg/L	0.007	0.023	0.006	0.00532	0.0065	0.00465	0.004	0.002	0.005	0.004	0.0081	0.005	0.005	0.003	0.008	0.004	0.005	0.003
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	0.17	3.01	< 0.15	<0.1	0.05	<0.1	< 0.15	<0.15	<0.15	-	0.436	-	-	-	-	0.022	0.013	0.012
Potassium	-		-		-		mg/L	3.7	3.62	4.2	5	4.49	4	4	4.3	4.3	-	6.83	7.13	6.86	6.63	8.64	6.08	4.7	4.17
Selenium	0.002		-		0.01	MAC	mg/L	<0.001	< 0.001	< 0.001	0.3	< 0.0002	0.0003	< 0.001	<0.001	<0.001	-	<0.0002	ND	0.0002	ND	0.0002	0.0001	<0.0001	<0.0001
Silicon	-		-		-		mg/L	15.8	20.6	15.9	-	15.6	-	4.9	5.2	5.1	-	6.22	6.75	7.5	5.8	8.42	8.08	6.48	5.77
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.0001	< 0.0001	< 0.00025	<0.00002	< 0.00005	<0.00002	< 0.00025	<0.00025	<0.00025	0.00008	<0.00003	ND	ND	ND	ND	<0.000005	<0.000005	<0.000005
Sodium	-		-		<200	AO	mg/L	28.9	24.2	28	33	24	25.4	17.6	17.8	16	14.1	42.1	32.7	29.1	25.1	34.4	26.2	18.3	16.4
Strontium	-		-		-		mg/L	0.44	0.41	0.44	0.481	0.366	0.368	0.32	0.34	0.32	-	0.54	0.566	0.534	0.508	0.575	0.513	0.4	0.357
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	0.0008		-		-		mg/L	<0.0001	< 0.0001	< 0.0001	0.000009	< 0.00002	0.000034	< 0.0001	<0.0001	<0.0001	0.0001	<0.00001	ND	ND	ND	ND	<0.00005	<0.00005	<0.00005
Tin	-		-		-		mg/L	<0.001	< 0.001	< 0.001	-	< 0.0002	-	< 0.001	<0.001	<0.001	-	0.00013	ND	ND	ND	ND	<0.005	<0.005	<0.005
Titanium	-		-		-		mg/L	0.001	0.046	< 0.001	<0.003	0.0006	<0.003	< 0.001	<0.001	<0.001	<0.02	0.008	ND	ND	ND	ND	<0.005	<0.005	<0.005
Uranium	0.0085		-		-		mg/L	<0.0005	0.0006	0.0028	0.000644	0.0004	0.000569	< 0.0005	<0.0005	0.0007	0.0003	0.0008	0.0008	0.0005	0.0005	0.0004	0.0005	0.0004	0.00034
Vanadium	-		-		-		mg/L	<0.001	0.012	< 0.001	0.00017	0.0003	0.00024	< 0.001	<0.001	<0.001	<0.002	0.001	ND	ND	ND	ND	<0.005	ND	ND
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653		<5.0	AO	mg/L	0.013	0.14	0.005	0.0048	0.011	0.0175	0.01	0.006	0.011	0.03	0.0046	0.091	0.075	0.021	0.476	0.011	0.028	0.0171
Zirconium	-		-		-		mg/L	<0.01	< 0.01	< 0.01	<0.005	< 0.002	<0.005	< 0.01	<0.01	<0.01	-	-	ND	ND	ND	ND	<0.0005	<0.0005	<0.0005

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
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H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-2: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Monitoring Well Sample ID Laboratory ID Sample Date QAQC	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	BH96-3 - 4-Jan-13 -	BH96-3 - 15-Apr-13 -	BH96-3 - 6-Jun-13 -	BH96-3 - 22-Oct-13 -	BH96-3 - 6-May-14 -	BH96-3 - 29-Oct-14 -	BH96-3 - 28-Mar-15 -	BH96-3 - 29-Aug-15 -	BH96-3 - 29-Nov-15 -
Conventional Parameters																
Conductivity	-		-		-		uS/cm	609	572	539	675	862	774	592	767	644
Hardness (Total as CaCO3)	-		-		-		mg/L	230	226	220	269	373	295	249	503	254
pH	6.5-9.0		-		6.5 - 8.5		-	6.6	6.5	6.5	6.5	6.7	6.5	6.7	6.5	6.6
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/l)) (i)**		-		mg/L	**360**	-	**980**	**1560**	**2000**	**540**	**180**	**5500**	**22000**
Ammonia, (as N)	1.13 - 1.85	pH/T*	**5.86 - 25.5**	pH/T*	-		mg/L	7.04	7.27	7.26	8.05	<0.03	11.1	-	7.62	0.66
Chloride (Cl)	150		**600**		<250	AO	mg/L	18.5	12	13.6	16	37.4	33.9	22	80.8	99.4
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	ND	0.057	<0.1	<0.1	<0.1	<0.1	ND	<0.10	0.12
Nitrate (as N)	3		**32.8**		10		mg/L	ND	0.12	0.198	0.86	<0.02	0.022	0.54	0.28	0.06
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	ND	0.083	0.016	<0.01	<0.01	ND	ND	<0.01	<0.01
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	31.1	27.9	33	26.9	36.3	ND	20.5	37	35
Biological Oxygen Demand (BOD)	-		-		-		mg/L	49	<4	50	46	220	130	9.9	<0.0001	380
Chemical Oxygen Demand (COD)	-		-		-		mg/L	158	809	290	324	416	248	250	>1500	363
Dissolved Metals																
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	<0.003	0.0068	<0.003	0.0053	<0.003	0.016	ND	<0.005	0.005
Antimony	0.009		-		-		mg/L	0.0023	0.000159	<0.0005	<0.0005	<0.0005	<0.0005	0.0001	0.0011	0.0004
Arsenic	0.005		-		0.01		mg/L	0.00173	0.00228	0.0159	0.0028	0.034	0.00864	0.0036	0.0045	0.0032
Barium	1		-		-		mg/L	0.141	0.0169	0.188	0.18	0.224	0.144	0.114	0.238	0.261
Beryllium	0.00013		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	ND	<0.0001	<0.0001
Bismuth	-		-		-		mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0001	<0.0001
Boron	1.2		-		5		mg/L	0.112	0.186	0.089	0.122	0.099	0.128	0.098	0.229	0.083
Cadmium	0.00013 - 0.00026	H	**0.00031 - 0.00079**	H	0.005		mg/L	0.00008	0.000132	0.00001	0.000033	0.000015	0.000055	0.00003	0.0003	0.00024
Calcium	-		-		-		mg/L	65.8	12.3	56.4	80.9	88.9	81.5	67.8	84.9	80.1
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	ND	<0.0005	<0.0005
Cobalt	0.004		**0.11**		-		mg/L	0.0078	0.000048	0.00285	0.00919	0.00994	0.00218	0.00079	0.00898	0.00539
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	0.00494	0.00028	0.00025	0.00105	0.00062	0.00352	0.0005	0.0009	0.003
Iron	-		**0.35**		<0.3	AO	mg/L	**3.5**	<0.005	**14.7**	**6.25**	**17.6**	**12.5**	**9.95**	**0.475**	0.073
Lead	0.0048 - 0.0079	H	**0.0373 - 0.1174**	H	0.01		mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00055	ND	<0.0001	0.0002
Lithium	-		-		-		mg/L	<0.005	0.00156	<0.005	<0.005	<0.005	<0.005	0.0012	0.0014	0.0008
Magnesium	-		-		-		mg/L	16.7	10.5	15.1	19.8	26.1	21.8	16.8	19.7	13.2
Manganese	0.8 - 3.02	H	**1.03 - 6.59**	H	<0.05	AO	mg/L	**11.4**	0.0246	**9.74**	**13.8**	**15.7**	**12.2**	**9.1**	**16.4**	**5.79**
Mercury	0.0001		-		0.001		mg/L	0.000013	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	ND	<0.00002	<0.00002
Molybdenum	2		-		0.25		mg/L	<0.001	0.00591	0.0018	0.0021	0.0021	<0.001	0.0005	0.0028	0.0011
Nickel	0.025-0.15		-		-		mg/L	0.006	0.00066	0.005	0.0067	0.0067	0.0075	0.0026	0.0094	0.0049
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	0.036	0.059	<0.01	0.024	0.632	0.076	ND	*<0.02*	*<0.02*
Potassium	-		-		-		mg/L	5.18	9.88	4.93	6.89	5.8	5.98	4.27	8.28	7.13
Selenium	0.002		-		0.01	MAC	mg/L	<0.0001	<0.0001	0.00011	<0.0001	0.00013	0.00014	ND	<0.0005	<0.0005
Silicon	-		-		-		mg/L	7.32	3.79	7.16	8.57	9.77	8.46	8.7	8	5.4
Silver	0.00005, 0.0015	H	**0.0001, 0.003**	H	-		mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00006	<0.00005	<0.00005
Sodium	-		-		<200	AO	mg/L	19.8	54.5	18.7	23.5	26.2	26.8	19.5	20.7	14.8
Strontium	-		-		-		mg/L	0.452	0.149	0.419	0.517	0.572	0.585	0.424	0.596	0.576
Sulfur	-		-		-		mg/L	-	-	-	-	8.4	ND	4	3	11
Thallium	0.0008		-		-		mg/L	<0.00005	0.000003	<0.005	<0.005	<0.005	<0.005	ND	<0.00002	<0.00002
Tin	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0001	<0.0002
Titanium	-		-		-		mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	ND	<0.0002	<0.005
Uranium	0.0085		-		-		mg/L	0.00079	0.00244	0.00072	0.0012	0.00117	0.00023	0.00015	<0.005	0.00015
Vanadium	-		-		-		mg/L	<0.005	0.00074	<0.005	<0.005	<0.005	<0.005	ND	0.00141	<0.001
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**		<5.0	AO	mg/L	0.016	0.0016	0.0104	0.0141	0.0067	0.0095	0.007	<0.001	0.063
Zirconium	-		-		-		mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	ND	0.055	<0.0001

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-3: Historic Groundwater Analytical Results
2018 Thornhill Trasnfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location					Thornhill Landfill												
Monitoring Well					Goodwin Well												
Sample ID	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Jun-96	1-May-98	15-Aug-00	1-Dec-01	1-Dec-03	27-May-08	26-Aug-09	15-Jun-10	25-Oct-10	24-Nov-10	24-May-12	25-Jul-16	24-Aug-17
QAQC					-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																	
Conductivity	-	-	-	uS/cm	-	475	-	427	413	415	439	-	-	466	-	449	447
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	-	51.1	37	49	44	39.6	70.9	-	-	59	-	70.5	65.4
pH	-	-	-	-	-	8.06	8.3	8.22	8.15	8.9	8.2	-	-	8.4	-	8.3	8.4
Total Suspended Solids	-	-	-	mg/L	7	34	-	-	-	-	-	-	-	-	-	<1.0	1.4
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	<0.1	0.052	0.07	0.06	<0.01	<0.03	ND	-	-	0.04	-	0.041	<0.03
Chloride (Cl)	1500	-	-	mg/L	27	28.2	31.8	28.9	28.7	28.8	8	-	-	24	-	32.7	31.1
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	0.6	0.6	0.69	0.79	0.56	-	-	0.73	-	0.63	0.59
Nitrate (as N)	400	**100**	10	mg/L	-	0.007	<0.05	<0.05	<0.05	<0.1	<0.1	-	-	<0.1	-	<0.01	0.034
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	-	0.016	<0.002	<0.002	<0.002	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01
Nitrate + Nitrite (as N)	-	-	-	mg/L	<0.05	0.023	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	35	35	37.5	34.1	32.3	26.4	-	-	-	33	-	32	31.7
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	-	<10	<10	<10	<6	ND	-	-	-	-	<4.0	<4.0
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	-	<25	<25	<25	<30	ND	-	-	<30	-	<20	<20
Dissolved Metals																	
Aluminum	-	**5**	9.5	mg/L	0.2	0.111	0.025	0.02	0.059	0.014	0.024	-	-	0.014	-	<0.005	0.0074
Antimony	0.09	-	0.006	mg/L	<0.001	<0.0001	<0.001	<0.001	< 0.001	<0.0006	ND	-	-	<0.0005	-	<0.0001	<0.00020
Arsenic	0.05	**0.025**	0.01	mg/L	<0.001	0.0027	0.002	0.002	0.002	0.0024	0.0023	-	-	0.002	-	0.002	0.00211
Barium	10	-	1	mg/L	<0.1	0.03	0.016	0.02	0.023	0.016	0.073	-	-	0.028	-	0.025	0.0229
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.001	<0.005	<0.001	<0.001	< 0.001	<0.0004	ND	-	-	<0.0001	-	<0.0001	<0.00010
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010
Boron	12	**5**	5	mg/L	-	-	0.17	0.17	0.1	0.227	0.146	-	-	-	-	0.155	0.121
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	<0.001	<0.0002	<0.0002	<0.0002	< 0.0002	<0.00002	ND	-	-	0.00004	-	0.00003	0.00001
Calcium	-	**1000**	-	mg/L	14	12.6	9.8	11.8	11	7.4	16.5	-	-	14.3	-	17.2	16
Chromium	0.01	**0.05**	0.05	mg/L	<0.02	<0.001	<0.001	<0.001	< 0.001	0.001	ND	-	-	<0.001	-	<0.0005	<0.00050
Cobalt	0.04	**1**	0.001	mg/L	<0.02	<0.01	<0.01	<0.01	< 0.001	<0.0001	ND	-	-	<0.0005	-	<0.00005	<0.00010
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	<0.01	0.004	0.004	0.002	0.006	0.0189	0.0053	-	-	0.0015	-	0.002	0.0194
Iron	-	-	6.5	mg/L	<0.1	0.06	<0.05	<0.05	0.14	<0.04	ND	-	-	0.01	-	<0.010	<0.010
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	0.002	<0.001	<0.001	<0.001	< 0.001	0.0007	ND	-	-	0.0003	-	<0.0001	<0.00020
Lithium	-	**5**	0.008	mg/L	-	-	-	-	-	-	-	-	-	-	-	0.0013	0.0012
Magnesium	-	-	-	mg/L	5	4.8	3	4.8	4.01	7.61	5.86	-	-	5.75	-	6.72	6.19
Manganese	-	-	1.5	mg/L	0.05	0.04	0.04	0.043	0.008	0.0156	0.102	-	-	0.132	-	0.0412	0.00178
Mercury	0.00025	**0.002**	0.001	mg/L	-	<0.00001	<0.00002	<0.00003	< 0.00002	<0.00006	ND	-	-	<0.00002	-	<0.00002	<0.000010
Molybdenum	10	**0.05**	0.25	mg/L	0.02	<0.03	0.019	0.016	0.014	0.0206	0.017	-	-	0.023	-	0.0192	0.0161
Nickel	0.25 - 1.5	**1**	0.08	mg/L	<0.01	<0.05	<0.001	<0.002	< 0.001	<0.001	ND	-	-	<0.001	-	<0.0002	<0.00040
Phosphorus	-	-	-	mg/L	-	-	<0.01	0.09	0.43	-	-	-	-	-	-	<0.02	<0.050
Potassium	-	-	-	mg/L	<5	-	1.72	2.51	1.97	-	2.78	-	-	2.91	-	3	2.67
Selenium	0.02	**0.03**	0.01	mg/L	-	<0.0005	<0.002	<0.003	< 0.001	<0.001	ND	-	-	<0.0001	-	<0.0005	<0.00050
Silicon	-	-	-	mg/L	-	-	9.86	8.2	6.75	-	4.12	-	-	4.19	-	4.3	4.4
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.01	<0.0001	<0.0001	<0.0002	< 0.0001	<0.00008	ND	-	-	<0.00002	-	<0.00005	<0.000050
Sodium	-	-	200	mg/L	91	-	48.1	75.9	61.5	69.4	71.9	-	-	86	-	87.2	72.6
Strontium	-	-	2.5	mg/L	-	-	0.088	0.095	0.084	-	0.116	-	-	0.116	-	0.122	0.12
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	-	-	12	11.2
Tellerium	-	-	-	mg/L	-	-	<0.001	<0.001	< 0.001	-	-	-	-	-	-	-	<0.00050
Thallium	0.003	-	-	mg/L	-	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	ND	-	-	<0.00005	-	<0.00002	<0.000020
Thorium	-	-	-	mg/L	-	-	<0.0005	<0.0005	< 0.0005	-	-	-	-	-	-	-	<0.00010
Tin	-	-	2.5	mg/L	-	-	<0.001	<0.001	< 0.001	-	ND	-	-	<0.005	-	<0.0002	0.00032
Titanium	1	-	-	mg/L	<0.01	<0.01	<0.001	<0.001	0.002	-	ND	-	-	<0.005	-	<0.005	<0.0050
Uranium	0.085	**0.2**	0.02	mg/L	-	0.00009	0.0007	0.0009	0.0008	0.0006	0.0011	-	-	0.001	-	0.00094	0.00112
Vanadium	-	**0.1**	0.02	mg/L	<0.01	<0.03	<0.001	<0.001	< 0.001	<0.002	ND	-	-	<0.005	-	<0.001	<0.0010
Zinc	0.075 - 2.4	**2**	3	mg/L	<0.01	<0.005	<0.005	<0.005	0.009	0.01	0.018	-	-	<0.005	-	<0.004	0.0145
Zirconium	-	-	-	mg/L	-	-	<0.01	<0.01	< 0.01	-	ND	-	-	<0.0005	-	<0.0001	<0.00010

NOTES

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

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

Table F-4: Groundwater Analytical Results
Thornhill Landfill Groundwater Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill												
Monitoring Well								Goodwin Well												
Sample ID								Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well	Goodwin Well
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-	-	-
Sample Date								1-Jun-96	1-May-98	15-Aug-00	1-Dec-01	1-Dec-03	27-May-08	26-Aug-09	15-Jun-10	25-Oct-10	24-Nov-10	24-May-12	25-Jul-16	24-Aug-17
QAQC								-	-	-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																				
Conductivity	-		-		-		uS/cm	-	475	-	427	413	415	439	-	-	466	-	449	447
Hardness (Total as CaCO3)	-		-		-		mg/L	-	51.1	37	49	44	39.6	70.9	-	-	59	-	70.5	65.4
Hardness (Dissolved as CaCO3)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	6.5-9.0		-		6.5 - 8.5		-	-	8.06	8.3	8.22	8.15	8.9	8.2	-	-	8.4	-	8.3	8.4
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/l)) (i)**		-		mg/L	7	34	-	-	-	-	-	-	-	-	-	<1.0	1.4
Ammonia, (as N)	0.16 - 1.85	pH/T*	**0.83 - 12.7**	pH/T*	-		mg/L	<0.1	0.052	0.07	0.06	<0.01	<0.03	ND	-	-	0.04	-	0.041	<0.03
Chloride (Cl)	150		**600**		<250	AO	mg/L	27	28.2	31.8	28.9	28.7	28.8	8	-	-	24	-	32.7	31.1
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	-	-	0.6	0.6	0.69	0.79	0.56	-	-	0.73	-	0.63	0.59
Nitrate (as N)	3		**32.8**		10		mg/L	-	0.007	<0.05	<0.05	<0.05	<0.1	<0.1	-	-	<0.1	-	<0.01	0.034
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	-	0.016	<0.002	<0.002	<0.002	<0.01	<0.01	-	-	<0.01	-	<0.01	<0.01
Nitrate + Nitrite (as N)	-		-		-		mg/L	<0.05	0.023	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	35	35	37.5	34.1	32.3	26.4	-	-	-	33	-	32	31.7
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	-	<10	<10	<10	<6	ND	-	-	-	-	<4.0	<4.0
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	-	<25	<25	<25	<30	ND	-	-	<30	-	<20	<20
Dissolved Metals																				
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	**0.2**	**0.111**	0.025	0.02	0.059	0.014	0.024	-	-	0.014	-	<0.005	0.0074
Antimony	0.009		-		-		mg/L	<0.001	<0.0001	<0.001	<0.001	< 0.001	<0.0006	ND	-	-	<0.0005	-	<0.0001	<0.00020
Arsenic	0.005		-		0.01		mg/L	<0.001	0.0027	0.002	0.002	0.002	0.0024	0.0023	-	-	0.002	-	0.002	0.00211
Barium	1		-		-		mg/L	<0.1	0.03	0.016	0.02	0.023	0.016	0.073	-	-	0.028	-	0.025	0.0229
Beryllium	0.00013		-		-		mg/L	<0.001	<0.005	<0.001	<0.001	< 0.001	<0.0004	ND	-	-	<0.0001	-	<0.0001	<0.00010
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010
Boron	1.2		-		5		mg/L	-	-	0.17	0.17	0.1	0.227	0.146	-	-	-	-	0.155	0.121
Cadmium	0.00013 - 0.00026	H	**0.00031 - 0.00079**	H	0.005		mg/L	<0.001	<0.0002	<0.0002	<0.0002	< 0.0002	<0.00002	ND	-	-	0.00004	-	0.00003	0.00001
Calcium	-		-		-		mg/L	14	12.6	9.8	11.8	11	7.4	16.5	-	-	14.3	-	17.2	16
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.02	<0.001	<0.001	<0.001	< 0.001	0.001	ND	-	-	<0.001	-	<0.0005	<0.00050
Cobalt	0.004		**0.11**		-		mg/L	<0.02	<0.01	<0.01	<0.01	< 0.001	<0.0001	ND	-	-	<0.0005	-	<0.00005	<0.00010
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	<0.01	0.004	0.004	0.002	0.006	0.0189	0.0053	-	-	0.0015	-	0.002	0.0194
Iron	-		**0.35**		<0.3	AO	mg/L	<0.1	0.06	<0.05	<0.05	0.14	<0.04	ND	-	-	0.01	-	<0.010	<0.010
Lead	0.0048 - 0.0079	H	**0.0373 - 0.1174**	H	0.01		mg/L	0.002	<0.001	<0.001	<0.001	< 0.001	0.0007	ND	-	-	0.0003	-	<0.0001	<0.00020
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	0.0013	0.0012
Magnesium	-		-		-		mg/L	5	4.8	3	4.8	4.01	7.61	5.86	-	-	5.75	-	6.72	6.19
Manganese	0.77 - 0.92	H	**0.95 - 1.32**	H	<0.05	AO	mg/L	0.05	0.04	0.04	0.043	0.008	0.0156	0.102	-	-	0.132	-	0.0412	0.00178
Mercury	0.0001		-		0.001		mg/L	-	<0.00001	<0.00002	<0.00003	< 0.00002	<0.00006	ND	-	-	<0.00002	-	<0.00002	<0.000010
Molybdenum	2		-		0.25		mg/L	0.02	<0.03	0.019	0.016	0.014	0.0206	0.017	-	-	0.023	-	0.0192	0.0161
Nickel	0.025-0.15		-		-		mg/L	<0.01	<0.05	<0.001	<0.002	< 0.001	<0.001	ND	-	-	<0.001	-	<0.0002	<0.00040
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	<0.01	0.09	0.43	-	-	-	-	-	-	*<0.02*	*<0.050*
Potassium	-		-		-		mg/L	<5	-	1.72	2.51	1.97	-	2.78	-	-	2.91	-	3	2.67
Selenium	0.002		-		0.01	MAC	mg/L	-	<0.0005	<0.002	<0.003	< 0.001	<0.001	ND	-	-	<0.0001	-	<0.0005	<0.00050
Silicon	-		-		-		mg/L	-	-	9.86	8.2	6.75	-	4.12	-	-	4.19	-	4.3	4.4
Silver	0.00005, 0.0015	H	**0.0001, 0.003**	H	-		mg/L	<0.01	<0.0001	<0.0001	<0.0002	< 0.0001	<0.00008	ND	-	-	<0.00002	-	<0.00005	<0.000050
Sodium	-		-		<200	AO	mg/L	91	-	48.1	75.9	61.5	69.4	71.9	-	-	86	-	87.2	72.6
Strontium	-		-		-		mg/L	-	-	0.088	0.095	0.084	-	0.116	-	-	0.116	-	0.122	0.12
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-	12	11.2
Tellerium	-		-		-		mg/L	-	-	<0.001	<0.001	< 0.001	-	-	-	-	-	-	-	<0.00050
Thallium	0.0008		-		-		mg/L	-	<0.0001	<0.0001	<0.0001	< 0.0001	<0.0001	ND	-	-	<0.00005	-	<0.00002	<0.000020
Thorium	-		-		-		mg/L	-	-	<0.0005	<0.0005	< 0.0005	-	-	-	-	-	-	-	<0.00010
Tin	-		-		-		mg/L	-	-	<0.001	<0.001	< 0.001	-	ND	-	-	<0.005	-	<0.0002	0.00032
Titanium	-		-		-		mg/L	<0.01	<0.01	<0.001	<0.001	0.002	-	ND	-	-	<0.005	-	<0.005	<0.0050
Uranium	0.0085		-		-		mg/L	-	0.00009	0.0007	0.0009	0.0008	0.0006	0.0011	-	-	0.001	-	0.00094	0.00112
Vanadium	-		-		-		mg/L	<0.01	<0.03	<0.001	<0.001	< 0.001	<0.002	ND	-	-	<0.005	-	<0.001	<0.0010
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**		<5.0	AO	mg/L	<0.01	<0.005	<0.005	<0.005	0.009	0.01	0.018	-	-	<0.005	-	<0.004	0.0145
Zirconium	-		-		-		mg/L	-	-	<0.01	<0.01	< 0.01	-	ND	-	-	<0.0005	-	<0.0001	<0.00010

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water
Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with temperature
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-5: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill										
Monitoring Well					Reinhardt Well										
Sample ID					Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well
Laboratory ID					-	-	-	-	-	-	-	-	-	-	-
Sample Date					1-Jun-96	1-May-98	15-Aug-00	1-Dec-03	27-May-08	26-Aug-09	15-Jun-10	25-Oct-10	24-May-12	25-Jul-16	24-Aug-17
QAQC					-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters															
Conductivity	-	-	-	uS/cm	-	181	-	161	156	156	-	-	-	180	181
Hardness (Dissolved as CaCO3)	-	-	-	mg/L	-	83.3	65	70	63.6	61.7	-	-	-	86.6	77
pH	-	-	-	-	-	7.69	7.81	7.65	8.1	7.7	-	-	-	7.9	8.1
Total Suspended Solids	-	-	-	mg/L	<5	<1	-	-	-	-	-	-	-	<1.0	<1.0
Ammonia, (as N)	1.3 - 18.5	-	-	mg/L	<0.1	<0.005	0.02	0.02	<0.03	ND	-	-	-	<0.03	<0.03
Chloride (Cl)	1500	-	-	mg/L	12.2	9.4	9.2	9.2	6.6	5.8	-	-	-	10.6	15
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	-	-	<0.05	0.06	<0.1	ND	-	-	-	<0.10	<0.10
Nitrate (as N)	400	**100**	10	mg/L	-	0.077	0.05	0.07	<0.1	ND	-	-	-	0.051	0.046
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	-	0.077	<0.002	<0.002	<0.01	ND	-	-	-	<0.01	<0.01
Nitrate + Nitrite (as N)	-	-	-	mg/L	0.07	0.015	0.05	0.07	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	2.6	2	3.1	2.7	2.8	-	-	-	-	3.2	2.9
Biological Oxygen Demand (BOD)	-	-	-	mg/L	-	-	<10	<10	<6	ND	-	-	-	<4.0	<4.0
Chemical Oxygen Demand (COD)	-	-	-	mg/L	-	-	<25	<25	<30	ND	-	-	-	<20	<20
Dissolved Metals															
Aluminum	-	**5**	9.5	mg/L	<0.1	<0.005	0.006	0.009	<0.01	ND	-	-	-	<0.005	<0.0050
Antimony	0.09	-	0.006	mg/L	<0.001	<0.0001	<0.001	< 0.001	<0.0006	ND	-	-	-	0.0001	<0.00020
Arsenic	0.05	**0.025**	0.01	mg/L	<0.001	0.0004	<0.001	< 0.001	<0.001	0.0005	-	-	-	<0.0005	0.00053
Barium	10	-	1	mg/L	<0.1	0.02	0.014	0.024	0.019	0.085	-	-	-	0.022	0.0211
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.001	<0.005	<0.001	< 0.001	<0.0004	ND	-	-	-	<0.0001	<0.00010
Bismuth	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010
Boron	12	**5**	5	mg/L	-	-	<0.05	< 0.05	0.004	ND	-	-	-	0.007	0.0148
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	<0.0002	<0.001	<0.0002	< 0.0002	<0.00002	ND	-	-	-	0.00005	<0.000010
Calcium	-	**1000**	-	mg/L	33	29.8	23.6	24.8	24.2	29.2	-	-	-	30.9	27.5
Chromium	0.01	**0.05**	0.05	mg/L	<0.02	<0.001	<0.001	< 0.001	0.002	ND	-	-	-	0.0008	0.00067
Cobalt	0.04	**1**	0.001	mg/L	*<0.02*	*<0.01*	*<0.001*	*< 0.001*	*<0.0001*	ND	-	-	-	<0.00005	<0.00010
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	<0.01	0.006	0.002	0.009	0.004	0.006	-	-	-	0.0048	0.00353
Iron	-	-	6.5	mg/L	<0.1	<0.03	<0.05	< 0.05	0.06	ND	-	-	-	<0.010	<0.010
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.001	<0.001	<0.001	< 0.001	0.0002	ND	-	-	-	0.0002	<0.00020
Lithium	-	**5**	0.008	mg/L	-	-	-	-	-	-	-	-	-	0.0007	0.00062
Magnesium	-	-	-	mg/L	2.3	2.1	1.36	1.82	1.98	2.08	-	-	-	2.3	2.01
Manganese	-	-	1.5	mg/L	<0.1	<0.005	0.006	< 0.001	0.005	ND	-	-	-	0.0005	0.0003
Mercury	0.00025	**0.002**	0.001	mg/L	-	<0.00001	<0.00002	< 0.00002	<0.00006	ND	-	-	-	<0.00002	<0.000010
Molybdenum	10	**0.05**	0.25	mg/L	<0.01	<0.03	<0.001	< 0.0005	0.0005	ND	-	-	-	0.0005	0.00045
Nickel	0.25 - 1.5	**1**	0.08	mg/L	<0.01	<0.05	<0.001	< 0.001	<0.001	ND	-	-	-	<0.0002	<0.00040
Phosphorus	-	-	-	mg/L	-	-	<0.01	0.38	-	-	-	-	-	<0.02	<0.050
Potassium	-	-	-	mg/L	<5	-	0.61	0.8	-	1.02	-	-	-	1.18	1.01
Selenium	0.02	**0.03**	0.01	mg/L	-	<0.0005	<0.002	< 0.001	<0.001	ND	-	-	-	<0.0005	<0.00050
Silicon	-	-	-	mg/L	-	-	11.4	8.58	-	5.41	-	-	-	5	5.2
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.01	<0.0001	<0.0001	< 0.0001	<0.00008	ND	-	-	-	<0.00005	<0.000050
Sodium	-	-	200	mg/L	1	-	1.57	2.25	2.77	3.18	-	-	-	4.06	3.49
Strontium	-	-	2.5	mg/L	-	-	0.08	0.076	-	0.09	-	-	-	0.09	0.0833
Sulfur	-	-	-	mg/L	-	-	-	-	-	-	-	-	-	<1	<3.0
Tellerium	-	-	-	mg/L	-	-	<0.001	< 0.001	-	-	-	-	-	-	<0.00050
Thallium	0.003	-	-	mg/L	-	<0.0001	<0.0001	< 0.0001	<0.0001	ND	-	-	-	<0.00002	<0.000020
Thorium	-	-	-	mg/L	-	-	<0.0005	< 0.0005	-	-	-	-	-	-	<0.00010
Tin	-	-	2.5	mg/L	-	-	<0.001	< 0.001	-	ND	-	-	-	<0.0002	<0.00020
Titanium	1	-	-	mg/L	<0.01	<0.01	<0.001	0.001	<0.02	ND	-	-	-	<0.005	<0.0050
Uranium	0.085	**0.2**	0.02	mg/L	-	0.00107	<0.0005	< 0.0005	<0.0001	0.0001	-	-	-	0.00011	0.000099
Vanadium	-	**0.1**	0.02	mg/L	<0.01	<0.03	<0.001	< 0.001	<0.002	ND	-	-	-	<0.001	<0.0010
Zinc	0.075 - 2.4	**2**	3	mg/L	0.04	0.031	0.044	0.034	0.015	0.043	-	-	-	0.032	0.0242
Zirconium	-	-	-	mg/L	-	-	<0.01	< 0.01	-	ND	-	-	-	<0.0001	<0.00010

NOTES

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

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

Table F-6: Historic Groundwater Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill										
Monitoring Well								Reinhardt Well										
Sample ID								Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well	Reinhardt Well
Laboratory ID								-	-	-	-	-	-	-	-	-	-	-
Sample Date								1-Jun-96	1-May-98	15-Aug-00	1-Dec-03	27-May-08	26-Aug-09	15-Jun-10	25-Oct-10	24-May-12	25-Jul-16	24-Aug-17
QAQC								-	-	-	-	-	-	-	-	-	-	-
Conventional Parameters																		
Conductivity	-		-		-		uS/cm	-	181	-	161	156	156	-	-	-	180	181
Hardness (Total as CaCO3)	-		-		-		mg/L	-	83.3	65	70	63.6	61.7	-	-	-	86.6	77
Hardness (Dissolved as CaCO3)	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	-	-
pH	6.5-9.0		-		6.5 - 8.5		-	-	7.69	7.81	7.65	8.1	7.7	-	-	-	7.9	8.1
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/l)) (i)**		-		mg/L	<5	<1	-	-	-	-	-	-	-	<1.0	<1.0
Ammonia, (as N)	0.9 - 1.86	pH/T*	**9.65 - 16**	pH/T*	-		mg/L	<0.1	<0.005	0.02	0.02	<0.03	ND	-	-	-	<0.03	<0.03
Chloride (Cl)	150		**600**		<250	AO	mg/L	12.2	9.4	9.2	9.2	6.6	5.8	-	-	-	10.6	15
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	-	-	<0.05	0.06	<0.1	ND	-	-	-	<0.10	<0.10
Nitrate (as N)	3		**32.8**		10		mg/L	-	0.077	0.05	0.07	<0.1	ND	-	-	-	0.051	0.046
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	-	0.077	<0.002	<0.002	<0.01	ND	-	-	-	<0.01	<0.01
Nitrate + Nitrite (as N)	-		-		-		mg/L	0.07	0.015	0.05	0.07	-	-	-	-	-	-	-
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	2.6	2	3.1	2.7	2.8	-	-	-	-	3.2	2.9
Biological Oxygen Demand (BOD)	-		-		-		mg/L	-	-	<10	<10	<6	ND	-	-	-	<4.0	<4.0
Chemical Oxygen Demand (COD)	-		-		-		mg/L	-	-	<25	<25	<30	ND	-	-	-	<20	<20
Dissolved Metals																		
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	<0.1	<0.005	0.006	0.009	<0.01	ND	-	-	-	<0.005	<0.0050
Antimony	0.009		-		-		mg/L	<0.001	<0.0001	<0.001	< 0.001	<0.0006	ND	-	-	-	0.0001	<0.00020
Arsenic	0.005		-		0.01		mg/L	<0.001	0.0004	<0.001	< 0.001	<0.001	0.0005	-	-	-	<0.0005	0.00053
Barium	1		-		-		mg/L	<0.1	0.02	0.014	0.024	0.019	0.085	-	-	-	0.022	0.0211
Beryllium	0.00013		-		-		mg/L	<0.001	<0.005	<0.001	< 0.001	<0.0004	ND	-	-	-	<0.0001	<0.00010
Bismuth	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<0.0001	<0.00010
Boron	1.2		-		5		mg/L	-	-	<0.05	< 0.05	0.004	ND	-	-	-	0.007	0.0148
Cadmium	0.00013 - 0.00026	H	**0.00031 - 0.00079**	H	0.005		mg/L	<0.0002	<0.001	<0.0002	< 0.0002	<0.00002	ND	-	-	-	0.00005	<0.000010
Calcium	-		-		-		mg/L	33	29.8	23.6	24.8	24.2	29.2	-	-	-	30.9	27.5
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.02	<0.001	<0.001	< 0.001	0.002	ND	-	-	-	0.0008	0.00067
Cobalt	0.004		**0.11**		-		mg/L	<0.02	<0.01	<0.001	< 0.001	<0.0001	ND	-	-	-	<0.00005	<0.00010
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	*<0.01*	0.006	0.002	0.009	0.004	0.006	-	-	-	0.0048	0.00353
Iron	-		**0.35**		<0.3	AO	mg/L	<0.1	<0.03	<0.05	< 0.05	0.06	ND	-	-	-	<0.010	<0.010
Lead	0.0048 - 0.0079	H	**0.0373 - 0.1174**	H	0.01		mg/L	<0.001	<0.001	<0.001	< 0.001	0.0002	ND	-	-	-	0.0002	<0.00020
Lithium	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	0.0007	0.00062
Magnesium	-		-		-		mg/L	2.3	2.1	1.36	1.82	1.98	2.08	-	-	-	2.3	2.01
Manganese	0.88 - 0.99	H	**1.22 - 1.49**	H	<0.05	AO	mg/L	<0.0.1	<0.005	0.006	< 0.001	0.005	ND	-	-	-	0.0005	0.0003
Mercury	0.0001		-		0.001		mg/L	-	<0.00001	<0.00002	< 0.00002	<0.00006	ND	-	-	-	<0.00002	<0.000010
Molybdenum	2		-		0.25		mg/L	<0.01	<0.03	<0.001	< 0.0005	0.0005	ND	-	-	-	0.0005	0.00045
Nickel	0.025-0.15		-		-		mg/L	<0.01	<0.05	<0.001	< 0.001	<0.001	ND	-	-	-	<0.0002	<0.00040
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	-	-	<0.01	0.38	-	-	-	-	-	<0.02	<0.050
Potassium	-		-		-		mg/L	<5	-	0.61	0.8	-	1.02	-	-	-	1.18	1.01
Selenium	0.002		-		0.01	MAC	mg/L	-	<0.0005	<0.002	< 0.001	<0.001	ND	-	-	-	<0.0005	<0.00050
Silicon	-		-		-		mg/L	-	-	11.4	8.58	-	5.41	-	-	-	5	5.2
Silver	0.00005, 0.0015	H	**0.0001, 0.003**	H	-		mg/L	<0.01	<0.0001	<0.0001	< 0.0001	<0.00008	ND	-	-	-	<0.00005	<0.000050
Sodium	-		-		<200	AO	mg/L	1	-	1.57	2.25	2.77	3.18	-	-	-	4.06	3.49
Strontium	-		-		-		mg/L	-	-	0.08	0.076	-	0.09	-	-	-	0.09	0.0833
Sulfur	-		-		-		mg/L	-	-	-	-	-	-	-	-	-	<1	<3.0
Tellerium	-		-		-		mg/L	-	-	<0.001	< 0.001	-	-	-	-	-	-	<0.00050
Thallium	0.0008		-		-		mg/L	-	<0.0001	<0.0001	< 0.0001	<0.0001	ND	-	-	-	<0.00002	<0.000020
Thorium	-		-		-		mg/L	-	-	<0.0005	< 0.0005	-	-	-	-	-	-	<0.00010
Tin	-		-		-		mg/L	-	-	<0.001	< 0.001	-	ND	-	-	-	<0.0002	<0.00020
Titanium	-		-		-		mg/L	<0.01	<0.01	<0.001	0.001	<0.02	ND	-	-	-	<0.005	<0.0050
Uranium	0.0085		-		-		mg/L	-	0.00107	<0.0005	< 0.0005	<0.0001	0.0001	-	-	-	0.00011	0.000099
Vanadium	-		-		-		mg/L	<0.01	<0.03	<0.001	< 0.001	<0.002	ND	-	-	-	<0.001	<0.0010
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**		<5.0	AO	mg/L	0.04	0.031	0.044	0.034	0.015	0.043	-	-	-	0.032	0.0242
Zirconium	-		-		-		mg/L	-	-	<0.01	< 0.01	-	ND	-	-	-	<0.0001	<0.00010

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water
Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-7: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill			
Site Name					SW-16			
Sample ID					SW-16	SW-16	SW-16	SW-16
Laboratory ID					-	-	-	-
Sample Date					22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17
QAQC					-	-	-	-
Lab Parameters								
Conductivity	-	-	-	uS/cm	125	140	107	83
Hardness (Total as CaCO3)	-	-	-	mg/L	57.3	66.7	45.1	31
pH	-	-	-	pH	7.6	7.7	7.6	7.3
Total Suspended Solids	-	-	-	mg/L	<1.0	1.4	<1.0	4.4
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	0.67	<0.03	<0.03	0.36
Chloride (Cl)	1500	-	-	mg/L	5	3.7	1.8	2.5
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	400	**100**	10	mg/L	0.63	0.35	0.11	0.098
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	<0.01	<0.01	<0.01	<0.01
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	2.5	2.7	2.3	1.5
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<4.0	<4.0	<4.0	<4.0
Chemical Oxygen Demand (COD)	-	-	-	mg/L	30	<20	<20	<20
Total Metals								
Aluminum	-	**5**	9.5	mg/L	0.124	0.078	0.039	0.622
Antimony	0.09	-	0.006	mg/L	<0.0001	0.0001	0.0002	<0.0001
Arsenic	0.05	**0.025**	0.01	mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Barium	10	-	1	mg/L	0.025	0.026	0.018	0.023
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	-	-	-	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Boron	12	**5**	5	mg/L	0.086	0.117	0.028	0.05
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	0.00001	0.00002	0.00002	<0.00001
Calcium	-	**1000**	-	mg/L	20	24.1	16.5	10.5
Chromium	0.01	**0.05**	0.05	mg/L	<0.0005	<0.0005	<0.0005	0.0007
Cobalt	0.04	**1**	0.001	mg/L	0.00012	0.00012	0.00005	0.00029
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.0009	0.0009	0.001	0.0019
Iron	-	-	6.5	mg/L	0.19	0.22	0.1	0.64
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.0001	<0.0001	<0.0001	0.0002
Lithium	-	**5**	0.008	mg/L	0.0001	<0.0001	<0.0001	0.0003
Magnesium	-	-	-	mg/L	1.74	1.53	0.95	1.19
Manganese	-	-	1.5	mg/L	0.0131	0.0151	0.0132	0.0553
Mercury	0.00025	**0.002**	0.001	mg/L	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	10	**0.05**	0.25	mg/L	0.0006	0.0007	0.0005	0.0003
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.0004	<0.0002	<0.0002	0.0008
Phosphorus	-	-	-	mg/L	<0.02	<0.02	0.02	<0.05
Potassium	-	-	-	mg/L	3.05	2.11	0.95	1.39
Selenium	0.02	**0.03**	0.01	mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Silicon	-	-	-	mg/L	3.5	3.6	2.7	3.5
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.00005	<0.00005	<0.00005	<0.00005
Sodium	-	-	200	mg/L	6.19	4.23	1.73	2.62
Strontium	-	-	2.5	mg/L	0.075	0.089	0.06	0.046
Sulfur	-	-	-	mg/L	<1	1	<1	<1
Tellurium	-	-	-	mg/L	-	-	-	<0.0002
Thallium	0.003	-	-	mg/L	<0.00002	<0.00002	<0.00002	<0.00002
Thorium	-	-	-	mg/L	-	-	-	<0.0001
Tin	-	-	2.5	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Titanium	1	-	-	mg/L	<0.005	<0.005	<0.005	0.025
Uranium	0.085	**0.2**	0.02	mg/L	0.00005	0.00008	0.00005	0.00004
Vanadium	-	**0.1**	0.02	mg/L	0.001	<0.001	<0.001	0.002
Zinc	0.075 - 38.1	**2**	3	mg/L	<0.004	<0.004	<0.004	<0.004
Zirconium	-	-	-	mg/L	0.0003	<0.0001	<0.0001	0.0002

NOTES

BC CSR AW-F — er Quality Guidelines for Protection of Freshwater Aquatic Life
BC CSR LW — on Water Quality Guidelines for Protection of Livestock
BC CSR DW — ulation Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)
QAQC = quality assurance/quality control; FD = field duplicate;

Table F-8: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill SW-16			
Site Name								SW-16	SW-16	SW-16	SW-16
Sample ID								-	-	-	-
Laboratory ID								22-Mar-16	25-Jul-16	13-Oct-16	28-Mar-17
Sample Date								-	-	-	-
QAQC											
Conventional Parameters											
Conductivity	-		-		-		uS/cm	125	140	107	82.7
Hardness (Total as CaCO3)	-		-		-		mg/L	57.3	66.7	45.1	31
pH	6.5-9.0		-		6.5 - 8.5		-	7.6	7.7	7.6	7.3
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/l)) (i)**		-		mg/L	<1.0	1.4	<1.0	4.4
Ammonia, Total (as N)	0.9 - 1.86	pH/T*	**9.65 - 16**	pH/T*	-		mg/L	0.67	<0.03	<0.03	0.36
Chloride (Cl)	150		**600**		<250	AO	mg/L	5	3.7	1.8	2.5
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	3		**32.8**		10		mg/L	0.63	0.35	0.11	0.098
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	<0.01	<0.01	<0.01	<0.01
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	2.5	2.7	2.3	1.5
Biological Oxygen Demand (BOD)	-		-		-			<4.0	<4.0	<4.0	<4.0
Chemical Oxygen Demand (COD)	-		-		-			30	<20	<20	<20
Total Metals											
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	0.124	0.078	0.039	0.622
Antimony	0.009		-		-		mg/L	<0.0001	0.0001	0.0002	<0.0001
Arsenic	0.005		-		0.01		mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Barium	1		-		-		mg/L	0.025	0.026	0.018	0.023
Beryllium	0.00013		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth	-		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.0001
Boron	1.2		-		5		mg/L	0.086	0.117	0.028	0.05
Cadmium	0.18 - 0.26	H	**0.47 - 0.79**	H	0.005		mg/L	0.00001	0.00002	0.00002	<0.00001
Calcium	-		-		-		mg/L	20	24.1	16.5	10.5
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.0005	<0.0005	<0.0005	0.0007
Cobalt	0.004		**0.11**		-		mg/L	0.00012	0.00012	0.00005	0.00029
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	0.0009	0.0009	0.001	0.0019
Iron	-		**1**		<0.3	AO	mg/L	0.19	0.22	0.1	0.64
Lead	0.0057 - 0.0079	H	**0.0611 - 0.1174**	H	0.01		mg/L	<0.0001	<0.0001	<0.0001	0.0002
Lithium	-		-		-		mg/L	0.0001	<0.0001	<0.0001	0.0003
Magnesium	-		-		-		mg/L	1.74	1.53	0.95	1.19
Manganese	0.74 - 0.9	H	**0.88 - 1.28**	H	<0.05	AO	mg/L	0.0131	0.0151	0.0132	0.0553
Mercury	0.0001		-		0.001		mg/L	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum	2		-		0.25		mg/L	0.0006	0.0007	0.0005	0.0003
Nickel	0.025 - 0.15		-		-		mg/L	0.0004	<0.0002	<0.0002	0.0008
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	*<0.02*	*<0.02*	0.02	*<0.05*
Potassium	-		-		-		mg/L	3.05	2.11	0.95	1.39
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005	<0.0005	<0.0005	<0.0005
Silicon	-		-		-		mg/L	3.5	3.6	2.7	3.5
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.00005	<0.00005	<0.00005	<0.00005
Sodium	-		-		<200	AO	mg/L	6.19	4.23	1.73	2.62
Strontium	-		-		-		mg/L	0.075	0.089	0.06	0.046
Sulfur	-		-		-		mg/L	<1	1	<1	<1
Tellurium	-		-		-		mg/L	-	-	-	<0.0002
Thallium	0.0008		-		-		mg/L	<0.00002	<0.00002	<0.00002	<0.00002
Thorium	-		-		-		mg/L	-	-	-	<0.0001
Tin	-		-		-		mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Titanium	-		-		-		mg/L	<0.005	<0.005	<0.005	0.025
Uranium	0.0005		-		-		mg/L	0.00005	0.00008	0.00005	0.00004
Vanadium	-		-		-		mg/L	0.001	<0.001	<0.001	0.002
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**	H	<5.0	AO	mg/L	<0.004	<0.004	<0.004	<0.004
Zirconium	-		-		-		mg/L	0.0003	<0.0001	<0.0001	0.0002

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water
Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill			
Site Name					SW-18	SW-18	SW-18	SW-18
Sample ID					-	-	-	-
Laboratory ID					22-Mar-16	13-Oct-16	28-Mar-17	24-Aug-17
Sample Date					-	-	-	-
QAQC								
Conventional Parameters								
Conductivity	-	-	-	uS/cm	119	111	77	92
Hardness (Total as CaCO3)	-	-	-	mg/L	58.6	47.9	30.3	40.7
pH	-	-	-	pH	7.6	7.5	7.3	7.7
Total Suspended Solids	-	-	-	mg/L	4.3	<1.0	5.8	3.2
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	0.5	<0.03	0.27	<0.03
Chloride (Cl)	1500	-	-	mg/L	3.9	2	2.2	1.2
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	400	**100**	10	mg/L	0.63	0.099	0.09	0.13
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	<0.01	<0.01	<0.01	<0.01
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	2.4	2.6	1.4	1.6
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<4.0	<4.0	<4.0	<4.0
Chemical Oxygen Demand (COD)	-	-	-	mg/L	<20	<20	<20	<20
Total Metals								
Aluminum	-	**5**	9.5	mg/L	0.137	0.035	0.509	0.0837
Antimony	0.09	-	0.006	mg/L	<0.0001	0.0002	<0.0001	<0.00020
Arsenic	0.05	**0.025**	0.01	mg/L	<0.0005	<0.0005	<0.0005	<0.00050
Barium	10	-	1	mg/L	0.023	0.019	0.02	0.0168
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.0001	<0.0001	<0.0001	<0.00010
Bismuth	-	-	-	mg/L	<0.0001	<0.0001	<0.0001	<0.00010
Boron	12	**5**	5	mg/L	0.078	0.022	0.042	0.0466
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	<0.00001	<0.00001	<0.00001	<0.000010
Calcium	-	**1000**	-	mg/L	20.7	17.6	10.3	14.8
Chromium	0.01	**0.05**	0.05	mg/L	<0.0005	<0.0005	0.0007	<0.00050
Cobalt	0.04	**1**	0.001	mg/L	0.00012	<0.00005	0.00029	<0.00010
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.0011	0.0011	0.002	0.00086
Iron	-	-	6.5	mg/L	0.23	0.11	0.63	0.132
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.0001	<0.0001	0.0002	<0.00020
Lithium	-	**5**	0.008	mg/L	0.0002	<0.0001	0.0003	<0.00010
Magnesium	-	-	-	mg/L	1.68	0.96	1.12	0.874
Manganese	-	-	1.5	mg/L	0.0163	0.0119	0.0398	0.0102
Mercury	0.00025	**0.002**	0.001	mg/L	<0.00002	<0.00002	<0.00002	<0.000010
Molybdenum	10	**0.05**	0.25	mg/L	0.0006	0.0006	0.0003	0.00043
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.0004	<0.0002	0.0008	<0.00040
Phosphorus	-	-	-	mg/L	0.04	<0.02	<0.05	<0.050
Potassium	-	-	-	mg/L	2.77	0.96	1.23	1.01
Selenium	0.02	**0.03**	0.01	mg/L	<0.0005	<0.0005	<0.0005	<0.00050
Silicon	-	-	-	mg/L	4	2.9	3.3	3.3
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.00005	<0.00005	<0.00005	<0.000050
Sodium	-	-	200	mg/L	5.45	1.69	2.33	1.77
Strontium	-	-	2.5	mg/L	0.071	0.06	0.041	0.0529
Sulfur	-	-	-	mg/L	2	<1	<1	<3.0
Tellurium	-	-	-	mg/L	-	-	<0.0002	<0.00050
Thallium	0.003	-	-	mg/L	<0.00002	<0.00002	<0.00002	<0.000020
Thorium	-	-	-	mg/L	-	-	<0.0001	<0.00010
Tin	-	-	2.5	mg/L	<0.0002	<0.0002	<0.0002	<0.00020
Titanium	1	-	-	mg/L	0.005	<0.005	0.015	<0.0050
Uranium	0.085	**0.2**	0.02	mg/L	0.00006	0.00006	0.00004	0.00005
Vanadium	-	**0.1**	0.02	mg/L	0.001	<0.001	0.001	<0.0010
Zinc	0.075 - 38.1	**2**	3	mg/L	<0.004	<0.004	<0.004	0.0043
Zirconium	-	-	-	mg/L	<0.0001	<0.0001	0.0002	<0.00010

NOTES

BC CSR AW-F — er Quality Guidelines for Protection of Freshwater Aquatic Life
BC CSR LW — on Water Quality Guidelines for Protection of Livestock
BC CSR DW — lation Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)
QAQC = quality assurance/quality control; FD = field duplicate;

Table F-10: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill			
Site Name								SW-18			
Sample ID								SW-18	SW-18	SW-18	SW-18
Laboratory ID								-	-	-	-
Sample Date								22-Mar-16	13-Oct-16	28-Mar-17	24-Aug-17
QAQC								-	-	-	-
Conventional Parameters											
Conductivity	-		-		-		uS/cm	119	111	76.5	92
Hardness (Total as CaCO3)	-		-		-		mg/L	58.6	47.9	30.3	40.7
pH	6.5-9.0		-		6.5 - 8.5		-	7.6	7.5	7.3	7.7
Total Suspended Solids	-		25 mg/L (backgr. 25-250 mg/l)) (i)		-		mg/L	4.3	<1.0	5.8	3.2
Ammonia, Total (as N)	0.9 - 1.86	pH/T*	9.65 - 16	pH/T*	-		mg/L	0.5	<0.03	0.27	<0.03
Chloride (Cl)	150		600		<250	AO	mg/L	3.9	2	2.2	1.2
Fluoride (F)	-		1.09 - 1.45	H	1.5		mg/L	<0.10	<0.10	<0.10	<0.10
Nitrate (as N)	3		32.8		10		mg/L	0.63	0.099	0.09	0.13
Nitrite (as N)	0.02 - 0.08	Cl	0.06 - 0.24	Cl	1		mg/L	<0.01	<0.01	<0.01	<0.01
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	2.4	2.6	1.4	1.6
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<4.0	<4.0	<4.0	<4.0
Chemical Oxygen Demand (COD)	-		-		-		mg/L	<20	<20	<20	<20
Total Metals											
Aluminum	0.05	pH	0.1	pH	9.5		mg/L	**0.137**	0.035	**0.509**	0.0837
Antimony	0.009		-		-		mg/L	<0.0001	0.0002	<0.0001	<0.00020
Arsenic	0.005		-		0.01		mg/L	<0.0005	<0.0005	<0.0005	<0.00050
Barium	1		-		-		mg/L	0.023	0.019	0.02	0.0168
Beryllium	0.00013		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.00010
Bismuth	-		-		-		mg/L	<0.0001	<0.0001	<0.0001	<0.00010
Boron	1.2		-		5		mg/L	0.078	0.022	0.042	0.0466
Cadmium	0.18 - 0.26	H	0.47 - 0.79	H	0.005		mg/L	<0.00001	<0.00001	<0.00001	<0.000010
Calcium	-		-		-		mg/L	20.7	17.6	10.3	14.8
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.0005	<0.0005	0.0007	<0.00050
Cobalt	0.004		0.11		-		mg/L	0.00012	<0.00005	0.00029	<0.00010
Copper	0.00004	H	0.00708 - 0.01450	H	1		mg/L	0.0011	0.0011	0.002	0.00086
Iron	-		1		<0.3	AO	mg/L	0.23	0.11	0.63	0.132
Lead	0.0057 - 0.0079	H	0.0611 - 0.1174	H	0.01		mg/L	<0.0001	<0.0001	0.0002	<0.00020
Lithium	-		-		-		mg/L	0.0002	<0.0001	0.0003	<0.00010
Magnesium	-		-		-		mg/L	1.68	0.96	1.12	0.874
Manganese	0.74 - 0.86	H	0.87 - 1.19	H	<0.05	AO	mg/L	0.0163	0.0119	0.0398	0.0102
Mercury	0.0001		-		0.001		mg/L	<0.00002	<0.00002	<0.00002	<0.000010
Molybdenum	2		-		0.25		mg/L	0.0006	0.0006	0.0003	0.00043
Nickel	0.025 - 0.15		-		-		mg/L	0.0004	<0.0002	0.0008	<0.00040
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	0.04	*<0.02*	*<0.05*	*<0.050*
Potassium	-		-		-		mg/L	2.77	0.96	1.23	1.01
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005	<0.0005	<0.0005	<0.00050
Silicon	-		-		-		mg/L	4	2.9	3.3	3.3
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.00005	<0.00005	<0.00005	<0.000050
Sodium	-		-		<200	AO	mg/L	5.45	1.69	2.33	1.77
Strontium	-		-		-		mg/L	0.071	0.06	0.041	0.0529
Sulfur	-		-		-		mg/L	2	<1	<1	<3.0
Tellurium	-		-		-		mg/L	-	-	<0.0002	<0.00050
Thallium	0.0008		-		-		mg/L	<0.00002	<0.00002	<0.00002	<0.000020
Thorium	-		-		-		mg/L	-	-	<0.0001	<0.00010
Tin	-		-		-		mg/L	<0.0002	<0.0002	<0.0002	<0.00020
Titanium	-		-		-		mg/L	0.005	<0.005	0.015	<0.0050
Uranium	0.0005		-		-		mg/L	0.00006	0.00006	0.00004	0.00005
Vanadium	-		-		-		mg/L	0.001	<0.001	0.001	<0.0010
Zinc	0.0075 - 0.0398	H	0.033 - 0.0653	H	<5.0	AO	mg/L	<0.004	<0.004	<0.004	0.0043
Zirconium	-		-		-		mg/L	<0.0001	<0.0001	0.0002	<0.00010

NOTES

BCWQG AWF Long-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term	BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW	BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Table F-11: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill SW-22 SW-22 - 22-Mar-16 -
Conventional Parameters					
Conductivity	-	-	-	uS/cm	1,840
Hardness (Total as CaCO3)	-	-	-	mg/L	590
pH	-	-	-	pH	8.1
Total Suspended Solids	-	-	-	mg/L	2.8
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	38.5
Chloride (Cl)	1500	-	-	mg/L	167
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	0.11
Nitrate (as N)	400	**100**	10	mg/L	9.19
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	0.029
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	26.9
Biological Oxygen Demand (BOD)	-	-	-	mg/L	48
Chemical Oxygen Demand (COD)	-	-	-	mg/L	139
Total Metals					
Aluminum	-	**5**	9.5	mg/L	0.14
Antimony	0.09	-	0.006	mg/L	0.0004
Arsenic	0.05	**0.025**	0.01	mg/L	0.0012
Barium	10	-	1	mg/L	0.311
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.0001
Bismuth	-	-	-	mg/L	<0.0001
Boron	12	**5**	5	mg/L	3.68
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	0.00004
Calcium	-	**1000**	-	mg/L	179.0
Chromium	0.01	**0.05**	0.05	mg/L	0.002
Cobalt	0.04	**1**	0.001	mg/L	0.00326
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.0028
Iron	-	-	6.5	mg/L	0.97
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.0001
Lithium	-	**5**	0.008	mg/L	0.002
Magnesium	-	-	-	mg/L	34.6
Manganese	-	-	1.5	mg/L	2.59
Mercury	0.00025	**0.002**	0.001	mg/L	<0.00002
Molybdenum	10	**0.05**	0.25	mg/L	0.001
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.0092
Phosphorus	-	-	-	mg/L	0.05
Potassium	-	-	-	mg/L	87.2
Selenium	0.02	**0.03**	0.01	mg/L	<0.0005
Silicon	-	-	-	mg/L	11.1
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.00005
Sodium	-	-	200	mg/L	178
Strontium	-	-	2.5	mg/L	1.11
Sulfur	-	-	-	mg/L	16
Thallium	0.003	-	-	mg/L	<0.00002
Tin	-	-	2.5	mg/L	0.0002
Titanium	1	-	-	mg/L	0.006
Uranium	0.085	**0.2**	0.02	mg/L	0.0002
Vanadium	-	**0.1**	0.02	mg/L	0.001
Zinc	0.075 - 38.1	**2**	3	mg/L	0.009
Zirconium	-	**-**	-	mg/L	0.0006

NOTES

BC CSR AW-F ter Quality Guidelines for Protection of Freshwater Aquatic Life

BC CSR LW ion Water Quality Guidelines for Protection of Livestock

BC CSR DW ulation Water Quality Guidelines for Drinking Water

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

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

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

Table F-12: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill SW-22 SW-22 - 22-Mar-16 -
Conventional Parameters								
Conductivity	-		-		-		uS/cm	1840
Hardness (Total as CaCO3)	-		-		-		mg/L	590
pH	6.5-9.0		-		6.5 - 8.5		-	8.1
Total Suspended Solids	-		**25 mg/L (backgr. 25 250 mg/l)) (i)**		-		mg/L	2.8
Ammonia, Total (as N)	1.86	pH/T*	**4.67**	pH/T*	-		mg/L	**38.5**
Chloride (Cl)	150		**600**		<250	AO	mg/L	167
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	0.11
Nitrate (as N)	3		**32.8**		10		mg/L	9.19
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	0.029
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	26.9
Biological Oxygen Demand (BOD)	-		-		-		mg/L	48
Chemical Oxygen Demand (COD)	-		-		-		mg/L	139
Total Metals								
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	**0.14**
Antimony	0.009		-		-		mg/L	0.0004
Arsenic	0.005		-		0.01		mg/L	0.0012
Barium	1		-		-		mg/L	0.311
Beryllium	0.00013		-		-		mg/L	<0.0001
Bismuth	-		-		-		mg/L	<0.0001
Boron	1.2		-		5		mg/L	3.68
Cadmium	0.18 - 0.26	H	**0.47 - 0.79**	H	0.005		mg/L	0.00004
Calcium	-		-		-		mg/L	179
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	0.002
Cobalt	0.004		**0.11**		-		mg/L	0.00326
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	0.0028
Iron	-		**1**		<0.3	AO	mg/L	0.97
Lead	0.0057 - 0.0079	H	**0.0611 - 0.1174**	H	0.01		mg/L	<0.0001
Lithium	-		-		-		mg/L	0.002
Magnesium	-		-		-		mg/L	34.6
Manganese	3.2 - 3.2	H	**7.04**	H	<0.05	AO	mg/L	2.59
Mercury	0.0001		-		0.001		mg/L	<0.00002
Molybdenum	2		-		0.25		mg/L	0.001
Nickel	0.025 - 0.15		-		-		mg/L	0.0092
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	0.05
Potassium	-		-		-		mg/L	87.2
Selenium	0.002		-		0.01	MAC	mg/L	<0.0005
Silicon	-		-		-		mg/L	11.1
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.00005
Sodium	-		-		<200	AO	mg/L	178
Strontium	-		-		-		mg/L	1.11
Sulfur	-		-		-		mg/L	16
Thallium	0.0008		-		-		mg/L	<0.00002
Tin	-		-		-		mg/L	0.0002
Titanium	-		-		-		mg/L	0.006
Uranium	0.0005		-		-		mg/L	0.0002
Vanadium	-		-		-		mg/L	0.001
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**	H	<5.0	AO	mg/L	0.009
Zirconium	-		-		-		mg/L	0.0006

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
British Columbia Approved and Working (or interim) Water Quality Guidelines (BC WQG),
H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

Location Site Name Sample ID Laboratory ID Sample Date QAQC	CSR Aquatic Life Standard, Freshwater (AW-F)	CSR Livestock Standard (LW)	CSR Drinking Water Standard (DW)	Units	Thornhill Landfill SW-23 SW-23 - 24-Aug-17 -	SW-23 - 28-Mar-17 -
Conventional Parameters						
Conductivity	-	-	-	uS/cm	100	72
Hardness (Total as CaCO3)	-	-	-	mg/L	45.8	26.7
pH	-	-	-	pH	7.5	7.1
Total Suspended Solids	-	-	-	mg/L	7.5	5.4
Ammonia, Total (as N)	1.3 - 18.5	-	-	mg/L	<0.03	0.16
Chloride (Cl)	1500	-	-	mg/L	1.3	3.6
Fluoride (F)	2.0-3.0 (e)	-	-	mg/L	<0.10	<0.10
Nitrate (as N)	400	**100**	10	mg/L	0.082	0.07
Nitrite (as N)	0.2 - 0.8	**10**	1	mg/L	<0.01	<0.01
Sulfate (SO4)	128 - 429	**1000**	500	mg/L	2.1	1.6
Biological Oxygen Demand (BOD)	-	-	-	mg/L	<4.0	<4.0
Chemical Oxygen Demand (COD)	-	-	-	mg/L	<20	<20
Total Metals						
Aluminum	-	**5**	9.5	mg/L	0.305	0.848
Antimony	0.09	-	0.006	mg/L	<0.00020	<0.0001
Arsenic	0.05	**0.025**	0.01	mg/L	<0.00050	<0.0005
Barium	10	-	1	mg/L	0.0159	0.018
Beryllium	0.0015	**0.1**	0.008	mg/L	<0.00010	<0.0001
Bismuth	-	-	-	mg/L	<0.00010	<0.0001
Boron	12	**5**	5	mg/L	0.0223	0.03
Cadmium	0.0005 - 0.004	**0.08**	0.005	mg/L	0.000011	<0.00001
Calcium	-	**1000**	-	mg/L	16.7	8.7
Chromium	0.01	**0.05**	0.05	mg/L	<0.00050	0.0009
Cobalt	0.04	**1**	0.001	mg/L	0.00018	0.0004
Copper	0.02 - 0.09	**0.3**	1.5	mg/L	0.00143	0.0025
Iron	-	-	6.5	mg/L	0.479	0.93
Lead	0.04 - 0.16	**0.1**	0.01	mg/L	<0.00020	0.0002
Lithium	-	**5**	0.008	mg/L	0.0002	0.0005
Magnesium	-	-	-	mg/L	0.988	1.2
Manganese	-	-	1.5	mg/L	0.0279	0.0873
Mercury	0.00025	**0.002**	0.001	mg/L	<0.000010	<0.00002
Molybdenum	10	**0.05**	0.25	mg/L	0.00098	0.0007
Nickel	0.25 - 1.5	**1**	0.08	mg/L	0.00041	0.0011
Phosphorus	-	-	-	mg/L	<0.050	<0.05
Potassium	-	-	-	mg/L	0.89	1.2
Selenium	0.02	**0.03**	0.01	mg/L	<0.00050	<0.0005
Silicon	-	-	-	mg/L	3.5	3.9
Silver	0.0005 - 0.015	-	0.02	mg/L	<0.000050	<0.00005
Sodium	-	-	200	mg/L	1.82	2.92
Strontium	-	-	2.5	mg/L	0.0441	0.03
Sulfur	-	-	-	mg/L	<3.0	<1
Tellurium	-	-	-	mg/L	<0.00050	<0.0002
Thallium	0.003	-	-	mg/L	<0.000020	<0.00002
Thorium	-	-	-	mg/L	<0.00010	<0.0001
Tin	-	-	2.5	mg/L	<0.00020	<0.0002
Titanium	1	-	-	mg/L	0.0086	0.026
Uranium	0.085	**0.2**	0.02	mg/L	0.000132	0.00018
Vanadium	-	**0.1**	0.02	mg/L	0.0012	0.002
Zinc	0.075 - 38.1	**2**	3	mg/L	<0.0040	0.004
Zirconium	-	**-**	-	mg/L	<0.00010	0.0004

NOTES

BC CSR AW-F — er Quality Guidelines for Protection of Freshwater Aquatic Life
BC CSR LW — on Water Quality Guidelines for Protection of Livestock
BC CSR DW — ulation Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
Standards shown are from the BC Contaminated Sites Regulation (CSR; BC Reg. 375/96, O.C. 1480/96 and M40/2019, includes amendments up to BC Regs. 11/2019 and 13/2019, updated to 24 Jan 2019)

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

Table F-14: Historic Surface Water Analytical Results
2018 Thornhill Transfer Station Annual Monitoring Program
Regional District of Kitimat-Stikine

Location Site Name Sample ID Laboratory ID Sample Date QAQC	BCWQG Aquatic Life - Freshwater (Chronic - Long-term average)	Notes	BCWQG Aquatic Life - Freshwater (Short-term maximum)	Notes	BCWQG -Drinking Water	Notes	Units	Thornhill Landfill SW-23 SW-23 - 24-Aug-17 -	 SW-23 - 28-Mar-17 -
Conventional Parameters									
Conductivity	-		-		-		uS/cm	100	71.6
Hardness (Total as CaCO3)	-		-		-		mg/L	45.8	26.7
pH	6.5-9.0		-		6.5 - 8.5		-	7.5	7.1
Total Suspended Solids	-		**25 mg/L (backgr. 25-250 mg/l)) (i)**		-		mg/L	7.5	5.4
Ammonia, Total (as N)	1.59 - 1.86	pH/T*	**12.7 - 19.1**	pH/T*	-		mg/L	<0.03	0.16
Chloride (Cl)	150		**600**		<250	AO	mg/L	1.3	3.6
Fluoride (F)	-		**1.09 - 1.45**	H	1.5		mg/L	<0.10	<0.10
Nitrate (as N)	3		**32.8**		10		mg/L	0.082	0.07
Nitrite (as N)	0.02 - 0.08	Cl	**0.06 - 0.24**	Cl	1		mg/L	<0.01	<0.01
Sulfate (SO4)	128 - 309	H	-		<500	AO	mg/L	2.1	1.6
Biological Oxygen Demand (BOD)	-		-		-		mg/L	<4.0	<4.0
Chemical Oxygen Demand (COD)	-		-		-		mg/L	<20	<20
Total Metals									
Aluminum	0.05	pH	**0.1**	pH	9.5		mg/L	**0.305**	**0.848**
Antimony	0.009		-		-		mg/L	<0.00020	<0.0001
Arsenic	0.005		-		0.01		mg/L	<0.00050	<0.0005
Barium	1		-		-		mg/L	0.0159	0.018
Beryllium	0.00013		-		-		mg/L	<0.00010	<0.0001
Bismuth	-		-		-		mg/L	<0.00010	<0.0001
Boron	1.2		-		5		mg/L	0.0223	0.03
Cadmium	0.18 - 0.26	H	**0.47 - 0.79**	H	0.005		mg/L	0.000011	<0.00001
Calcium	-		-		-		mg/L	16.7	8.7
Chromium	0.001 $^{Cr\ VI}$ 0.0089 $^{Cr\ III}$	V	-		-		mg/L	<0.00050	0.0009
Cobalt	0.004		**0.11**		-		mg/L	0.00018	0.0004
Copper	0.00004	H	**0.00708 - 0.01450**	H	1		mg/L	0.00143	0.0025
Iron	-		**1**		<0.3	AO	mg/L	0.479	0.93
Lead	0.0057 - 0.0079	H	**0.0611 - 0.1174**	H	0.01		mg/L	<0.00020	0.0002
Lithium	-		-		-		mg/L	0.0002	0.0005
Magnesium	-		-		-		mg/L	0.988	1.2
Manganese	0.72 - 0.81	H	**0.83 - 1.04**	H	<0.05	AO	mg/L	0.0279	0.0873
Mercury	0.0001		-		0.001		mg/L	<0.000010	<0.00002
Molybdenum	2		-		0.25		mg/L	0.00098	0.0007
Nickel	0.025 - 0.15		-		-		mg/L	0.00041	0.0011
Phosphorus	0.005-0.015		-		0.01	AO	mg/L	<0.050	<0.05
Potassium	-		-		-		mg/L	0.89	1.2
Selenium	0.002		-		0.01	MAC	mg/L	<0.00050	<0.0005
Silicon	-		-		-		mg/L	3.5	3.9
Silver	0.00005, 0.0015	H	0.0001, 0.003	H	-		mg/L	<0.000050	<0.00005
Sodium	-		-		<200	AO	mg/L	1.82	2.92
Strontium	-		-		-		mg/L	0.0441	0.03
Sulfur	-		-		-		mg/L	<3.0	<1
Tellurium	-		-		-		mg/L	<0.00050	<0.0002
Thallium	0.0008		-		-		mg/L	<0.000020	<0.00002
Thorium	-		-		-		mg/L	<0.00010	<0.0001
Tin	-		-		-		mg/L	<0.00020	<0.0002
Titanium	-		-		-		mg/L	0.0086	0.026
Uranium	0.0005		-		-		mg/L	0.000132	0.00018
Vanadium	-		-		-		mg/L	0.0012	0.002
Zinc	0.0075 - 0.0398	H	**0.033 - 0.0653**	H	<5.0	AO	mg/L	<0.0040	0.004
Zirconium	-		-		-		mg/L	<0.00010	0.0004

NOTES

BCWQG AWF Long-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Chronic Long-term Average
BCWQG AWF Short-term — BC Water Quality Guidelines for Freshwater Aquatic Life - Short-term Maximum
BCWQG DW — BC Water Quality Guidelines for Drinking Water

Italics indicate that the laboratory detection limit exceeds the applicable standard.
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H = standard is hardness dependent; pH = standard is pH dependent; Cl = standard is chloride dependent; T = standard varies with
V = Standard is valence dependent VI refers to chromium VI and III refers to chromium III; Ca = standard is calcium dependent
* = for ammonia guideline, an average temperature of 10 degrees Celsius and a pH of 7.5 was chosen where no data was available
MAC = Maximum Acceptable Concentration
AO = Aesthetic Objective
QAQC = Quality Assurance and Control; FDA = Field Duplicate Available; FD = Field Duplicate

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