



ISKUT LANDFILL

2021 Annual Report

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

The Iskut Landfill serves the community of Iskut and surrounding Electoral Area residents. It is owned by the Regional District of Kitimat-Stikine and operated in accordance with Ministry of Environment and Climate Change Strategy (ENV) Operational Certificate (OC) MR-4612.

In 2021, 536.3 tonnes (3,287.2 cubic metres) of solid waste were deposited into the landfill. An estimated 48.95 tonnes (577 cubic metres) of metal were diverted from the landfill. Septage and tires were also diverted from landfill, however these materials and their volumes were not tracked during 2021.

There were no instances of mammalian wildlife breaching the facility fence observed during 2021 at the Iskut Landfill. There was minimal vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens).

During 2021, the Iskut Facility had some projects completed to bring the facility into compliance with its OC as well as the CSR Hazardous Waste Regulation. The facility self-reported one non-compliance for September. The remaining non-compliance points for the year were identified upon site visits and a facility document review by ENV in August 2021.

The two surface water compliance points were sampled and monitored according to their OC prescriptions. The compiled data, interpretation, and recommendations by Tattersfield Consulting will be contained in the *Iskut Landfill 2021 Annual Environmental Effects Monitoring (EEM) Report*.



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1 Introduction

This annual report covers the period from January to December 2021 and has been prepared to fulfill the requirements of Iskut Landfill Operational Certificate (OC) MR-4612. The Iskut OC was issued in 2012, and last amended in October 2022. The OC authorizes the discharge of municipal solid and liquid wastes and outlines the criteria for environmental and human protection at the landfill.

The 2021 Annual Report summarizes the topics presented in Table 1.

Table 1: Report Objectives

<p>Waste Tracking</p> <p>Quantity of Waste Received, Recycled and Composted</p> <p>Wildlife Observations</p> <p>Operations</p> <p>Facility Updates and Maintenance Non-Compliances</p> <p>Environmental Monitoring</p>	
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Environmental monitoring was conducted in accordance with the OC. The results of the waster quality monitoring program, which includes surface water monitoring, are discussed in the Environmental Effects Monitoring Report prepared by Tattersfield Consulting, and contained in Appendix A of this report.

2 Background

The Iskut Landfill is owned and operated by the Regional District of Kitimat-Stikine (RDKS). It is located two km northwest of Iskut with access from the Stewart-Cassiar Highway. The landfill serves the Iskut Community, which includes the area along Highway 37 north of Iskut to the Stikine River, and South of Iskut to Kinaskin Lake Provincial Park. The landfill does not accept waste from mining camps or industrial project sites.

The Iskut landfill site is 3.5 ha in size and includes a landfill, a septage receiving lagoon, a borrow area for cover material, and a designated area for the diversion of metal, tires, and clean wood. The Iskut Landfill is responsible for the management of municipal solid and liquid waste generated by commercial and residential sources in the Iskut Community and surrounding Electoral Area residents in accordance with the RDKS Solid Waste Management Plan.

Landfill operations are regulated by the Ministry of Environment and Climate Change Strategy (ENV) under OC MR-4612 and conducted in accordance with Iskut Landfill Operations and Closure Plan prepared by Sperling HansenAssociates in February 1999.



3 Waste Disposal

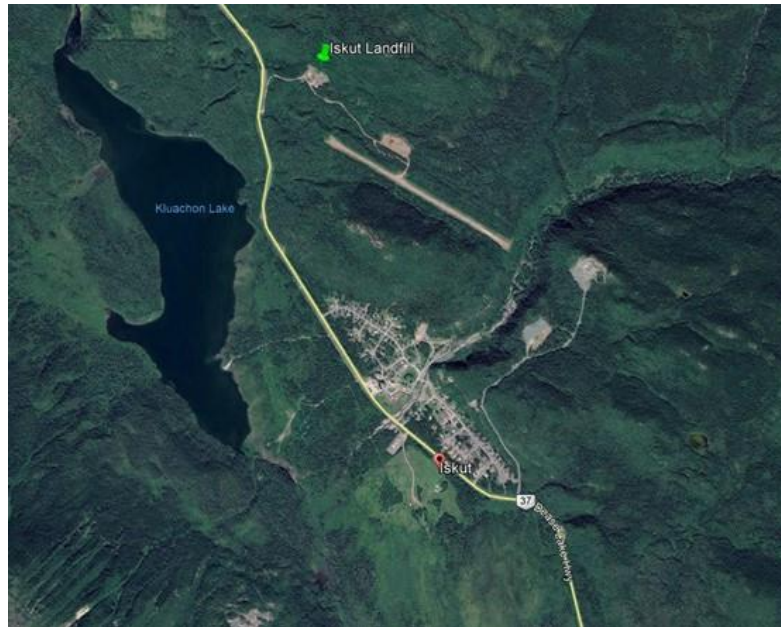



Figure 1: Location of Iskut Landfill

The Iskut Landfill serves the residents and businesses in Iskut and the surrounding area. In 2021, the Iskut Landfill served approximately 478 people between on-reserve and off-reserve residents (data provided by 2021 census). The total volume of landfilled waste and diverted materials collected at the Iskut landfill from January through to December 2021 are shown in Table 2.



Table 2 Landfilled and Diverted Waste for Iskut Facility 2021.

Waste Type	Cubic Metres	Tonnes
Landfilled Waste	3,287.2	536
Refuse ¹	3,287.2	536
Diverted Waste	577	49
Metal ²	577	49
Septage ³	0	0
Tires ⁴	0	0



3.1 Landfilled Waste

Refuse

Refuse is defined as discharged materials, substances, or objects, not including Restricted Wastes (metal, tires, and recyclable materials), hazardous or radioactive waste, contaminated soil, smoldering or flammable material, explosive or highly combustible materials, or tires. Refuse is disposed of in the landfill.

In 2021, 536.3 tonnes (3,287.2 cubic metres) of refuse were disposed in the Iskut landfill. Refuse tonnage was converted from cubic metres using the U.S. EPA’s *Volume to Weight Conversion Factors* (2016) document. The mixed MSW-Residential, Institutional, Commercial: Uncompacted conversion factor of 1 yard³ = 275lbs was used to calculate tonnage.

3.2 Diverted Wastes

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

Metal

Metal, consisting of scrap, propane tanks, and large appliances, is collected from the Iskut Landfill by Terrace-based metal recyclers. In 2021, four loads of metal were removed. Three of the loads consisted of auto hulks that were previously lined up along the North boundary of the facility and one load contained scrap metal. It is estimated that there was a total of 48.95 tonnes (577 cubic metres) of metal

¹ These values are based on pre-compaction volume (m3) data collected from January to December 2021. Volume data was converted to tonnage using the U.S. Environmental Protection Agency’s Volume to Weight Conversion Factors (2016) value of 275lbs/yard³ for uncompacted mixed municipal solid waste.

² Tonnage of metal was estimated and recorded in staff facility inspection reports. There were no receipts located associated with the volume of metal picked up and removed from site by ABC Recycling.

³ Septage was received at the facility, but volumes were not tracked during 2021, as a result volumes are being displayed as 0.

⁴ Tires were collected and diverted from the landfill; however the Tire Stewardship of BC did not pick up any tires from the site during 2021 and no accurate count or volume was tracked, hence the use of the 0 in the reporting table and report.



on site through 2021. All ozone depleting substances were removed from applicable appliances prior to being included in the on-site scrap metal storage.

Septage

Septage is defined as septic tank pumpage and treated sewage sludge, but does not include other sewage wastes (wastewater, sewage or slurry, including catch basins, oil water separators, shop floor drains).

Septage volumes were not tracked during 2021 at the Iskut Facility.

Tires

In 2021, tires were not collected by the Tire Stewardship of BC. There was a load of approximately 50 tires with rims removed from the facility and brought to an automotive shop to have rims removed. No official count or volume was made or tracked for tires.

4 Wildlife Occurrences and Observations

The Iskut Landfill is located in an area with bears, wolves, coyotes, several species of birds of prey, and many other species of mammals that may attempt access to the facility. An electric fence surrounds the landfill area to prevent access and is kept charged from spring until late fall.

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 inspections are recorded on the Daily Operation Inspection Form.

4.1 Bird and Vector Control

Birds, such as ravens and crows, are a nuisance at landfill sites, as they can scatter litter into the surrounding environment. Bird control at the Iskut landfill is based on thorough and complete cover of waste.

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

4.2 Mammals

In 2021, there were no recorded instances of mammalian wildlife breaching the facility.




5 Operations

5.1 Facility Works & Projects

During 2021 there were facility works and projects completed to bring the site into compliance with several of the non-compliances identified and described in Table 4 and Table 5. These works are summarized in Table 3.

Table 3 Major Works & Projects at Facility.

Date & Nature of Work	Details	
<p>October 2021 Removal of auto-hulks</p>	<p>To comply with OC section 4.7 Fire Prevention, the auto hulks were removed from site to maintain the 15m wide fire break around combustible materials from the disposal, treatment and receiving storage areas.</p>	
<p>October 2021 Installation of fire suppression kit on site</p>	<p>To comply with OC section 4.7, RDKS staff installed a fire suppression kit consisting of an industrial fire extinguisher, pulaski, gloves, a fire blanket and a wildfire plastic backpack extinguisher all stored in a large waterproof tote.</p>	
<p>November 15-19, 2021 Site clean-up and minor reconfiguration</p>	<p>To reduce illegal dumping on site and encourage correct segregation of divertible materials the facility was cleaned up and slightly reconfigured to better define recycling areas and obstruct access to areas that have repeatedly seen illegal dumping.</p> <p>Improvements included:</p> <ul style="list-style-type: none"> • Construction of U-bays for scrap metal and tire recycling • Removal of trees and tires from the septage lagoon • Removal of oil and paint from the site • Removal of metal, (~70% of the metal pile), and relocation of the remainder of the metal pile to a location >15m from combustible materials • Storing batteries in a covered area • Removing auto-hulks and blocking off access to the back of the site. 	



5.2 Non-Compliance Reports

Non-compliance reports include non-compliance with the OC, and with applicable legislation such as the Hazardous Waste Regulation (HWR).

5.2.1 Operational Certificate MR-4612

For 2021 at the Iskut facility, the RDKS self reported one non-compliance that was identified by staff during a site-visit on September 29th. The remaining non-compliances in 2021, were identified by ENV during a facility inspection on the August 25th and corresponding facility document review. A Non-Compliance Report was submitted to the RDKS from ENV September 20th, 2021. A summary of all the non-compliances for the Iskut facility during the year of 2021 are in Table 4.

Table 4 OC Non-compliances Reported for the Iskut facility in 2021.

Operational Certificate Section	Description of Non-Compliance
Section 4.17.8 Electric Fencing: Gate(s)	The facility gate was deenergized and left open during non-operational hours.
Section 4.2 Prohibited Wastes	Unauthorised hazardous wastes were received at the facility and improperly stored on site.
Section 4.7 Fire Prevention	A 15m fire break was not maintained around the storage areas of combustible materials and fire suppression materials, including water supply or soil and earth movement equipment, were not maintained at a sufficient level.
Section 4.10 Litter Control	Litter was scattered around the facility.
Section 4.16 Maintenance Works & Emergency Procedures	Regular inspections were not completed by the Operations Contractor, motor vehicles and white metals containing ODS remained haphazardly on the ground, solid wastes were identified in vegetation outside of the authorized waste disposal area, derelict vehicles were stored in an area north of the borrow pit, litter control was deficient, and the electric fencing was not fully operational as required.
Section 4.17.6 Electric Fencing: Period of Operation	Electric fence inspections through 2021 indicated that the fence did not maintain a charge of at least 7,000 volts consistently during April 1st to October 31st.
Section 4.17.7 Electric Fencing: Minimum Voltage	The third and fourth strands on the electric fence did not match the appropriate voltage of the upper two strands (7,000 volts). Upon inspection by the ENV, the bottom two strands measured only 2,500 volts.



Operational Certificate Section	Description of Non-Compliance
Section 4.17.8 Electric Fencing: Gate(s)	The facility gate was deenergized and left open during non-operational hours.
Section 4.17.9 Electric Fencing: Gate(s)	The electric fence was not tested once every 7 days or increased to once per day when low voltage or signs of penetration attempts were observed.
Section 7.1 Operational Requirements for Storage of Selected Wastes for Salvage and Recycling: Location	Signs were not maintained for the unsorted metal storage or appliances collection in the salvage and recycling area. No sign indicating what was acceptable to deposit.
Section 7.2 Operational Requirements for Storage of Selected Wastes for Salvage and Recycling: Nature of Wastes	Hazardous wastes restricted by section 4.2 was deposited at the facility without RDKS approval.
Section 9.1 Operational Requirements for Liquid Waste Disposal: Location	Septage lagoons were not located in the area delineated in the site plan.
Section 9.3 Operational Requirements for Liquid Waste Disposal: Nature of Wastes	Septage lagoons contained debris, including a tire and other solid wastes.
Section 10 Monitoring Requirements	A qualified professional had not evaluated the environmental monitoring program as required by September 30, 2013.
Section 11.2 Reporting Requirements: Logbook	Proper facility records had not been kept as required by Sections 4.17.9 and 5.6 during the inspection period.
Section 11.3 Reporting Requirements: Non-Compliance Reporting	There were no records of notifications to the Director found in the Ministry's files for any of the non-compliances with the OC during the inspection period.

5.2.2 Environmental Management Act: Hazardous Waste Regulation

The site visit and review of facility records on August 25th, 2021 also highlighted 3 non-compliances with the Hazardous Waste Regulation (HWR). On September 20th, 2021 ENV produced a warning letter listing the HWR non-compliances. A summary of these non-compliances can be found below in Table 5.



Table 5 Lists the HWR non-compliances for the Iskut facility during 2021.

HWR Non-Compliances	Description of Non-Compliance
Section 42.3 (1)(b) and 50 (8) of HWR	RDKS did not operate the Facility for the storage of hazardous waste in accordance with the HWR during the inspection period.
Section 42.3 of HWR	The Facility is not registered under the Hazardous Waste Regulation (HWR) as a return collection facility as required under Section 42.3 of the HWR.
Section 50 (8) of HWR	Hazardous wastes were not appropriately secured at the facility during inspection.



6 Environmental Monitoring

Environmental monitoring for the Iskut Facility was conducted by RDKS Environmental Services Technician, following Ministry of Environment and Climate Change Strategy, 2013 British Columbia Field Sampling Manual. Tattersfield Consulting has been retained to compile and analyze in-situ monitoring and surface water sampling results. The compiled data, interpretation, and recommendations by Tattersfield Consulting will be contained in the *Iskut Landfill 2021 Annual Environmental Effects Monitoring (EEM) Report*.

Surface Water

There are currently two surface water sites for the environmental monitoring program at the Iskut Landfill: one Upstream and one Downstream point along an unnamed creek near the facility. The surface water runs parallel along the facility’s Northwest and Southwest fence line. They are sampled and monitored twice yearly during the spring and fall. In-Situ parameters are monitored using a YSI. Lab parameters are collected in sample bottles and shipped to ALS for analysis.

7 Summary

In 2021, 536.3 tonnes (3,287.2 cubic metres) of solid waste were deposited into the landfill. An estimated 48.95 tonnes (577 cubic metres) of metal were diverted from the landfill. Septage and tires were also diverted from landfill, however these materials and their volumes were not tracked during 2021. There were no instances of mammalian wildlife breaching the facility fence recorded during 2021 at the Iskut Landfill. There was noted vector activity from birds, including raptor species (bald eagles), and corvid species (crows and ravens). During 2021, the Iskut Facility had works projects completed to bring the facility into compliance with its OC as well as the Hazardous Waste Regulation. The facility self-reported one non-compliance for September, with additional non-compliance points identified during a site-inspection and facility document review conducted by ENV in August.



The two surface water compliance points were sampled and monitored according to their OC prescriptions. The compiled data, interpretation, and recommendations by Tattersfield Consulting will be contained in the *Iskut Landfill 2021 Annual Environmental Effects Monitoring (EEM) Report* in Appendix A.

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Regional District of
Kitimat-Stikine

Appendix A Environmental Effects Monitoring Report

ISKUT LANDFILL 2021 ENVIRONMENTAL MONITORING REPORT

Prepared for:

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Tattersfield Consulting
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June 2022

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1. Introduction

The Regional District of Kitimat-Stikine (RDKS) is required to report annually on their environmental monitoring program for the Iskut Landfill including an evaluation of surface water samples, identification of any potential impacts on the receiving environment and trend analysis for key parameters.

The on-going Environmental Monitoring program currently reflects interim monitoring requirements outlined in Section 10 – Monitoring Requirements in the Iskut Operational Certificate (Figure 1).

Sampling Locations ¹ and EMS ID	Frequency ³	Parameters ³
Un-named Creek U/S of Iskut Landfill E282678	twice annually, in April and September	<u>Field Measurements:</u> pH, dissolved oxygen, specific conductance, temperature <hr/> <u>Lab Analysis:</u> BOD, total nitrogen, phosphorous, ammonia, pH, total and dissolved metals ²
Un-named Creek D/S of Iskut Landfill E282679		
¹ Sampling locations are shown on the site plan ² Lab analysis for dissolved metals shall use a low level scan ³ May be altered in future, depending on results		

Figure 1. Interim monitoring requirements as shown in the Iskut Landfill OC.

1.1. Site Setting


The Iskut landfill is located approximately 2 km north of Iskut, to the east of Highway 37 north (Figure 2).

Esri, NASA, NGA, USGS, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Esri Canada, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NRCam, Parks Canada, Esri Canada
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Project:

2021 Iskut Landfill Environmental Effects Annual Reporting



**Regional District of
Kitimat-Stikine**
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Legend:

- Surface Water Site
- ← Watercourse
- - - Unmapped Stream
- Tenure Lease

Title: **Monitoring Locations
Iskut Landfill
2021**

Scale: 2,500	Projection: NAD 1983 UTM Zone 9N
File: 5360-03-02-05	Date: June 3, 2022
Drawn: N. Lavoie Reviewed: S. Prouse	Figure No: Figure 2

2. Surface Water Quality Monitoring

Surface water sampling is currently completed twice annually at two locations along an unnamed creek, as per Section 10 – Monitoring Requirements in the Iskut Operation Certificate (OC) (Figure 1).

The sample creek is located to the north west of the landfill. Upstream and downstream sample locations have been established. The control site is located upstream from the landfill to establish background surface water conditions (receiving water in a location not affected by any potential leachate). The downstream site could potentially be impacted by any leachate from the landfill.

In 2021, surface water sampling was completed on May 20 and September 29 at the following locations (Figure 2):

- Un-named Creek upstream (U/S) of Iskut Landfill (E282678)
- Un-named Creek downstream (D/S) of Iskut Landfill (E282679)

Historic sample dates include:

- June 26, 2013
- July 30, 2014
- May 20, 2015
- July 18, 2016
- 2017 – no samples
- May 15, 2018
- September 5, 2018
- May 14, 2019
- October 16, 2019 – no sample
- May 20, 2020
- September 23, 2020

2.1. Protocol

Surface water samples were collected by a Regional District of Kitimat-Stikine Environmental Technician following methods that align with the Ministry of Environment and Climate Change Strategy, 2013 BC Field Sampling Manual and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. RDKS' general surface water sampling methods include the following:

- Samples are taken by dipping bottles into streams for those not requiring filtering.
- Syringes with filters are used for dissolved metals and dissolved mercury samples.
- Samples are transported in coolers with ice packs.

- Typically, RDKS obtains:
 - an unfiltered, unpreserved sample for general parameters,
 - an unfiltered sample for nutrients analysis, preserved with sulfuric acid,
 - an unfiltered sample for total metals analysis, preserved with nitric acid,
 - a filtered sample, for dissolved metals preserved with nitric acid,
 - an unfiltered sample for total mercury analysis, preserved with hydrochloric acid, and,
 - a filtered sample for dissolved mercury, preserved with hydrochloric acid.
- pH, dissolved oxygen, specific conductance and temperature were recorded in the field using a YSI meter.

2.2. Analysis

Water samples were sent to ALS Environmental laboratory for analysis. The analytical reports for 2021 are attached in Appendix A. All data were compiled (Appendix B) and reviewed against the following guidelines:

- BC MoE Water Quality Guidelines for aquatic life (BCWQG -AW)
- BC MoE Approved and Working Water Quality Guidelines for drinking water (BCWQG-DW)

The following required parameters, as specified in the OC, are summarized in this report:

Field:

- pH, dissolved oxygen, specific conductance, temperature

Lab:

- BOD, total nitrogen, phosphorus, ammonia, pH
- total and dissolved metals (not summarized, but collated in Appendix B)

Trends have been presented for both U/S and D/S locations for conductivity, aluminum and iron as in previous years.

Specific conductance measurements were taken this year, so trends for this value can start being presented next year.

The BCWQG-AW require dissolved organic carbon (DOC) to determine the criteria for copper using biotic ligand modelling software. DOC was not collected during the 2021 field program and the copper criteria was not calculated.

2.3. Results

2.3.1. E282678 Un-named Creek U/S from Iskut Landfill

The E282678 sample site is located U/S from potential leachate effects and establishes background surface water quality. No exceedances of the guidelines were noted in the 2021 data. Table 1 summarizes the required parameters except total and dissolved metals. All other results, including total and dissolved metals, are collated in Appendix B.

Table 1. Summary of required water quality monitoring results for Un-named creek U/S of Iskut Landfill (E282678).

Required Field Parameters	BCWQG-AW Short-Term	BCWQG-DW	20-May-2021	29-Sep-2021
pH	6.5-9.0	-	8.43	7.5
Dissolved oxygen (mg/L)	-	-	11.4	9.4
Specific conductance (μ S/cm)	-	-	328.6	386.1
Temperature ($^{\circ}$ C)	-	-	0.7	5.9
Required Lab Parameters				
BOD (mg/L)	-	-	<2.0	<2.0
Total Nitrogen (mg/L)	-	-	0.351	0.199
Total Phosphorus (mg/L)	-	-	0.0149	0.003
Dissolved Phosphorus (mg/L)	-	-	<0.050	<0.050
Ammonia, Total as N (mg/L)	0.501 (May) - 1.92 (September)*	-	0.0064	<0.0050
pH	6.5-9.0	-	8.08	8.31

- No Standard

*Temperature and pH dependent

2.3.2. E282679 Un-named creek D/S from Iskut Landfill

The E282679 sample site is located D/S from the landfill and would likely capture potential leachate effects. No exceedances of the guidelines were noted in the 2021 data. Table 2 summarizes the required parameters except total and dissolved metals. All other results, including total and dissolved metals, are collated in Appendix B.

Table 2. Summary of required water quality monitoring results for Un-named creek D/S of Iskut Landfill (E282679).

Required Field Parameters	BCWQG-AW Short-Term	BCWQG-DW	20-May-2021	29-Sep-2021
pH	6.5-9.0	-	8.29	8.15
Dissolved oxygen (mg/L)	-	-	12.6	12.2
Specific conductance (µS/cm)	-	-	300.6	345.2
Temperature (°C)	-	-	2.3	5.2
Required Lab Parameters				
BOD (mg/L)	-	-	<2.0	<2.0
Total Nitrogen (mg/L)	-	-	0.133	0.122
Total Phosphorus (mg/L)	-	-	0.0053	0.0231
Dissolved Phosphorus (mg/L)	-	-	<0.050	<0.050
Ammonia, Total as N (mg/L)	0.620 (May) - 0.942 (September)*	-	<0.0050	<0.0050
pH	6.5-9.0	-	8.16	8.37

- No Standard

*Temperature and pH dependent

3. Quality Assurance

Field duplicate samples were taken at the downstream location for quality assurance purposes. Results are reported as Relative Percent Difference (RPD) between the sample and duplicate sample (Appendix B).

Relative Percent Difference (RPD) is calculated as:

$$RPD = 2*(A-B)/(A+B) * 100$$

Where: RPD = Relative Percent Difference; A = Measured value of the first duplicate; B = Measured value of the second duplicate

RPD >20% between the sample and field duplicate results can indicate a problem, and >50% RPD indicates a definite problem with the sample, according to the Ministry of Environment and Climate Change Strategy, 2013 BC Field Sampling Manual. RPD only applies when the result of the analyte is greater than 5x the lab report detection limit. No RPD issues were noted in the 2021 Iskut data.

4. Trends

Trends are limited to data from 2013-2021. Figures 4-6 illustrate existing data points for U/S (E282678) and D/S (E282679) locations for specific conductance (field & lab), total aluminum and total iron. A gap in data for October 2019 exists, as no data were collected.

Specific conductance remains between a low of 345.2 uS/cm and a high of 403 uS/cm recorded this September (Figure 4). This is relatively low-mid range for streams and fluctuations have been fairly consistent between upstream and downstream sites over time.

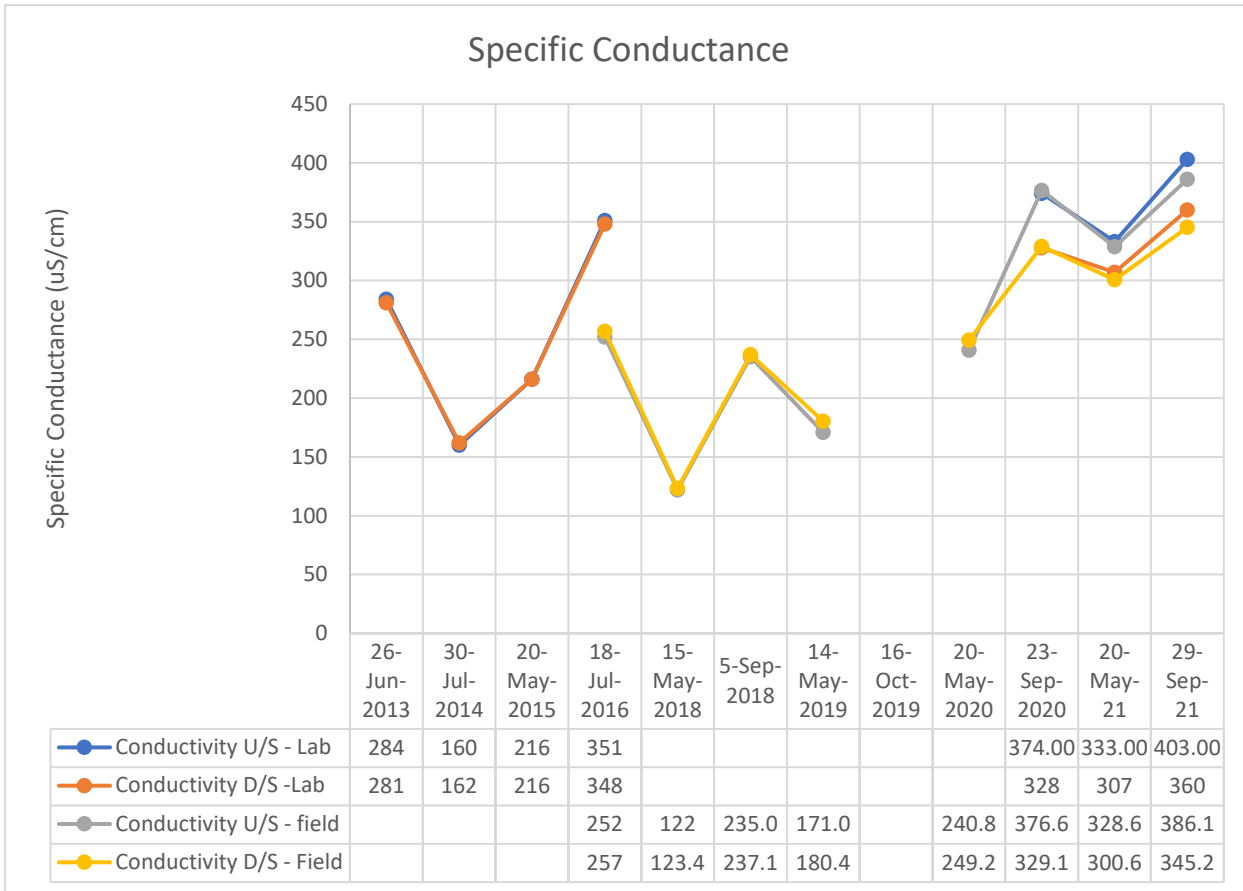


Figure 2. Specific Conductance over time.

Total aluminum concentrations have remained low, except for the increased U/S level recorded in May 2015. The BCWQG-DW guideline for total aluminum is 9.5 mg/L; however, D/S concentrations remain less than 0.01 mg/L (Figure 5).

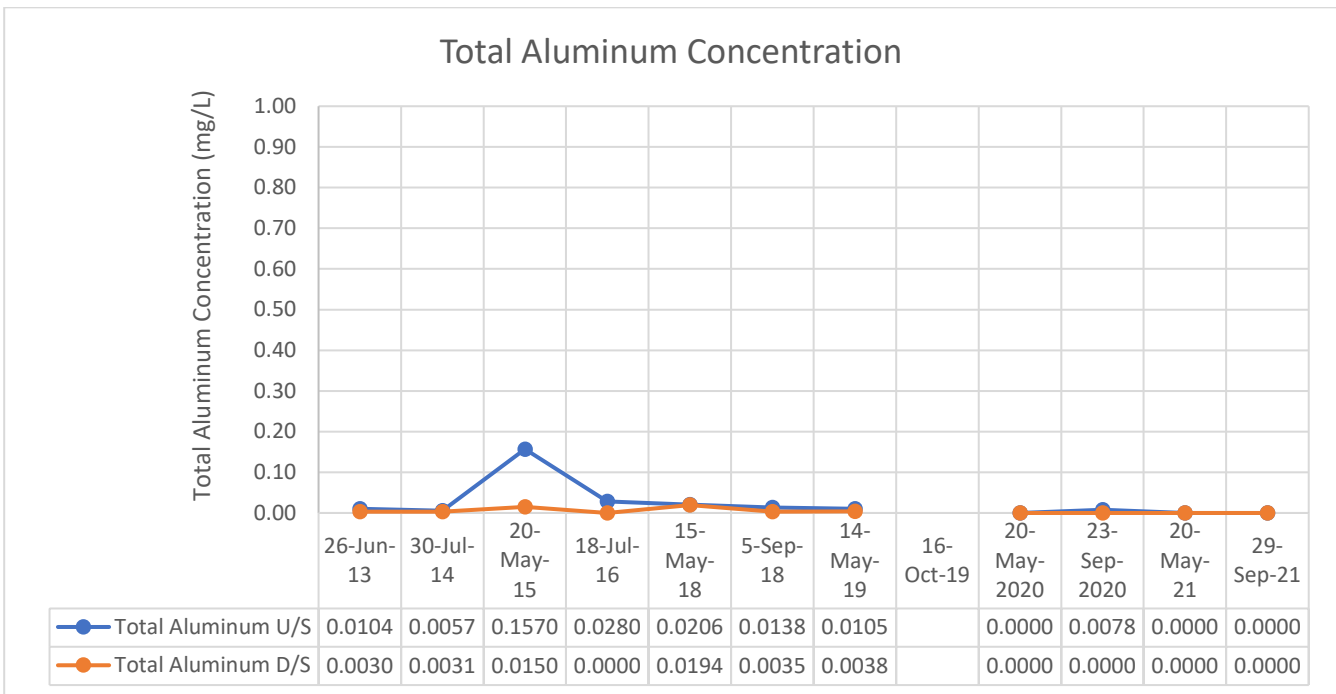


Figure 3. Total aluminum concentration over time.

Total iron concentrations have also remained low, except for the same increased U/S level recorded in May 2015. Both U/S and D/S results remain well below the BCWQG-AW guideline for total iron 1.0 mg/L (Figure 6).

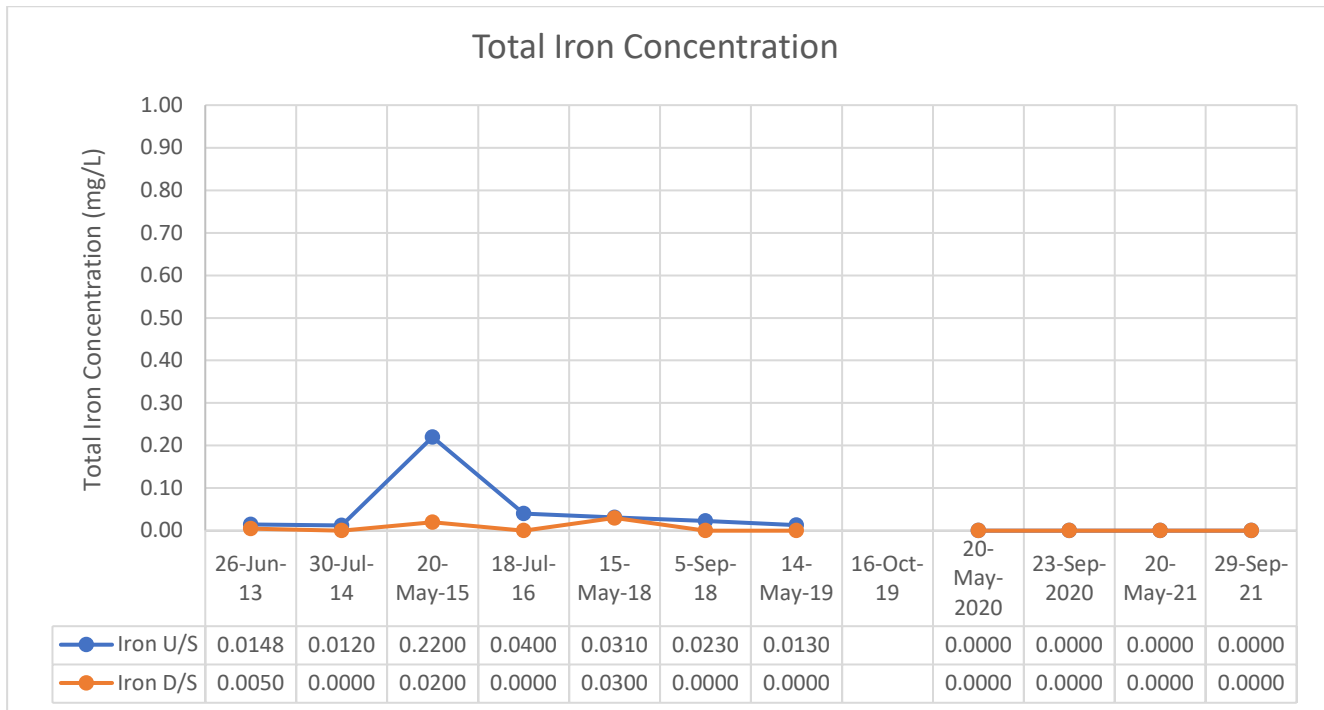


Figure 4. Total iron concentration over time.

5. Conclusion

Based on the data and guidelines provided for use by RDKS, and the assumption that they accurately reflect the existing water quality conditions at the Iskut Landfill and BC water quality standards respectively, the landfill operation is not causing water quality concerns in Un-named Creek.

No exceedances or RPD issues were noted in the sample data at U/S or D/S sample locations in 2021.

5.1. Recommendations

The following recommendations may be taken into consideration for future monitoring efforts:

- Twice annual surface water sampling at the U/S and D/S locations should be continued, as specified in the OC.
- Sample timing should be reviewed seasonally based on local weather conditions to facilitate successful sampling (i.e., the stream may contain water earlier in the spring; and less likely to be frozen earlier in the fall and/or time sampling during or after a rain event to capture surface water runoff).
- The QA/QC process should be maintained to ensure no contaminants or errors occur in the sampling process.
- Ensure the YSI meter is calibrated prior to sampling.
- Local weather and stream flow conditions could be recorded at the time of sampling to identify any major runoff or flood events that may impact surface water quality.
- DOC could be collected in future, to allow for calculation of the copper criteria.
- As per Section 10 in the Iskut OC, an environmental review was completed by Golder Associates in 2020 to determine the need for on-going environmental monitoring and the necessity of establishing groundwater monitoring sites. Golder recommended establishing 4 groundwater monitoring wells.

Report prepared by:



Carmen Tattersfield, MSc., RP.Bio.

Tattersfield Consulting

carmen.tattersfield@gmail.com

Appendix A – 2021 Laboratory Data



CERTIFICATE OF ANALYSIS

Work Order : **VA21B0033**
Client : **Regional District of Kitimat-Stikine**
Contact : H Shinton
Address : # 300 - 4545 Lazelle Avenue
Terrace BC Canada V8G 4E1
Telephone : ----
Project : Iskut Landfill
PO : ----
C-O-C number : ----
Sampler : H Shinton
Site :
Quote number : Q62338
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 21-May-2021 16:00
Date Analysis Commenced : 23-May-2021
Issue Date : 01-Jun-2021 16:45

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angela Ren	Team Leader - Metals	Metals, Burnaby, British Columbia
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Dee Lee	Analyst	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Saron Kim	Analyst	Metals, Burnaby, British Columbia
Sristika Chand	Lab Analyst	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
DTMF	Dissolved concentration exceeds total for field-filtered metals sample. Metallic contaminants may have been introduced to dissolved sample during field filtration.
RRV	Reported result verified by repeat analysis.



Analytical Results

Sub-Matrix: Water					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel Blank
(Matrix: Water)										
Client sampling date / time					20-May-2021 09:16	20-May-2021 12:47	20-May-2021 12:00	20-May-2021 12:25	[20-May-2021]	
Analyte	CAS Number	Method	LOR	Unit	VA21B0033-001	VA21B0033-002	VA21B0033-003	VA21B0033-004	VA21B0033-005	
					Result	Result	Result	Result	Result	
Physical Tests										
conductivity	----	E100	2.0	µS/cm	333	307	308	<2.0	<2.0	
hardness (as CaCO ₃), dissolved	----	EC100	0.60	mg/L	174	157	153	<0.60	----	
hardness (as CaCO ₃), from total Ca/Mg	----	EC100A	0.60	mg/L	182	172	166	<0.60	<0.60	
pH	----	E108	0.10	pH units	8.08	8.16	8.16	5.05	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0064	<0.0050	<0.0050	<0.0050	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.351	0.133	0.135	<0.030	<0.030	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0149	0.0053	0.0046	<0.0020	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0510	0.0190	0.0214	<0.0030	<0.0030	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00031	0.00030	0.00029	<0.00010	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0267	0.0269	0.0263	<0.00010	<0.00010	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000280	0.0000062	<0.0000050	<0.0000050	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	60.0	55.5	52.4	<0.050	<0.050	
cesium, total	7440-46-2	E420	0.000010	mg/L	0.000018	<0.000010	<0.000010	<0.000010	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	0.00081	0.00067	0.00069	<0.00050	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	0.122	0.026	0.028	<0.010	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	7.94	8.13	8.53	<0.0050	<0.0050	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.0415	0.00195	0.00222	<0.00010	<0.00010	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000100 ^{DLM}	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00120	0.00152	0.00149	<0.000050	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel Blank
Client sampling date / time					20-May-2021 09:16	20-May-2021 12:47	20-May-2021 12:00	20-May-2021 12:25	[20-May-2021]	
Analyte	CAS Number	Method	LOR	Unit	VA21B0033-001	VA21B0033-002	VA21B0033-003	VA21B0033-004	VA21B0033-005	
					Result	Result	Result	Result	Result	
Total Metals										
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.562	0.452	0.451	<0.050	<0.050	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00038	<0.00020	0.00020	<0.00020	<0.00020	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000504	0.000777	0.000710	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	4.51	4.04	4.06	<0.10	<0.10	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	2.37	2.17	2.21	<0.050	<0.050	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.188	0.150	0.151	<0.00020	<0.00020	
sulfur, total	7704-34-9	E420	0.50	mg/L	10.7	10.6	10.9	<0.50	<0.50	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	0.00240	0.00105	0.00142	<0.00030	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000108	0.000291	0.000288	<0.000010	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0053	0.0018	0.0020	<0.0010	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00018	0.00028	0.00028	<0.00010	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0253	0.0265	0.0264	<0.00010	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000071	<0.0000050	<0.0000050	<0.0000050	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	57.0	49.3	47.8	<0.050	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel Blank
Client sampling date / time					20-May-2021 09:16	20-May-2021 12:47	20-May-2021 12:00	20-May-2021 12:25	[20-May-2021]	
Analyte	CAS Number	Method	LOR	Unit	VA21B0033-001	VA21B0033-002	VA21B0033-003	VA21B0033-004	VA21B0033-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00052	0.00065	0.00064	<0.00020	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	7.79	8.19	8.24	<0.0050	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00028	0.00011	0.00014	<0.00010	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00113	0.00232 ^{DTMF}	0.00221 ^{DTMF}	0.00128 ^{DTC, RRV}	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.622	0.496	0.481	<0.050	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00032	0.00022	0.00020	<0.00020	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000417	0.000815	0.000776	<0.000050	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.36	3.80	3.95	<0.050	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	2.42	2.05	2.02	<0.050	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.175	0.143	0.138	<0.00020	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	10.1	10.4	11.0	<0.50	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000084	0.000275	0.000264	<0.000010	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel Blank
Client sampling date / time					20-May-2021 09:16	20-May-2021 12:47	20-May-2021 12:00	20-May-2021 12:25	[20-May-2021]	
Analyte	CAS Number	Method	LOR	Unit	VA21B0033-001	VA21B0033-002	VA21B0033-003	VA21B0033-004	VA21B0033-005	
Aggregate Organics					Result	Result	Result	Result	Result	
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0	<2.0	<2.0	<2.0	----	

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

CERTIFICATE OF ANALYSIS

Work Order : **VA21C1769**
Client : **Regional District of Kitimat-Stikine**
Contact : Hannah Shinton
Address : # 300 - 4545 Lazelle Avenue
 Terrace BC Canada V8G 4E1
Telephone : ----
Project : Iskut Landfill
PO : ----
C-O-C number : ----
Sampler : H. Shinton
Site :
Quote number : Q62338
No. of samples received : 5
No. of samples analysed : 5

Page : 1 of 6
Laboratory : Vancouver - Environmental
Account Manager : Amber Springer
Address : 8081 Lougheed Highway
 Burnaby BC Canada V5A 1W9
Telephone : +1 604 253 4188
Date Samples Received : 02-Oct-2021 12:00
Date Analysis Commenced : 05-Oct-2021
Issue Date : 20-Oct-2021 11:41

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caleb Deroche	Lab Analyst	Metals, Burnaby, British Columbia
Cindy Tang	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Ilnaz Badbezanchi	Team Leader - Metals preparation	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Shaneel Dayal	Analyst	Metals, Burnaby, British Columbia



General Comments

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

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

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

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

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

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

<: less than.

>: greater than.

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

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

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

Qualifiers

<i>Qualifier</i>	<i>Description</i>
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.



Analytical Results

Sub-Matrix: Water					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel blank
(Matrix: Water)					Client sampling date / time	29-Sep-2021 11:10	29-Sep-2021 11:40	29-Sep-2021 12:00	29-Sep-2021 12:13	29-Sep-2021
Analyte	CAS Number	Method	LOR	Unit	VA21C1769-001	VA21C1769-002	VA21C1769-003	VA21C1769-004	VA21C1769-005	
					Result	Result	Result	Result	Result	
Physical Tests										
conductivity	----	E100	2.0	µS/cm	403	360	359	<2.0	----	
hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	204	187	188	<0.60	----	
hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	213	186	186	<0.60	<0.60	
pH	----	E108	0.10	pH units	8.31	8.37	8.37	5.12	----	
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----	
nitrogen, total	7727-37-9	E366	0.030	mg/L	0.199	0.122	0.130	<0.030	<0.030	
phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	0.0030	0.0231	0.0038	<0.0020	----	
Total Metals										
aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	0.0050	0.0047	<0.0030	<0.0030	
antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00024	0.00032	0.00028	<0.00010	<0.00010	
barium, total	7440-39-3	E420	0.00010	mg/L	0.0332	0.0346	0.0357	<0.00010	<0.00010	
beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	
bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000068	0.0000056	<0.0000050	<0.0000050	<0.0000050	
calcium, total	7440-70-2	E420	0.050	mg/L	70.2	58.8	58.0	<0.050	<0.050	
cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	0.00060	0.00061	<0.00050	<0.00050	
iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
lithium, total	7439-93-2	E420	0.0010	mg/L	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	
magnesium, total	7439-95-4	E420	0.0050	mg/L	9.14	9.58	10.1	<0.0050	<0.0050	
manganese, total	7439-96-5	E420	0.00010	mg/L	0.00193	0.00045	0.00044	<0.00010	<0.00010	
mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00113	0.00108	0.00110	<0.000050	<0.000050	
nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel blank
Client sampling date / time					29-Sep-2021 11:10	29-Sep-2021 11:40	29-Sep-2021 12:00	29-Sep-2021 12:13	29-Sep-2021	
Analyte	CAS Number	Method	LOR	Unit	VA21C1769-001	VA21C1769-002	VA21C1769-003	VA21C1769-004	VA21C1769-005	
					Result	Result	Result	Result	Result	
Total Metals										
phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
potassium, total	7440-09-7	E420	0.050	mg/L	0.439	0.427	0.431	<0.050	<0.050	
rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	
selenium, total	7782-49-2	E420	0.000050	mg/L	0.000104	0.000397	0.000445	<0.000050	<0.000050	
silicon, total	7440-21-3	E420	0.10	mg/L	4.74	4.77	4.86	<0.10	<0.10	
silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
sodium, total	17341-25-2	E420	0.050	mg/L	2.99	2.42	2.40	<0.050	<0.050	
strontium, total	7440-24-6	E420	0.00020	mg/L	0.223	0.167	0.171	<0.00020	<0.00020	
sulfur, total	7704-34-9	E420	0.50	mg/L	9.85	10.9	11.3	<0.50	<0.50	
tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
uranium, total	7440-61-1	E420	0.000010	mg/L	0.000100	0.000241	0.000249	<0.000010	<0.000010	
vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	
zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved Metals										
aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	0.0019	0.0023	<0.0010	----	
antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00026	0.00032	0.00033	<0.00010	----	
barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0344	0.0364	0.0364	<0.00010	----	
beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	<0.000100	<0.000100	----	
bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000082	0.0000058	<0.0000050	<0.0000050	----	
calcium, dissolved	7440-70-2	E421	0.050	mg/L	66.0	57.6	58.4	<0.050	----	
cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel blank
Client sampling date / time					29-Sep-2021 11:10	29-Sep-2021 11:40	29-Sep-2021 12:00	29-Sep-2021 12:13	29-Sep-2021	
Analyte	CAS Number	Method	LOR	Unit	VA21C1769-001	VA21C1769-002	VA21C1769-003	VA21C1769-004	VA21C1769-005	
					Result	Result	Result	Result	Result	
Dissolved Metals										
cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00033	0.00062	0.00063	<0.00020	----	
iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----	
lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	9.50	10.5	10.2	<0.0050	----	
manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00132	0.00023	0.00024	<0.00010	----	
mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00113	0.00106	0.00107	<0.000050	----	
nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.423	0.428	0.424	<0.050	----	
rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	0.00025	0.00022	<0.00020	<0.00020	----	
selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000139	0.000403	0.000485	<0.000050	----	
silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.83	4.86	4.90	<0.050	----	
silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
sodium, dissolved	17341-25-2	E421	0.050	mg/L	2.91	2.38	2.41	<0.050	----	
strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.213	0.156	0.158	<0.00020	----	
sulfur, dissolved	7704-34-9	E421	0.50	mg/L	9.35	10.8	10.8	<0.50	----	
tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
thorium, dissolved	7440-29-1	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000088	0.000228	0.000230	<0.000010	----	
vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----	
dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	----	



Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	Up Stream Iskut	Down Stream Iskut	DUP	Field Blank	Travel blank
Client sampling date / time					29-Sep-2021 11:10	29-Sep-2021 11:40	29-Sep-2021 12:00	29-Sep-2021 12:13	29-Sep-2021	
Analyte	CAS Number	Method	LOR	Unit	VA21C1769-001	VA21C1769-002	VA21C1769-003	VA21C1769-004	VA21C1769-005	
Aggregate Organics					Result	Result	Result	Result	Result	
biochemical oxygen demand [BOD]	----	E550	2.0	mg/L	<2.0 ^{HTD}	<2.0 ^{HTD}	<2.0 ^{HTD}	<2.0 ^{HTD}	----	

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

Appendix B – Compiled Data

Table 1. Analytical Results for General Parameters and Anions & Nutrients

Work Order	BCWQG AW	BCWQG DW	Units	VA21B0033					Lab Report Limit	Lab Report Limit x 5	RPD	DF	VA21C1769					Lab Report Limit	Lab Report Limit x 5	RPD	DF
				us	ds	Field Blank	dup	Travel Blank					us	ds	Field Blank	dup	Travel Blank				
				20-May-2021	20-May-2021	20-May-2021	20-May-2021	20-May-2021					29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021				
				09:16	12:47	12:25	12:00	00:00					11:10	11:40	12:13	12:00	00:00				
ALS Sample ID				VA21B0033-001	VA21B0033-002	VA21B0033-004	VA21B0033-003	VA21B0033-005					VA21C1769-001	VA21C1769-002	VA21C1769-004	VA21C1769-003	VA21C1769-005				
Physical Tests																					
Conductivity			mg/L	333	307	<2.0	308	<2.0	2	10	0.3%	0.10	403	360	<2.0	359		2	10	0.3%	0.50
alkalinity, total (as CaCO3)			mg/L																		
hardness (as CaCO3), dissolved			mg/L	174	157	<0.60	153		0.6	3	2.6%	6.67	204	187	<0.60	188		0.6	3	0.5%	1.67
hardness (as CaCO3), from total Ca/Mg			mg/L	182	172	<0.60	166	<0.60	0.6	3	3.6%	10.00	213	186	<0.60	186	<0.60	0.6	3	13.5%	45.00
pH	6.5-9.0		pH Units	8.08	8.16	5.05	8.16		0.1	0.5	0.0%	0.00	8.31	8.37	5.12	8.37		0.1	0.5	0.7%	0.60
Field Parameters																					
Temperature				0.7	2.3								5.9	5.2							
Conductivity				328.6	300.6								244.8	214.4							
SPC													386.1	345.2							
pH				8.43	8.29								7.5	8.15							
Dissolved Oxygen %				89	102								85	108							
Dissolved Oxygen				11.4	12.6								9.4	12.2							
ORP				241.8	246.6								227.6	248.2							
Flow				NA	NA								NA	NA							
Anions and Nutrients																					
Ammonia, total (as N)	Temperature and pH Dependent Look up in guideline table for temp and pH		mg/L	0.0064	<0.0050	<0.0050	<0.0050		0.005	0.025	NA	NA	<0.0050	<0.0050	<0.0050	<0.0050		0.005	0.025	NA	NA
BOD			mg/L	<2.0	<2.0	<2.0	<2.0		2	10	NA	NA	<2.0	<2.0	<2.0	<2.0		2	10	NA	NA
Chloride	600 mg/L (instant maximum) 150 mg/L (30-day average)		mg/L																		
Nitrogen, total			mg/L	0.351	0.133	<0.030	0.135	<0.030	0.03	0.15	1.5%	0.07	0.199	0.122	<0.030	0.13	<0.030	0.03	0.15	6.3%	0.27
Dissolved Organic Carbon	Long Term Median within 20% of Background median																				
Phosphorus Total			mg/L	0.0149	0.0053	<0.0020	0.0046		0.002	0.01	14.1%	0.35	0.0030	0.0231	<0.0020	0.0038		0.002	0.01	143.5%	9.65

Table 2. Analytical Results for Total Metals In Surface Water

Work Order Client Sample ID	BCWQG AW	BCWQG DW	Units	VA21B0033					Lab Report Limit	Lab Report Limit x 5	RPD	DF	VA21C1769					Lab Report Limit	Lab Report Limit x 5	RPD	DF
				us	ds	Field Blank	dup	Travel Blank					us	ds	Field Blank	dup	Travel Blank				
				20-May-2021	20-May-2021	20-May-2021	20-May-2021	20-May-2021					29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021				
				09:16	12:47	12:25	12:00	00:00					11:10	11:40	12:13	12:00	00:00				
ALS Sample ID				VA21B0033-001	VA21B0033-002	VA21B0033-004	VA21B0033-003	VA21B0033-005					VA21C1769-001	VA21C1769-002	VA21C1769-004	VA21C1769-003	VA21C1769-005				
Total Metals																					
aluminum, total	pH Dependent Applies to only the dissolved fraction	9.5	mg/L	0.051	0.019	<0.0030	0.0214	<0.0030	0.003	0.015	11.9%	0.80	<0.0030	0.005	<0.0030	0.0047	<0.0030	0.003	0.015	6.2%	0.10
antimony, total		0.006	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA
arsenic, total	0.005	0.01	mg/L	0.00031	0.0003	<0.00010	0.00029	<0.00010	0.0001	0.0005	3.4%	0.10	0.00024	0.00032	<0.00010	0.00028	<0.00010	0.0001	0.0005	13.3%	0.40
barium, total			mg/L	0.0267	0.0269	<0.00010	0.0263	<0.00010	0.0001	0.0005	2.3%	6.00	0.0332	0.0346	<0.00010	0.0357	<0.00010	0.0001	0.0005	3.1%	11.00
beryllium, total			mg/L	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	0.0001	0.0005	NA	NA	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	0.0001	0.0005	NA	NA
bismuth, total			mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00005	0.00025	NA	NA	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00005	0.00025	NA	NA
boron, total	Long Term Chronic 1.2	5	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.05	NA	NA	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.05	NA	NA
cadmium, total	Hardness Dependent Applies to only the dissolved fraction Short Term applies to water hardness between 7-455 Chronic applies to hardness between 3.4-285	0.005	mg/L	0.000028	0.000062	<0.000050	<0.000050	<0.000050	0.000005	0.000025	NA	NA	0.000068	0.000056	<0.000050	<0.000050	<0.000050	0.000005	0.000025	NA	NA
	Hardness-Dependent BCAWQG to protect AW (3) (instant max)		mg/L	1.041	0.936	#VALUE!	0.912	#NUM!		0	NA	NA	1.226	1.121	#VALUE!	1.127	#NUM!			NA	NA
	Hardness-Dependent BCAWQG to protect AW (3) (30-d average)		mg/L	0.318	0.295	#VALUE!	0.289	#NUM!		0	NA	NA	0.357	0.335	#VALUE!	0.337	#NUM!			NA	NA
calcium, total			mg/L	60	55.5	<0.050	52.4	<0.050	0.05	0.25	5.7%	62.00	70.2	58.8	<0.050	58	<0.050	0.05	0.25	1.4%	16.00
cesium, total				0.000018	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA
chromium, total		0.05	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA
cobalt, total	0.110 (Short Term), 0.004 (Long Term Average)	0.001	mg/L	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA
copper, total	DOC Dependent - Biotic Ligand Model equation Freeware from Ministry ENV BC Applies to only the dissolved fraction. Standards are unique to each sampling event	2	mg/L	0.00081	0.00067	<0.00050	0.00069	<0.00050	0.0005	0.0025	2.9%	0.04	<0.00050	0.0006	<0.00050	0.00061	<0.00050	0.0005	0.0025	1.7%	0.02
iron, total	Short Term Total 1	NA	mg/L	0.122	0.026	<0.010	0.028	<0.010	0.01	0.05	7.4%	0.20	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.05	NA	NA
lead, total	Hardness Dependent - Total Only	0.005	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00005	0.00025	NA	NA	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.00005	0.00025	NA	NA

Table 2. Analytical Results for Total Metals In Surface Water

Work Order Client Sample ID	BCWQG AW	BCWQG DW	Units	VA21B0033					Lab Report Limit	Lab Report Limit x 5	RPD	DF	VA21C1769					Lab Report Limit	Lab Report Limit x 5	RPD	DF
				us	ds	Field Blank	dup	Travel Blank					us	ds	Field Blank	dup	Travel Blank				
				20-May-2021	20-May-2021	20-May-2021	20-May-2021	20-May-2021					29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021				
				09:16	12:47	12:25	12:00	00:00					11:10	11:40	12:13	12:00	00:00				
ALS Sample ID				VA21B0033-001	VA21B0033-002	VA21B0033-004	VA21B0033-003	VA21B0033-005					VA21C1769-001	VA21C1769-002	VA21C1769-004	VA21C1769-003	VA21C1769-005				
	Hardness Dependent Short Term Acute		mg/L	0.165253	0.144981	#VALUE!	0.140295	0.000003			NA	NA	0.202344	0.181128	#VALUE!	0.182361	0.000003			NA	NA
	Hardness Dependent Long Term Chronic		mg/L	0.009756	0.008965	#VALUE!	0.008783	#NUM!			NA	NA	0.011203	0.010375	#VALUE!	0.010423	#NUM!			NA	NA
lithium, total			mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.005	NA	NA	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.001	0.005	NA	NA
magnesium, total			mg/L	7.94	8.13	<0.0050	8.53	<0.0050	0.005	0.025	4.8%	80.00	9.14	9.58	<0.0050	10.1	<0.0050	0.005	0.025	5.3%	104.00
manganese, total	Hardness Dependent - Total Only	0.12	mg/L	0.0415	0.00195	<0.00010	0.00222	<0.00010	0.0001	0.0005	12.9%	2.70	0.00193	0.00045	<0.00010	0.00044	<0.00010	0.0001	0.0005	2.2%	0.10
	Hardness Dependent Short Term Acute		mg/L	2.457	2.270	#VALUE!	2.226	0.540			NA	NA	2.788	2.601	#VALUE!	2.612	0.540			NA	NA
	Hardness Dependent Long Term Chronic		mg/L	1.371	1.296	#VALUE!	1.278	0.605			NA	NA	1.503	1.428	#VALUE!	1.432	0.605			NA	NA
Methyl Mercury	1		mg/L								NA	NA									
mercury, total	.00002 when MeHg is ≤0.5% Calculated when MeHg is >.5% of total Hg MeHg %	0.001	mg/L	<0.0000100	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	0.000025	NA	NA	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.000005	0.000025	NA	NA
	MeHg > 0.05% Short Term 46		mg/L	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!		0	NA	NA	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!			NA	NA
molybdenum, total	Long Term 7.6	0.088	mg/L	0.00120	0.00152	<0.000050	0.00149	<0.000050	0.00005	0.00025	2.0%	0.60	0.00113	0.00108	<0.000050	0.00110	<0.000050	0.00005	0.00025	1.8%	0.40
nickel, total		0.08	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA
phosphorus, total			mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	0.25	NA	NA	<0.050	<0.050	<0.050	<0.050	<0.050	0.05	0.25	NA	NA
potassium, total			mg/L	0.562	0.452	<0.050	0.451	<0.050	0.05	0.25	0.2%	0.02	0.439	0.427	<0.050	0.431	<0.050	0.05	0.25	0.9%	0.08
rubidium, total			mg/L	0.00038	<0.00020	<0.00020	0.0002	<0.00020	0.0002	0.001	NA	NA	0.00022	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.001	NA	NA
selenium, total	Long Term Chronic Alert: 0.001 WQG: 0.002	0.01	mg/L	0.000504	0.000777	<0.000050	0.00071	<0.000050	0.00005	0.00025	9.0%	1.34	0.000104	0.000397	<0.000050	0.000445	<0.000050	0.00005	0.00025	11.4%	0.96
silicon, total			mg/L	4.51	4.04	<0.10	4.06	<0.10	0.1	0.5	0.5%	0.20	4.74	4.77	<0.10	4.86	<0.10	0.1	0.5	1.9%	0.90
silver, total	Hardness Dependent		mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA
	Long Term Hardness Calculation			0.00150	0.00150	0.00150	0.00150	0.00005			NA	NA	0.00150	0.00150	0.00150	0.00150	0.00005			NA	NA
	Short Term Hardness Calculation			0.0030	0.0030	0.0030	0.0030	0.0001			NA	NA	0.0030	0.0030	0.0030	0.0030	0.0001			NA	NA
sodium, total			mg/L	2.37	2.17	<0.050	2.21	<0.050	0.05	0.25	1.8%	0.80	2.99	2.42	<0.050	2.4	<0.050	0.05	0.25	0.8%	0.40
strontium, total		7	mg/L	0.188	0.15	<0.00020	0.151	<0.00020	0.0002	0.001	0.7%	5.00	0.223	0.167	<0.00020	0.171	<0.00020	0.0002	0.001	2.4%	20.00
sulfur, total			mg/L	10.7	10.6	<0.50	10.9	<0.50	0.5	2.5	2.8%	0.60	9.85	10.9	<0.50	11.3	<0.50	0.5	2.5	3.6%	0.80
tellurium, total			mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.001	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.001	NA	NA
thallium, total			mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.00001	0.00005	NA	NA
thorium, total			mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA
tin, total			mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA
titanium, total			mg/L	0.0024	0.00105	<0.00030	0.00142	<0.00030	0.0003	0.0015	30.0%	1.23	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	0.0003	0.0015	NA	NA
tungsten, total			mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.0005	NA	NA
uranium, total		0.02	mg/L	0.000108	0.000291	<0.000010	0.000288	<0.000010	0.00001	0.00005	1.0%	0.30	0.0001	0.000241	<0.000010	0.000249	<0.000010	0.00001	0.00005	3.3%	0.80
vanadium, total			mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0025	NA	NA

Table 2. Analytical Results for Total Metals In Surface Water

Work Order Client Sample ID	BCWQG AW	BCWQG DW	Units	VA21B0033					Lab Report Limit	Lab Report Limit x 5	RPD	DF	VA21C1769					Lab Report Limit	Lab Report Limit x 5	RPD	DF
				us	ds	Field Blank	dup	Travel Blank					us	ds	Field Blank	dup	Travel Blank				
				20-May-2021	20-May-2021	20-May-2021	20-May-2021	20-May-2021					29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021				
				09:16	12:47	12:25	12:00	00:00					11:10	11:40	12:13	12:00	00:00				
ALS Sample ID				VA21B0033-001	VA21B0033-002	VA21B0033-004	VA21B0033-003	VA21B0033-005					VA21C1769-001	VA21C1769-002	VA21C1769-004	VA21C1769-003	VA21C1769-005				
zinc, total	Hardness Dependent	3	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.003	0.015	NA	NA	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.003	0.015	NA	NA
	Long Term			0.07050	0.05775	#VALUE!	0.05475	0.00750			NA	NA	0.09300	0.08025	#VALUE!	0.08100	0.00750			NA	NA
	Short Term			0.0960	0.0833	#VALUE!	0.0803	0.0330			NA	NA	0.1185	0.1058	#VALUE!	0.1065	0.0330			NA	NA
zirconium, total			mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.001	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	0.001	NA	NA

Table 3. Analytical Results for Dissolved Metals in Surface Water

Work Order Client Sample ID	BCWQG AW	BCWQG DW	Units	VA21B0033					Lab Report Limit	Lab Report Limit x 5	RPD	DF	VA21C1769					Lab Report Limit	Lab Report Limit x 5	RPD	DF
				us	ds	Field Blank	dup	Travel Blank					us	ds	Field Blank	dup	Travel Blank				
				20-May-2021	20-May-2021	20-May-2021	20-May-2021	20-May-2021					29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021	29-Sep-2021				
				09:16	12:47	12:25	12:00	00:00					11:10	11:40	12:13	12:00	00:00				
ALS Sample ID																					
Dissolved Metals																					
aluminum, dissolved	pH Dependent Applies to only the dissolved fraction Long Term		mg/L	0.0053	0.0018	<0.0010	0.002		0.001	0.005	10.5%	0.20	<0.0010	0.0019	<0.0010	0.0023		0.001	0.005	19.0%	0.40
	Short Term Acute			0.100	0.100	0.024	0.100	3.350			NA	NA	0.100	0.100	0.024	0.100	3.350			NA	NA
	Long-Term Chronic			0.050	0.050	0.007	0.050	4.953			NA	NA	0.050	0.050	0.007	0.050	4.953			NA	NA
antimony, dissolved	-		mg/L	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA
arsenic, dissolved	-		mg/L	0.00018	0.00028	<0.00010	0.00028		0.0001	0.0005	0.0%	0.00	0.00026	0.00032	<0.00010	0.00033		0.0001	0.0005	3.1%	0.10
barium, dissolved	-		mg/L	0.0253	0.0265	<0.00010	0.0264		0.0001	0.0005	0.4%	1.00	0.0344	0.0364	<0.00010	0.0364		0.0001	0.0005	0.0%	0.00
beryllium, dissolved	-		mg/L	<0.000100	<0.000100	<0.000100	<0.000100		0.0001	0.0005	NA	NA	<0.000100	<0.000100	<0.000100	<0.000100		0.0001	0.0005	NA	NA
bismuth, dissolved	-		mg/L	<0.000050	<0.000050	<0.000050	<0.000050		0.00005	0.00025	NA	NA	<0.000050	<0.000050	<0.000050	<0.000050		0.00005	0.00025	NA	NA
boron, dissolved	-		mg/L	<0.010	<0.010	<0.010	<0.010		0.01	0.05	NA	NA	<0.010	<0.010	<0.010	<0.010		0.01	0.05	NA	NA
cadmium, dissolved	Hardness Dependent Applies to only the dissolved fraction Short Term applies to water hardness between 7 - 455 Chronic applies to hardness between 3.4 - 285		mg/L	0.0000071	<0.0000050	<0.0000050	<0.0000050		0.000005	0.000025	NA	NA	0.0000082	0.0000058	<0.0000050	<0.0000050		0.000005	0.000025	NA	NA
	Short Term Acute		mg/L	0.001041	0.000936	Site Specific	0.000912	Site Specific			NA	NA	0.001226	0.001121	Site Specific	0.001127	Site Specific			NA	NA
	Long Term Chronic		mg/L	0.000318	0.000295	Site Specific	0.000289	Site Specific			NA	NA	0.000357	0.000335	Site Specific	0.000337	Site Specific			NA	NA
calcium, dissolved	-		mg/L	57	49.3	<0.050	47.8		0.05	0.25	3.1%	30.00	66	57.6	<0.050	58.4		0.05	0.25	1.4%	16.00
cesium, dissolved	-		mg/L	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA
chromium, dissolved	-		mg/L	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA
cobalt, dissolved	-		mg/L	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA
copper, dissolved	DOC Dependent - Biotic Ligand Model equation Freeware from Ministry ENV BC Applies to only the dissolved fraction.		mg/L	0.00052	0.00065	<0.00020	0.00064		0.0002	0.001	1.6%	0.05	0.00033	0.00062	<0.00020	0.00063		0.0002	0.001	1.6%	0.05
	Calculated BLM Standard Short Term Dissolved 0.35			Not Calculated - No DOC	Not Calculated - No DOC	Not Calculated - No DOC	Not Calculated - No DOC				NA	NA	Not Calculated - No DOC	Not Calculated - No DOC	Not Calculated - No DOC	Not Calculated - No DOC				NA	NA
iron, dissolved	-		mg/L	<0.010	<0.010	<0.010	<0.010		0.01	0.05	NA	NA	<0.010	<0.010	<0.010	<0.010		0.01	0.05	NA	NA
lead, dissolved	-		mg/L	<0.000050	<0.000050	<0.000050	<0.000050		0.00005	0.00025	NA	NA	<0.000050	<0.000050	<0.000050	<0.000050		0.00005	0.00025	NA	NA
lithium, dissolved	-		mg/L	<0.0010	<0.0010	<0.0010	<0.0010		0.001	0.005	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010		0.001	0.005	NA	NA
magnesium, dissolved	-		mg/L	7.79	8.19	<0.0050	8.24		0.005	0.025	0.6%	10.00	9.5	10.5	<0.0050	10.2		0.005	0.025	2.9%	60.00
manganese, dissolved	-		mg/L	0.00028	0.00011	<0.00010	0.00014		0.0001	0.0005	24.0%	0.30	0.00132	0.00023	<0.00010	0.00024		0.0001	0.0005	4.3%	0.10
mercury, dissolved	-		mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050		0.000005	0.000025	NA	NA	<0.0000050	<0.0000050	<0.0000050	<0.0000050		0.000005	0.000025	NA	NA
molybdenum, dissolved	-		mg/L	0.00113	0.00232	0.00128	0.00221		0.00005	0.00025	4.9%	2.20	0.00113	0.00106	<0.000050	0.00107		0.00005	0.00025	0.9%	0.20
nickel, dissolved	-		mg/L	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA
phosphorus, dissolved	-		mg/L	<0.050	<0.050	<0.050	<0.050		0.05	0.25	NA	NA	<0.050	<0.050	<0.050	<0.050		0.05	0.25	NA	NA
potassium, dissolved	-		mg/L	0.622	0.496	<0.050	0.481		0.05	0.25	3.1%	0.30	0.423	0.428	<0.050	0.424		0.05	0.25	0.9%	0.08
rubidium, dissolved	-		mg/L	0.00032	0.00022	<0.00020	0.0002		0.0002	0.001	9.5%	0.10	0.00025	0.00022	<0.00020	<0.00020		0.0002	0.001	NA	NA
selenium, dissolved	-		mg/L	0.000417	0.000815	<0.000050	0.000776		0.00005	0.00025	4.9%	0.78	0.000139	0.000403	<0.000050	0.000485		0.00005	0.00025	18.5%	1.64
silicon, dissolved	-		mg/L	4.36	3.8	<0.050	3.95		0.05	0.25	3.9%	3.00	4.83	4.86	<0.050	4.9		0.05	0.25	0.8%	0.80
silver, dissolved	-		mg/L	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA
sodium, dissolved	-		mg/L	2.42	2.05	<0.050	2.02		0.05	0.25	1.5%	0.60	2.91	2.38	<0.050	2.41		0.05	0.25	1.3%	0.60
strontium, dissolved	-		mg/L	0.175	0.143	<0.00020	0.138		0.0002	0.001	3.6%	25.00	0.213	0.156	<0.00020	0.158		0.0002	0.001	1.3%	10.00
sulfur, dissolved	-		mg/L	10.1	10.4	<0.50	11		0.5	2.5	5.6%	1.20	9.35	10.8	<0.50	10.8		0.5	2.5	0.0%	0.00
tellurium, dissolved	-		mg/L	<0.00020	<0.00020	<0.00020	<0.00020		0.0002	0.001	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020		0.0002	0.001	NA	NA
thallium, dissolved	-		mg/L	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA	<0.000010	<0.000010	<0.000010	<0.000010		0.00001	0.00005	NA	NA
thorium, dissolved	-		mg/L	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA
tin, dissolved	-		mg/L	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA
titanium, dissolved	-		mg/L	<0.00030	<0.00030	<0.00030	<0.00030		0.0003	0.0015	NA	NA	<0.00030	<0.00030	<0.00030	<0.00030		0.0003	0.0015	NA	NA
tungsten, dissolved	-		mg/L	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA	<0.00010	<0.00010	<0.00010	<0.00010		0.0001	0.0005	NA	NA
uranium, dissolved	-		mg/L	0.000084	0.000275	<0.000010	0.000264		0.00001	0.00005	4.1%	1.10	0.000088	0.000228	<0.000010	0.00023		0.00001	0.00005	0.9%	0.20
vanadium, dissolved	-		mg/L	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA	<0.00050	<0.00050	<0.00050	<0.00050		0.0005	0.0025	NA	NA
zinc, dissolved	-		mg/L	<0.0010	<0.0010	<0.0010	<0.0010		0.001	0.005	NA	NA	<0.0010	<0.0010	<0.0010	<0.0010		0.001	0.005	NA	NA
zirconium, dissolved	-		mg/L	<0.00020	<0.00020	<0.00020	<0.00020		0.0002	0.001	NA	NA	<0.00020	<0.00020	<0.00020	<0.00020		0.0002	0.001	NA	NA

Appendix C – Iskut Landfill Operational Certificate

ISKEET LANDFILL
5360 03 02

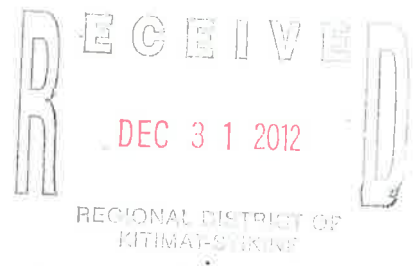


File: MR-4612

Date: December 20, 2012

REGISTERED MAIL

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



Dear Operational Certificate Holder:

Enclosed is Operational Certificate MR-4612 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

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

Administration of this operational certificate will be carried out by staff from the Skeena Region. Plans, data and reports pertinent to the operational certificate are to be submitted to the Director, Environmental Protection, at Ministry of Environment, Regional Operations, Skeena Region, 3726 Alfred Avenue, Box 5000, Smithers, BC, V0J 2N0.

Yours truly,

Mark Love, P. Ag.
for Director, *Environmental Management Act*
Skeena Region

Enclosure



MINISTRY OF ENVIRONMENT

OPERATIONAL CERTIFICATE
MR-4612

for the

ISKUT 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

Suite 300-4545 Lazelle Avenue

Terrace, British Columbia

V8G 4E1

is authorized to store, handle, treat and discharge municipal solid waste from Iskut and surrounding area at the Iskut 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 350 metres north of the Iskut airstrip, at coordinates 57°51'18.70"/129°59'43.56, Cassiar Land District.

2. AUTHORIZED DISCHARGES

2.1 Discharge of Municipal Solid Waste

This section applies to the discharge of municipal solid waste to ground at the landfill located approximately as shown on the attached site plan. The site reference number for this discharge is E208904. Refer to Section 5 for the operational requirements associated with this discharge.

2.1.1 Subject to Sections 4.2, 4.3 and 4.4, the characteristics of the discharge shall be typical of municipal solid waste.

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

2.1.3 The authorized works are a separate municipal solid waste disposal area and related appurtenances located approximately as shown on the attached site plan.

2.2 Storage and Handling of Wastes for Salvage and Recycling

This section applies to the storage and handling of municipal solid wastes for salvage and recycling. Refer to Section 7 for the operational requirements associated with this discharge.

2.2.1 Subject to Section 4.2, the characteristics of the discharge shall be typical of recyclable municipal solid waste.

2.2.2 The quantity of recyclable wastes stored or handled is indeterminate.

2.2.3 The authorized works are a separate recyclable municipal solid waste storage area and related appurtenances located approximately as shown on the attached site plan.

2.3 Discharge of Air Contaminants from Open Burning

This section applies to the discharge of air contaminants to the atmosphere from the regulated open burning of wood and selected combustibles from a burn pile located approximately as shown on the attached site plan. The site reference number for this discharge is E220154. Refer to Section 8 for the operational requirements associated with this discharge.

- 2.3.1 The characteristics of the discharge shall be typical of those resulting from the regulated open burning of selected combustibles as per Section 8.3.
- 2.3.2 The maximum authorized rate of discharge is indeterminate.
- 2.3.3 The authorized works are a separate burn area associated with a landfill operation and related appurtenances located approximately as shown on the attached site plan.

2.4 Discharge of Liquid Wastes

This section applies to the discharge of septage into a septage lagoon and thence to ground, located approximately as shown on the attached site plan. The site reference number for this discharge is E277450. Refer to Section 9 for the operational requirements associated with this discharge.

- 2.4.1 Subject to Section 4.2, the characteristics of the discharge shall be typical of septic tank pumpage, holding tank and sewage treatment plant sludges.
- 2.4.2 The maximum authorized quantity of discharge is 1000 m³/year.
- 2.4.3 The authorized works are exfiltration lagoons associated with a landfill operation and related appurtenances.

3 LANDFILL DESIGN

3.1 Design by Qualified Professional(s)

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

3.2 Construction

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

3.3 Engineered Footprint

The landfill design shall include preparation of an engineered final design footprint delineating the maximum extent of solid waste disposal allowable at the facility horizontally (in plan view). The engineered final design footprint shall be clearly shown on a scaled plan of the site and the plan made available in PDF format (see Section 3.6). These details shall be documented in the DOCP.

3.4 Engineered Excavation and Final Grade Contours

The landfill design shall include preparation of engineered excavation grade (if below grade landfilling is to occur) and final grade contours delineating the maximum extent of solid waste disposal allowable at the facility vertically (in cross-sectional view). The engineered excavation and final grade contours shall be clearly shown on scaled drawings (accompanied with typical cross sections to aid in depicting the landfill profile) and the drawings shall be made available in PDF format (see Section 3.6). These details shall be documented in the DOCP.

3.5 Legal Survey

The landfill property shall be legally surveyed on or before June 30, 2016, or a minimum of 6 months prior to closure, whichever is sooner.

3.6 Scaled Drawings

A scaled site plan accurately showing the legal survey (when completed), the engineered final design footprint, and final design contours, shall be included in the DOCP and made available in PDF format upon request by the Director. Additional scaled drawings showing excavation contours (if relevant) and typical cross sectional views of the site shall also be included in the DOCP.

4. GENERAL REQUIREMENTS

4.1 Site Identification

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

4.2 Prohibited Wastes

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



Lead-acid batteries shall not be landfilled but may be salvaged/recycled provided they are stored, handled and shipped in compliance with the *Hazardous Waste Regulation* and with Section 8 of this operational certificate. Tires equal to or less than 22" in rim size and auto hulks shall not be landfilled.

4.3 Waste Asbestos

Notwithstanding Section 4.2 of this operational certificate, the disposal of waste asbestos under Section 2.1 of this operational certificate and in compliance with the requirements of Section 40 of the *Hazardous Waste Regulation* is hereby authorized.

4.4 Contaminated Soil

Soil that contains contaminants in concentrations less than "Hazardous Waste" as defined by the *Hazardous Waste Regulation* may be disposed at the landfill site. Disposal includes monofilling, co-disposal with other wastes, use as a refuse cell berm material and use as a refuse cell cover material. Disposal must occur within a disposal area as authorized by Section 5 of this operational certificate. Disposal does not include use as final cover material.

4.5 Waste Measurement

The quantity of waste material landfilled at the site shall be measured or estimated by means suitable to the Director. The results shall be submitted in accordance with Section 11.5, once per year on or before June 30 for the previous year, expressed in tonnes/yr and/or m³/yr.

4.6 Ozone Depleting Substances

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

4.7 Fire Prevention

The operational certificate holder shall make all reasonable efforts to prevent unauthorized fires from occurring at the landfill site. As a minimum, a fire break clear of all combustible materials at least 15 metres wide shall surround all disposal, treatment and individual storage areas which have received or are receiving combustible materials. Disposal areas that have had 30 cm of compacted mineral soil cell cover or final cover applied are exempt. Water supply and pumping capabilities and/or soil and earth moving equipment shall be



maintained at a sufficient level to extinguish fires. In addition, reasonable efforts shall include, but are not necessarily limited to, the preparation of a Fire Prevention and Response Plan.

4.8 Extinguishment of Fires

In the event of an unauthorized fire (including any smouldering fire), the operational certificate holder shall immediately make all reasonable efforts to extinguish the fire. The operational certificate holder shall also immediately notify the Provincial Emergency Program (phone: 1-800-663-3456) and any local fire authority of an unauthorized fire.

4.9 Buffer Zone

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

4.10 Litter Control

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

4.11 Water Table Restriction

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

4.12 Surface Water Management

The distance between a natural body of surface water and any stored or buried materials shall be a minimum of 25 metres.

4.13 Inert Materials

Specific inert materials may be exempted from the requirements of Section 4.11 by the Director. The permission of the Director must be obtained in writing prior to any disposal or handling of inert materials on an exemption basis.

4.14 Landfill Gas Lower Explosive Limit

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

4.15 Water Quality and Protection

The landfill shall be operated in a manner such that ground or surface water quality does not decrease beyond that specified by the Director, at the landfill property boundary or other specified location.

If exceedences of the specified criteria occur as a result of landfill operations, the Director may require that leachate management control measures or works be undertaken. Terms of reference for any leachate management study and/or design work shall be submitted to the Director for approval prior to conducting the work.

In addition to requirements specified by the director, groundwater must be managed in accordance with the Contaminated Sites Regulation.

4.16 Maintenance of Works and Emergency Procedures

The operational certificate holder shall inspect the operation regularly and maintain it in good working order. The operational certificate holder shall immediately notify the Director of any circumstance which prevents continuing operation in the approved manner or results in non-compliance with the requirements of this operational certificate.

4.17 Electric Fencing

4.17.1 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.

4.17.2 Fence Type

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

4.17.3 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

4.17.4 Post Spacing

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

4.17.5 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.

4.17.6 Period of Operation

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



Mark Love, P.Ag.

For Director, Environmental Management Act

4.17.7 Minimum Voltage

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

4.17.8 Gate(s)

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

4.17.9 Fence Inspections

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

Signs of digging or other attempts by bears to penetrate electric fencing shall be recorded in a log book. Any penetrations through electric fencing by bears shall be immediately reported to the Conservation Officer Service at 1-877-952-7277 and to the Director at 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.

4.18 Other Agency Requirements

This operational certificate does not relieve the operational certificate holder from complying with requirements of federal, provincial, regional district or municipal authorities.



5. OPERATIONAL REQUIREMENTS FOR THE DISPOSAL OF SOLID WASTE

5.1 Location

The operational certificate holder shall identify an area for disposal of solid waste (herein referred to as the solid waste disposal area) that is within the authorized municipal solid waste disposal footprint (see Section 2.1.3). Signs which identify the nature of the waste acceptable at the designated solid waste disposal area shall be erected and maintained. The lettering on the sign shall be such that it is clearly readable by the public upon approach.

5.2 Nature of Wastes

Wastes disposed at the active face of the solid waste disposal area may include any municipal solid waste except liquid wastes and hot ashes or as otherwise restricted by Section 4.2.

5.3 Bear-Proofing

The solid waste disposal area shall be maintained inside an electric fence. The electric fence shall comply with all requirements of Section 4.17.

5.4 Waste Compaction

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

5.5 Maximum Lift Height

The maximum height of any lift of compacted waste in the solid waste disposal area shall be 5 metres.

5.6 Waste Cover

Cover shall be applied to waste in the solid waste disposal area as specified below. The operational certificate holder shall maintain a log book to record all dates of cover application.

5.6.1 Active Face Cover

Except as otherwise stated in Sub-section 5.6.2, the active face of the solid waste disposal area does not normally require cover. Based on information concerning environmental or public health concerns related to exposed waste at the active face, however, the Director may require that



the active face be covered completely at a specified frequency with 0.15 m of soil (or functional equivalent) for a specified period.

5.6.2 Cell Cover

A uniform cover of 30 cm compacted soil shall be applied to all sides of the active waste cell in the solid waste disposal area such that no more than 200 m² of waste are exposed at the active face at any time and such that the volume of waste in the cell does not exceed 2000 m³. Once the maximum volume of waste has been reached in a cell, the active face shall be covered with 30 cm of compacted soil and a new waste cell begun.

5.6.3 Final Cover

Completed portions of the solid waste disposal area shall progressively receive final cover during the active life of the landfill (see Section 12.5).

5.7 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.

6. OPERATIONAL REQUIREMENTS FOR COMPOSTING

6.1 Composting

Composting operations shall comply with the requirements of the *Organic Matter Recycling Regulation* and any other relevant legislation.

6.2 Bear-Proofing

If the composting operation is to receive any organic wastes that are potential attractants to bears, then composting shall be completely enclosed by an electric fence or contained in a bear-proof structure (building or composting vessel). The electric fence shall comply with all requirements of Section 4.17.



7. OPERATIONAL REQUIREMENTS FOR STORAGE OF SELECTED WASTES FOR SALVAGE AND RECYCLING

7.1 Location

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

7.2 Nature of Wastes

Wastes to be salvaged/recycled may be any items with potential salvage or recycling value such as tires, lead-acid batteries, auto hulks, white goods, furniture, used lumber, used goods and the like, but shall not include any refuse consisting of or containing putrescibles, any liquid wastes, hot ashes or materials otherwise restricted by Section 4.2.

7.3 Compliance

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

7.4 Contamination

Contamination of any of the designated salvage/recycling storage piles with putrescible wastes shall be cleaned up immediately.

8. OPERATIONAL REQUIREMENTS FOR REGULATED OPEN BURNING

8.1 Location

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

8.2 Quantity, Timing, and Duration of Discharge

The maximum authorized quantity of wood residue to be open burned during each event is that which has accumulated at the time of burn initiation. The pile(s) shall be constructed so as to ensure a rapid and complete burn. The quantity of air contaminants is indeterminate.

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 must be completely extinguished at the end of the authorized burn duration.

Should a condition arise which prevents the burn pile(s) from being burned within this period, the Director must be notified in accordance with Section 8.10 of this authorization.

8.3 Nature of Wastes

No wastes shall be burned which are unacceptable to the Director. Acceptable materials for burning may only include dry, unpainted, untreated demolition, construction and packing-related wood residue, clean stumps and brush, but must 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.

8.4 Favourable Weather for Smoke Dispersion

Open burning shall not proceed unless weather conditions are such that emissions are dispersed away from populated areas.

The operational certificate holder must also obtain a burn registration number from the Ministry of Forests (1-888-797-1717) prior to ignition.

Open burning of wood residue must not be initiated or continued if the local air flow will cause the smoke to negatively impact a nearby population or cause pollution.

No burning shall occur during periods of fire hazard or when burning is prohibited by other agencies.

8.5 Fire Accelerant

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

8.6 Minimization of Smoke

The burn shall be tended and fed 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 dirt; waiting to burn until wastes are reasonably dry after any significant precipitation event; and using adequate equipment and staff.

8.7 Contingency Plan

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

- i) Inadequate smoke dispersion in the surrounding environment;
- ii) wood residue continues to smoulder after the authorized burn period; and,
- iii) the Director requires that the open burn be extinguished for environmental protection reasons.

At a minimum, the plan must detail the actions to be taken to extinguish the open burn should any of the above conditions occur. The plan shall be made available to the Director upon request.

8.8 Extinguishment

All combustion shall be completely extinguished at the end of the authorized period as set out in Section 8.2 "Quantity, Timing and Duration of Discharge."

8.9 Fire Supervision and Suppression

An attendant shall be on-site to supervise the burn. Adequate fire suppression equipment shall be available for the entire duration of the event, and must be capable of extinguishing the fire if necessary. Local fire departments must be notified of the operational certificate holder's intent to burn, prior to ignition.

8.10 Maintenance of Works and Emergency Procedures

The operational certificate holder shall inspect the burn piles regularly and ensure that they are burning well. In the event of an emergency, or condition beyond the control of the operational certificate holder which prevents continuing operation of the approved method of open burning, the operational certificate holder shall notify the Director within two hours. If notification is necessary, it shall be accomplished by contacting the Environmental Protection program at (250) 847 - 7260.

The Director may require additional controls on the burning process and may require that the burn be extinguished at any time based on its impacts on the receiving environment.

8.11 Documentation

Following completion of each burn, notice shall be sent to the Director by fax (250-847-7591) or by e-mail to a Skeena Environmental Protection staff member advising of the following details: time of burn initiation, time of burn cessation, volume of wood residue burned, venting index values obtained for burning, and any extraordinary conditions encountered during the burn.

9. OPERATIONAL REQUIREMENTS FOR LIQUID WASTE DISPOSAL

9.1 Location

The designated septage waste disposal area shall be clearly identified at the landfill site. Septage waste disposal shall be restricted to this area. The location and design of the designated septage waste disposal area shall be to the satisfaction of the Director. This area shall be fenced to restrict access to the sewage lagoons. Signs worded 'Septage Waste Disposal' shall be erected and maintained such that the lagoons are identifiable from any approach.

9.2 Freeboard and Berms

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

9.3 Nature of Wastes

The nature of wastes which may be discharged to the designated lagoons is that of typical septic tank pumpage, holding tank waste and sewage treatment plant sludge. Industrial sludges (including, but not limited to, oil separation sludges and the like) shall not be discharged to the designated lagoons.

9.4 Sludge Removal

Sludge from the septage lagoons shall be disposed in a manner and at a location approved by the Director. If the sludge is to be removed from the lagoon for final disposal on the adjacent landfill, the lagoon must be rested for a sufficient amount of time to allow the wastes to dewater. Once the solidified sludge is deposited on the



landfill, it must be covered immediately with a minimum of 30 centimetres of compacted cover material.

9.5 Lagoon Closure

If the lagoons are to be closed, the sludge must be allowed to dewater to a moisture content that will support final cover. The lagoons must then be covered with a minimum of 1 metre of compacted soil and sloped to promote runoff.

10. MONITORING REQUIREMENTS

The operational certificate holder shall have a qualified professional evaluate whether an environmental effects monitoring program is needed. The assessment and recommended monitoring program, should one be required, shall be submitted for Director's approval on or before June 30, 2013. In addition to surface water sites, the qualified professional should consider the necessity of establishing ground water monitoring locations.

Until June 30, 2013, an interim monitoring program shall be implemented as follows:

Sampling Locations ¹ and EMS ID	Frequency ³	Parameters ³
Un-named Creek U/S of Iskut Landfill E282678	twice annually, in April and September	<u>Field Measurements:</u> pH, dissolved oxygen, specific conductance, temperature
Un-named Creek D/S of Iskut Landfill E282679		<u>Lab Analysis:</u> BOD, total nitrogen, phosphorous, ammonia, pH, total and dissolved metals ²
¹ Sampling locations are shown on the site plan ² Lab analysis for dissolved metals shall use a low level scan ³ May be altered in future, depending on results		

11. REPORTING REQUIREMENTS

11.1 Reporting

All reports, drawings, data, studies and the like shall be submitted in hardcopy and electronic formats unless otherwise specified by the Director.

11.2 Log Book

As required by Sections 4.17.9 and 5.6 the operational certificate holder

shall maintain a log book. The log book shall be made available for inspection by Ministry staff upon request.

11.3 Non-compliance Reporting

The operational certificate holder shall immediately notify the Director 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.

11.4 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.

11.5 Annual Report

The operational certificate holder shall submit a basic annual report to the Director on or before June 30 each year for the previous calendar year.

The 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;
- 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.

12. **CLOSURE REQUIREMENTS**

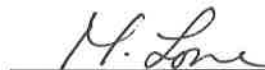
12.1 **Notification of Closure**

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

12.2 **Closure Plan**

A closure plan shall be submitted to the Director no later than 6 months in advance of scheduled closure. 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.

12.3 Closure Funding

The operational certificate holder shall ensure that sufficient funds will be available to provide for all closure and post-closure requirements as outlined in the closure plan required by Section 12.2, plus a reasonable contingency for any remediation which may be required.

12.4 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. Higher permeability soil may be used if determined to be acceptable by a qualified professional and specified in the DOCP. The final cover shall be constructed with minimum and maximum slopes as specified by a qualified professional (see Section 3.4) to promote runoff and minimize erosion, with appropriate runoff drainage controls, erosion controls, and gas venting controls. The site shall be seeded with a grass/legume mixture suited to the local climate.

12.5 Progressive Application of Final Cover

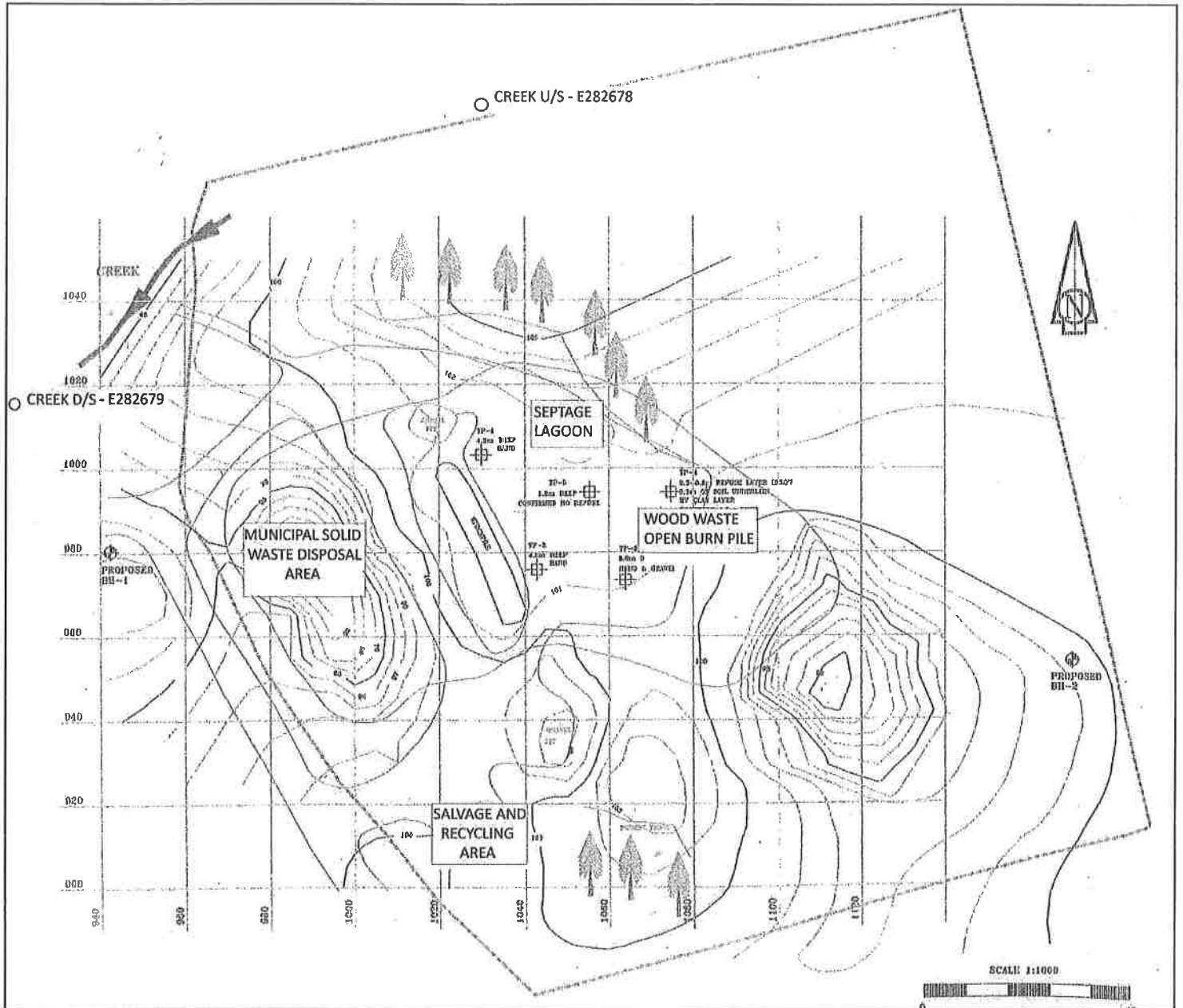
Completed portions of the landfill shall progressively receive final cover during the active life of the landfill. The maximum area of disposed refuse that has not yet received final cover shall not exceed 25% of the total final footprint area. Final cover is to be applied according to the specifications identified in Section 12.4.

13. 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.




SITE PLAN



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Skeena Region
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