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2018 ENVIRONMENTAL MONITORING REPORT GOLDEN DISPOSAL FACILITY (OC – 17006), GOLDEN, B.C.

Prepared for:

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April 29, 2019

Project # 14-024-16

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Dear Mr. Van Nostrand:

Re: 2018 Environmental Monitoring Report – Golden Disposal Facility, Golden, B.C.

Western Water Associates Ltd. (WWAL) is pleased to provide this report which summarizes environmental monitoring at the Golden Refuse Disposal Facility (RDF) in 2018.

For the 2018 reporting, we discuss the additional work performed in 2018, which included drilling two new monitoring wells, assessing soil quality at the neighbouring property to the south and completing a well receptor survey. The additional information gathered in 2018 has provided a more robust picture of the hydrogeologic setting at the site including an updated hydraulic conductivity and calculated groundwater flow direction.

As with past reports, time-series plots were created from historic and current data. This temporal analysis helps us understand the degree of impact on groundwater over time. This report satisfies the requirements of the provincially issued Operational Certificate and is suitable for submission to the B.C. Ministry of Environment and Climate Change Strategy.

We trust that the professional opinions and advice presented in this document are sufficient for your current requirements. Should you have any questions or if we can be of further assistance in this matter, please contact the undersigned.

WESTERN WATER ASSOCIATES LTD.

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1. INTRODUCTION AND SITE BACKGROUND

Western Water Associates Limited (WWAL) was retained by the Columbia Shuswap Regional District (CSRD) to prepare the 2018 Annual Environmental Monitoring Report for the Golden Refuse Disposal Facility (RDF) (hereinafter called the "site") as part of a district-wide monitoring contract. This report presents the monitoring for the 2018 report period from January 1 to December 31, 2018. Associated Engineering (formerly Summit Environmental Consultants Inc.) previously reported on the 2008 to 2013 monitoring programs. Prior to 2008, Sperling Hansen Associates (SHA) prepared the annual reports (SHA 2008). In 2014 WWAL was awarded the monitoring contract and we are pleased to provide the results of the 2018 environmental monitoring program at the Golden Landfill in this report.

The Golden RDF has operated as a natural attenuation site since the late 1970's when the permit was transferred to Columbia Shuswap Regional District (CSRD). The site operates under the now referenced Operational Certificate (OC) 17006, issued May 5, 2003 and most recently amended August 29, 2012, by the British Columbia Ministry of Environment (MoE). The Golden waste shed includes the municipality of Golden and CSRD Electoral Area A, which includes the unincorporated communities of Parson and Nicholson and services approximately 7,000 residents (Summit 2013). This report was prepared in accordance with the annual landfill reporting requirements outlined in Section 5.0 of the Operational Certificate 17006. A copy of the OC is included as Appendix A and the table below summarizes the corresponding report sections to the approved schedule condition of the OC.

Operational Certificate 17006 Concordance Table	
Approved Schedule Condition	**Corresponding Report Information Section**
Section 5. Monitoring and Reporting Requirements	
4.1 - Landfill Monitoring	2.4 Monitoring Network, Table 2, Table 3, Figure 1, Figure 2, Figure 3
4.2 - Sampling Techniques	3.1 Sampling Parameters and 3.2 Sampling Methods and Protocol
4.3 - Analysis	Completed by CARO Analytical a CALA accredited laboratory
4.4 - Quality Assurance	3.2 Sampling Method and Protocol, Appendix C
Section 5 - Landfill Reporting	
5.1 (a) - Executive Summary	Executive Summary

5.1 (b) - Type and tonnage of waste received/stored	CSRD Report
5.1 (c) - Proposed changes to Design and Operations Plan	6. Recommendations
5.1 (d) - Review of preceding year of operation or operations update - landfill development work	CSRD Report
5.1 (e) - Occurrences of Wildlife	CSRD Report (from contractor)
5.1 (g) - Outline of Environmental Monitoring Data, Trend, Statistical and Graphical Analysis	2.4 Monitoring Network, Table 2, Table 3, Section 4 (4.2.1 Groundwater Water Quality Exceedances, 4.2.2 Surface Water Quality Exceedances, 4.3 Water Quality Trend Analysis), 5. Conclusions, Table 3, Table 4, Figures 3 -10, Appendix C
5.1 (h) - List of training programs for landfill operators	CSRD Report
Section 5.2 Five Year Report	
5.2 (a) - Executive Summary	CSRD Report - Executive Summary
5.2 (b) - Updated Design and Operations Plan	CSRD Report
5.2 (c) - Detailed Hydrogeologic Assessment	Appendix E
5.2 (d) - Type and tonnage of waste received, recycled, stored on-site and discharged/landfilled each year	CSRD Report
5.2 (e) - Current topographic map detailing airspace consumption, on-site burrow pit changes and future developments	CSRD Report
5.2 (f) - Volume and density analysis or an in-place material summary, updated estimates for the remaining capacity, site life, revised closure date	CSRD Report
5.2 (g) - Outline of Environmental Monitoring Data, Trend, Statistical and Graphical Analysis	2.4 Monitoring Network, Table 2, Table 3, Section 4 (4.2.1 Groundwater Water Quality Exceedances, 4.2.2 Surface Water Quality Exceedances, 4.3 Water Quality Trend Analysis), 5. Conclusions, Table 3, Table 4, Figures 3 -10, Appendix C
5.2 (h) - Update on the financial assurance mechanism including statement of the current dollar value of the closure Fund and the amount earmarked for the Landfill Site	CSRD Report
5.2 (i) - Any additional information requested by the Director	Action Plan requested in the MoE issued Warning Letter sent July 27, 2018. Action Plan provided in the 5-year hydrogeological Assessment. Section 6 summarizes the Action Plan in this current report.

1.1 Objective and Scope

To meet the goal of assessing the long-term monitoring for groundwater impacts from landfill operations, the objectives of the program are to collect and analyze groundwater samples, and interpret analytical results in accordance with the OC (MoE 1996) and the consulting agreement between WWAL and the CSRD. The tasks undertaken were as follows:

- Collect and submit to the laboratory, water samples as scheduled for the year;
- Assess the condition of local on-site vegetation for potential stress;
- Summarize water quality guideline exceedances from the 2018 results;
- Analyze the data and prepare the final annual report (this document); and
- Review the results with the CSRD Project Manager at the end of each year and provide recommendations to revise the program for future years, if warranted.

2. SITE DESCRIPTION

This section describes geographic location, bedrock and surficial geology of the study area, historical climate data, hydrologic data, and hydrogeology data for Golden RDF. Further, a description of the monitoring network that was sampled in the 2018 monitoring program is provided.

2.1 Location

The Golden RDF is located on a southwest facing slope approximately 2 km northeast of downtown Golden (Figure 1). The site covers an area of about 17 ha with the waste footprint covering an area of approximately 4.4 ha. The property is bounded on all sides by forest with Golden-Donald Upper Road located along the western site boundary. The site is approximately 1 km north and above the Kicking Horse River, which is a major surface water body in the area. The nearest privately-owned residence is within 100 m of the landfill boundary and is located just east of the site. The Golden RDF site is relatively flat and is at an elevation of 920 m above sea level (m asl), however the northeastern landfill area is located on a southwest facing slope and is at an elevation of 950 m asl. The site layout is provided on Figure 2 and the civic and legal address is as follows.

Civic: 350 Golden-Donald Upper Road in Golden, BC

Legal: Subdivision 12 of Section 18, Township 27, Range 21, West of the fifth Meridian, Kootenay District

2.2 Geology, Hydrology and Hydrogeology

Surficial geology in the Golden area are mainly comprised of a thick continuous glacial till blanket, which may include fluted landforms, morainal deposits, and drumlins (Geological Survey of Canada 2014). Deposits at the Golden RDF site consist of dense gravely sand and silty ablation till along the eastern slopes, with well-sorted bedded sand and gravels and alluvial deposits in the south central and western sections, as well as within the trench at the southwest corner of the site (Kala 1995; SHA 2008). Silt with sand and gravel deposits were observed in test hole 4 (MW95-4) at the western edge of the landfill (Kala 1995). Based on well logs for newly drilled MW18-10, MW18-11 and existing well MW09-6D the unconsolidated deposits are far thicker in the southern and southwest corner of the site and thinner

towards the north, where bedrock has been observed at surface. Deposits in exposures along the west side of Golden-Donald Road (across from the RDF site) consist of dense, well-sorted sands and gravels with traces of silt and clay and occasional bedding planes.

The bedrock at the site consists of sedimentary strata of the Rocky Mountains Cambrian to Ordovician in age (540 to 445 million years ago). Bedrock geology is mapped as limestone, sandstone, shale, minor conglomerate, and associated meta-sedimentary rocks of the McKay Group (Massey et al. 2005). No bedrock was encountered in the five test pits completed during the Kala 1995 hydrogeological investigation. However, limestone bedrock was encountered at approximately 34 m (111 ft) below ground surface (bgs) at MW09-6D near the west central boundary of the site. Bedrock outcrops were noted in the northeastern part of the site.

The Kicking Horse River is approximately 1 km southeast of the RDF site and nearly 130 m lower in elevation (800 m asl). The river flows northwest through the western range of the Rocky Mountains and lower Kicking Horse Canyon where it merges into the Columbia River at the Town of Golden. The Columbia River flows northwest and is approximately 3 km west of the site. Hospital Creek, located in a deeply incised valley northwest of the landfill site, flows southwest into the Columbia River.

Surface drainage at the RDF site is dependent on the local topography. A narrow ravine located midway along the east side of the site collects the surface water from the east side of the site and diverts flow away from the landfill during extreme rain events or periods of high run-off from snowmelt. There are no other surface water drainage courses leading away from the landfill. The permeability of the surficial deposits at the site ranges from low to moderate. Silty surficial deposits along the eastern side of the landfill limit groundwater recharge while the silty sand and gravel located in the south-central section of the landfill is typical moderately (SHA 2008).

The B.C. Water Resources Atlas shows MoE sand and gravel Aquifer 456 IIB approximately 60 m southwest of the Golden RDF boundary and is located at the confluence of the Columbia and Kicking Horse Rivers. This aquifer, which is classified as having a moderate demand, high productivity, and moderate vulnerability, covers an area of 10.2 km^2. Demand describes local reliance on the groundwater water source, productivity indicates relative well yields, and vulnerability describes the potential for contaminants to move from the surface into the aquifer. There are no MoE reported aquifers at the site location. Based on site topography and water level elevations from the three wells (MW09-6D, MW10-8, and DMW-2) completed in the local bedrock aquifer (Summit 2010), groundwater flow direction at the site is from northeast to southwest, moving from the uplands towards the Columbia and Kicking Horse Rivers. The groundwater flow direction should be confirmed once an accurate survey of the top of casing elevation of the wells is completed. Rain and snowmelt percolating through the landfill will likely migrate vertically down until reaching the water table.

2.3 Climate

The climate at the site is humid continental with relatively warm summers and a relatively short dry season, with Golden situated between two mountain ranges. The nearest climatic data available for the region is from the station at the Golden Airport (Climate STN ID 1173210). Climate averages for this station are available for 1981 to 2010. During this period, the recorded average annual temperature and total precipitation at Golden were 5.1°C and 466.8 mm/year, respectively (Environment Canada 2016). Recorded mean monthly temperatures ranged from – 7.9°C in January to 17.3°C in July. The recorded mean precipitation ranged from 24.1 mm/month in February to 51.1 mm/month in November. Table 1 summarizes the climate data from the Golden climate station.

Table 1: Monthly Average Climate Data (STN 1173210: 1981 - 2010)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year Avg.
Temperature													
Daily Average (°C)	-7.9	-5.0	0.8	6.5	11.3	14.9	17.3	16.7	11.5	5.00	-2.0	-7.8	5.1
Precipitation													
Precipitation (mm)	45.9	24.1	24.4	24.4	34.5	49.7	50.6	45.3	38.0	34.9	51.1	43.9	466.8

Source: Canadian Climate Normals (Environment Canada, 2018)

2.4 2018 Monitoring Network

2.4.1 Existing Program

In 2016 WWAL was asked by the CSRD to standardize the naming scheme of the monitoring wells for all CSRD Refuse and Disposal Facilities (five sites in total). A legend outlining the previous and current monitoring well identification names for all the monitored sites is provided in Appendix B.

The 2018 monitoring network included six groundwater locations:

- four monitoring wells (MW09-6S, MW10-8, MW18-10 (new in 2018) and MW18-11 (new in 2018))
- two domestic wells (DMW-1b and DMW-4); and
- two town supply wells (Town Well #4 (TW- #4) and Town Well #6 (TW- #6)).

Although it is not part of the monitoring program water quality results from sampling at MW15-01, which is a sentry well for the Town of Golden Town Well #4 (TW-#4) our shared between the Town of Golden and the CSRD.

In 2018 two additional on-site wells were drilled in June 2018; MW18-10 and MW18-11. MW18-10, located on the southern perimeter within the landfill, was installed to replace MW95-02 (TH-2), which has historically been dry. MW18-11 is located at the southwest perimeter outside of the landfill boundary. Both wells were drilled with an air rotary drill by JR Drilling of Kamloops, BC a certified well driller (Jerry Opper Well Drillers Certificate No. WD 08052101) on June 25 and 26, 2018. MW18-10 was drilled to a depth of 36 m (117 ft) bgs and MW18-11 was drilled to a depth of 115 m (380 ft) bgs. MW18-11 was not

completed as a monitoring well in June 2018 as budget constraints were met during the initial drilling. Drilling of MW18-11 was resumed in December 2018, by Kicking Horse Water Services of Golden, BC (Glen Fury Well Drillers Certificate No. WD 16072501). MW18-11 was completed to a depth of 146 m (480 ft) bgs, with bedrock encountered at 120 m (394 ft) bgs. The well logs for both MW18-10 and MW18-11 can be found in Appendix B.

Monitoring Well MW95-2 has been dry since 2007 and was decommissioned in June 2018 by JR Drilling of Kamloops, BC. Three on-site monitoring wells were installed in 2009: MW09-6S (shallow), MW09-6D (deep), and MW09-7 to replace decommissioned wells MW95-4 and MW95-3, respectively. MW09-7 has never been sampled as it has been dry since installation. Nested wells MW09-6S and MW09-6D are located along the western site boundary north of the landfill gate. Due to similar water chemistry at wells MW09-6S and MW09-6D, sampling of MW09-6D was considered redundant and therefore discontinued in 2011. Monitoring well MW10-8 was installed approximately 150 m northwest of the site to assess potential offsite leachate migration. MW10-8 was sampled for the first time since 2015 during the September and December 2018 sampling event.

Domestic well DMW-1b, located east of the site, was added to the program in 2011 as a replacement to upgradient monitoring location DMW-1. Monitoring at DMW-1 was discontinued after 2010 as a raw water quality could not be sampled due to a filtration system connected to all the water outlets. DMW-4, located east of the site, was added to the program in 2013, as one of the nearest available cross gradient receptors. DMW-1 characterized background water quality, therefore DMW-1b and DMW-4 are now considered as new background wells.

Town Well #4 is one of Golden's five municipal water supply wells located approximately 1.5 km west of the landfill site. Beginning in 2013, another supply well (Town Well #6) was targeted for sampling because the capture zone for this well is closer to the landfill than Town Well #4 (Golder 2006). Town Well #6 was only able to be sampled during the June 2018 sampling event, as work was being completed on the well in an attempt to increase the well yield. Table 2 summarizes the current monitoring locations and available well logs are provided in Appendix B.

Sampling at Golden RDF occurs three times annually with the 2018 sampling events occurring on June 26, September 11 and December 3. Landfill gas monitoring points GP-6S/GP-6D and GP-7S/GP-7D were also installed in 2009 and are currently being monitored by the CSRD personnel.

2.4.2 Well Receptor Survey in 2018

As part of the 5-year hydrogeological assessment study, a water well receptor survey was completed in 2018 to inventory water wells within a 1km perimeter of the landfill. Well locations and well logs were obtained from the B.C. Water Resource Atlas. From this list of wells, WWAL attempted to contact well owners to confirm water use and well completion detail. Based on property owners that were receptive, and the well depth; five domestic wells were sampled for water quality to help assess background groundwater geochemistry. A well located in the Town of Golden at the BNW Contracting property with the Well Tag Number (WTN) 22653 was sampled during the December 2018 sampling event, as part of the well receptor survey. The location of the domestic wells sampled in the well receptor survey are depicted on Figure 2. The bedrock geochemistry of the domestic wells sampled in the survey is discussed in the 2018 Hydrogeological Report (WWAL 2019).

Table 2: Groundwater Monitoring Location Summary Information

Sample Location	Depth of Well (m btoc)	Aquifer Type/ Primary Lithology	Approximate Ground Surface Elevation (masl)	Location Description
MW09-6S (MW-6S)	34.5	Bedrock	920	Located along the western boundary of the landfill site and is the northern most on-site well.
MW09-6D (MW-6D)	65.9	Bedrock	920	Nested with MW09-6S
MW10-8 (TH-8)	26.2	Bedrock	921	Located approximately 300 m northwest of the site along Golden Donald Upper Rd.
Town Well #4	Unknown	Unknown (assumed to be unconsolidated)	790	Located approximately 1.5 km northwest of the site on a strata road north of 14th St N.
Town Well #6	Unknown	Unknown (assumed to be unconsolidated)	Unknown	Located approximately 2 km northwest of the site on the west side of 11th Ave. N.
DMW-1b	60	Bedrock	975	Located approximately 150 m east of the landfill site on Hietala Rd.
DMW-4	120	Unknown	Unknown	Located approximately 250 m east of the landfill site just north of Hietala Rd.
MW18-10	36.4	Bedrock	920	Located along the south-central boundary of the landfill, beside TH-2.
MW18-11	146.3	Bedrock	915	Located on the southwest corner of the landfill, outside of the landfill perimeter.
Dry Wells				
MW95-2 (TH-2)	22.5	Unknown	915	Located along the south-central boundary of the landfill.
MW09-7 (TH-7)	31.7	Unconsolidated (sand silt and gravel)	Unknown	Located along the western boundary of the landfill (south side) near Golden- Donald Upper Rd and Granite Dr.

Note: **masl** = metres above sea level; **mbtoc** = metres below top of casing; Ground surface elevations were measured by Summit, accurate to ±30 cm. Depth for both domestic wells are approximate and are determined from personal communication with home owners.

2.4.3 Surface Water Sampling in 2018

In 2018 both the Kicking Horse River and Hospital Creek were sampled and compared to provincial approved aquatic water guidelines. Hospital Creek was sampled for the full list of parameters, whereas Kicking Horse River was only sampled for field parameters, along with chloride and nitrate, which are the landfill parameters of concern.

2.4.4 Soils Sampling in 2018

Three surface water samples were taken in April 2017 on the neighboring property located on the southern side of the Golden Landfill, as a result of observed surface water runoff entering the property. Soil samples were taken at surface in June 2018 in the observed runoff locations from 2017. Eight soil samples were taken offsite on the neighbouring property and two samples were taken within the landfill perimeter in June 2018, locations are depicted on Figure 3. One location (LOC-6) was in exceedance of Contaminated Sites Residential Low-Density standard for manganese with a measured concentration of 2910 µg/g. A Protocol 17 Notice of Migration was filed with the Ministry of Environment and Climate Change Strategy (Appendix F) and a confirmatory soil sample event was completed in September 2018

with an additional eighteen sampling locations concentrated around LOC-6 on the offsite neighbouring property. From the confirmatory sampling, no exceedances for Contaminated Sites Residential Low-Density standard for manganese were observed. Locations of the soil samples from both June and September 2018 can be depicted in Figure 3 and Appendix E.

3. METHODS

The following sections outline the program methods, including parameters sampled and field techniques used for the program.

3.1 Sampling Parameters

The 2018 laboratory assessed water quality parameters included the following:

- Total Alkalinity (total as $CaCO_3$);
- Total suspended solids (TSS)
- Turbidity;
- pH and Conductivity;
- Hardness (dissolved, as $CaCO_3$);
- Anions (chloride, fluoride, bromide, and sulphate);
- Nutrients: (nitrate (as N), nitrite (as N), and ammonia (as N)); and
- Dissolved metals.

Dissolved metals were sampled at the domestic and town well locations for all three sampling events in 2018 in order to compare metal concentrations between the landfill, and domestic and town well locations.

The groundwater monitoring program conducted in 2018 consisted of hydraulic (water level) monitoring, field measurements of pH, electrical conductivity (EC), temperature, and oxidation-reduction potential (ORP) and dissolved oxygen (DO) recorded during purging and immediately before sampling. All of the above-listed parameters were analyzed during each sample event, except VOC's, which are sampled once per year (September 2018).

3.2 Sampling Methods and Protocols

In order to ensure that representative groundwater samples were obtained from the monitoring wells and that no contamination of the recovered samples occurred. Sampling protocols followed the second edition (draft) of the "Landfill Criteria for Municipal Solid Waste" (MoE 2016), "British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection for, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples" (MoE 2013).

Prior to groundwater sample collection, each well was purged of the standing volume of stagnant water using a submersible well pump, dedicated bailers, peristaltic pump or Waterra tubing (as appropriate). The

objective of purging is to pump groundwater from the well until a representative sample of the formation groundwater is obtained. This is typically achieved by removal of three to five times the volume of standing water in the well or purging the well dry and letting the well recover to at least half of its pre-pumping level. Purging was considered complete once sediment-free groundwater is obtained and/or the EC, temperature, ORP, and pH of the groundwater stabilize. The pump was decontaminated between each sample location. Groundwater samples were collected in the appropriate laboratory-supplied clean, new sample containers and preserved as required. Groundwater samples designated for metals analysis were field filtered to 0.45 micron and preserved.

All samples were packaged in a cooler and delivered to the laboratory within a 24-hour period for analysis. Groundwater samples were submitted, under chain-of-custody protocol, to Caro Analytical Services (Kelowna, BC), for analysis. The laboratory results were sent directly from the laboratory to Wireless Water, our database manager. The field and laboratory data were then merged and the data were available in one database for analysis by WWAL.

During each monitoring event, the following field data were recorded:

- water level;
- field measured parameters [temperature, pH, ORP, DO, and EC];
- field notes on procedures (e.g. purging rates) and any unusual observations (e.g. well condition, odours, colours, etc.);
- evaluation of vegetation health in the area surround the wells that could be attributed to landfill leachate (luxuriant growth, discolouration, die-off, etc.); and
- signs of leachate breakout zones (e.g. presence of unusual bacteria or algae at all sites, signs of liquid flowing from the surface).

The Relative Standard Deviation (RSD) for each sampled parameter were assessed by taking several replicate samples (at least three in each set) at select locations during the 2018 sampling program. RSD is a statistical measure of reliability of the results for each parameter sampled at each location. A lower RSD means the parameter results are more reliable and representative. The following parameters showed a Relative Standard Deviation above 20%: aluminum (dissolved), ammonia (total as N) and phosphorus (dissolved). All other parameters showed percent errors lower than 17%, with the majority of the parameters falling below 5%. Therefore, we deem the water quality data gathered in 2018 to be acceptably reliable, the quality of the data is good and does not negatively affect the conclusions made in this report.

4. RESULTS AND DISCUSSION

The following section describes field observations and the results of the water quality sampled at the Golden Disposal Facility in 2018. Annual water level elevations, water quality guideline exceedances in 2018, along with temporal and spatial trends for the Golden RDF monitoring program are discussed. The descriptive statistics (average, standard deviation, maximum, minimum and count) for select water quality

results between 2002 and 2018 are summarized in Table 4, with the full water quality database of all historic and current results provided in Appendix C. The 2018 water quality reports provided by the laboratory can be found in Appendix D.

Our analysis of potential leachate impacts on the receiving environment employs two main approaches:

- comparison of monitoring results to guidelines (i.e. does a problem exist); and
- trend analysis (i.e. is the situation changing over-time or space).

The ensuing evaluation, elucidated in our discussion below, may then be used to inform decisions about future monitoring priorities as well as the overall program results. Water quality results were assessed both temporally and spatially.

Potential impacts to groundwater from landfill leachate are typically identified by assessing the concentrations of landfill leachate indicators relative to background groundwater concentrations. Typical leachate indicators may include, but are not limited to: ammonia, chloride, total alkalinity, sulphate, manganese, iron, calcium, magnesium, and the heavy metals cadmium, chromium, copper, nickel, and zinc (Christensen et al. 2001).

Figures 3 through 8 depict the time series plots for water quality parameters sampled at the five locations between 2002 and 2018. The landfill leachate associated parameters plotted include the following: chloride, electrical conductivity, dissolved sodium, sulphate, nitrate, dissolved Iron and dissolved manganese. Plotted results below the reportable detection limit are displayed as one-half the reportable detection limit.

- Chloride and Conductivity (Figure 3);
- Dissolved Sodium and Total Sodium (Figure 4);
- Sulphate (Figure 5);
- Nitrate and Modified Nitrate (Figure 6);
- Dissolved Iron and Total Iron (Figure 7); and
- Dissolved Manganese (Figure 8).

4.1 Vegetation

Trees at the south end of the site, which did appear to be stressed historically, have been removed to allow for installation of a road around the site. Trees, located on the private land to the south of the site appear to be generally healthy, though raven roosting has defoliated some trees. From previous years recommendations, the trees located on the property to the south were assessed by a forester who provided information stating that the trees did not appear to show signs of impact from landfill activities.

4.2 Water Quality Exceedances

Assessing impact on the receiving environment from operation of the Golden RDS is the objective of the current monitoring program at Golden. The 2018 groundwater quality results were compared to the following applicable guidelines and standards:

- Guidelines for Canadian Drinking Water Quality Maximum Acceptable Concentration (health-based guideline) (GCDWQ MAC) and Aesthetic Objective (based on aesthetic considerations) (GCDWQ AO) (Health Canada 2017); and
- B.C. Contaminated Sites Regulation 375/96, Schedule 6, Generic Numerical Water Standards for drinking water (CSR DW) (MoE 2017).

Table 3 provides a list of exceedances in water quality guidelines and standards relevant to landfill leachate impact.

4.2.1 Groundwater Quality Exceedances

Similar to previous years, a number of parameters were detected at concentrations above guidelines/standards in 2018 (Table 3).

4.2.1.1 Naturally Occurring Exceedances

Consistent with historical data, the highest arsenic concentrations were found at DMW-1b; where concentrations exceeded the GCDWQ MAC and BC CSR DW of 0.010 mg/l, during the June and September sampling events in 2018. Arsenic (dissolved) was also in exceedance of the GCDWQ MAC guidelines and BC CSR DW standards at DMW-5 and MW18-11 (475 ft) sampled for the first time in 2018. The arsenic, lithium, cobalt, strontium fluoride, manganese and iron exceedances are believed to be naturally occurring and not related to landfill activity, as these species can be found a high concentration throughout the Golden area and throughout interior B.C. It should be noted that residences at DMW-1b were notified by WWAL field staff of exceedances of the drinking water guidelines.

4.2.1.2 Landfill Operation Associated Exceedances

Like previous years, chloride was detected at concentrations above the BCAWQG DW, and GCDWQ AO (250 mg/l) at MW09-6S. MW10-08 was sampled during the September and December 2018 sampling events for the first time since 2015 and was in exceedance of GCDWQ AO guidelines for chloride. Newly drilled well MW18-10, located on the southern perimeter of the landfill was in exceedance of the BC CSR DW standard and GCDWQ AO guideline for chloride for all three sampling events in 2018. Nitrate and concentrations at MW09-6S and MW18-10 are in exceedance of GCDWQ MAC and sulphate (MW09-6S) of GCDWQ AO.

Table 3: 2018 Groundwater Quality Exceedances

Sampling Location	Guideline	2018 Exceedances
DMW-1b	GCDWQ MAC	Arsenic (dissolved)
	GCDWQ AO	Iron (dissolved)
	BC CSR DW	Arsenic (dissolved), Lithium (dissolved)
DMW-4	BC CSR DW	Cobalt (dissolved), Lithium (dissolved), Lithium (total), Strontium (dissolved), Strontium (total)
DMW-5	GCDWQ MAC	Arsenic (total), Fluoride
	GCDWQ AO	Sodium (total), Total dissolved solids (computed)
	BC CSR DW	Arsenic (total), Fluoride, Sodium (total)
DMW-568	GCDWQ MAC	Total coliforms (counts)
	GCDWQ AO	Iron (total), Total dissolved solids (computed)
DMW-571	GCDWQ MAC	Total coliforms (counts)
	GCDWQ AO	Iron (total), Manganese (total), Total dissolved solids (computed)

	BC CSR DW	Cobalt (total)
DMW-606	GCDWQ MAC	Fluoride, Total coliforms (counts)
	GCDWQ AO	Iron (total), Sodium (total), Total dissolved solids (computed)
	BC CSR DW	Cobalt (total), Fluoride, Sodium (total)
MW09-06D	GCDWQ MAC	Nitrate (as N), Nitrate + Nitrite (as N) (calculated)
	GCDWQ AO	Chloride, pH [F], Sodium (dissolved), Sulphate
	BC CSR DW	Chloride, Cobalt (dissolved), Lithium (dissolved), Nitrate (as N), Nitrate + Nitrite (as N) (calculated), Sodium (dissolved), Sulphate
MW09-6S	GCDWQ MAC	Nitrate (as N), Nitrate + Nitrite (as N) (calculated)
	GCDWQ AO	Chloride, Iron (dissolved), Manganese (dissolved), Sodium (dissolved), Sulphate
	BC CSR DW	Chloride, Cobalt (dissolved), Lithium (dissolved), Nitrate (as N), Nitrate + Nitrite (as N) (calculated), Sodium (dissolved), Sulphate
MW10-08	GCDWQ MAC	Toluene
	GCDWQ AO	Chloride, Sodium (dissolved), Toluene
	BC CSR DW	Chloride, Lithium (dissolved), Sodium (dissolved), Toluene, Tungsten (dissolved)
MW18-10	GCDWQ MAC	Nitrate (as N), Nitrate + Nitrite (as N) (calculated)
	GCDWQ AO	Chloride, Manganese (dissolved), pH [F]
	BC CSR DW	Chloride, Cobalt (dissolved), Lithium (dissolved), Nitrate (as N), Nitrate + Nitrite (as N) (calculated)
MW18-11 375 ft	GCDWQ AO	Manganese (dissolved)
	BC CSR DW	Lithium (dissolved)
MW18-11 475 ft	GCDWQ MAC	Arsenic (dissolved)
	GCDWQ AO	Sodium (dissolved)
	BC CSR DW	Arsenic (dissolved), Cobalt (dissolved), Lithium (dissolved), Sodium (dissolved)
Well ID 22653	GCDWQ AO	Iron (dissolved), Manganese (dissolved)

[F] = Field Results

Notes:
BC CSR DW BC CSR, Schedule 6 and 10, Generic Numerical Water Standards for Drinking Water
GCDWQ AO Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives
GCDWQ MAC Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations

4.2.1 Surface Water Quality Exceedances

Kicking Horse River and Hospital Creek, both sampled in 2018, showed no indication of impact from operation of the landfill site, see Appendix C for surface water quality results which are compared to provincial aquatic water guidelines. In the spring of 2017 substantial runoff was observed migrating from the northeast off the southern property boundary. In the spring of 2018, there were no surface waters present on-site. To address concerns regarding off-site runoff of surface water, soil sampling was conducted, with the results provided in Appendix E, attached.

4.3 Water Quality Trend Analysis From 2002 to 2018

Sample locations were selected to monitor potential receptors surrounding the Golden RDF. The Town wells (#4 and #6) both monitor downgradient, off-site water quality at the confluence of the Kicking Horse with the Columbia River Valley. The capture zones for Town Well #6 and Town Well #4 are both southwest of the landfill and include industrial, commercial, and residential areas, which could also contribute contaminant sources. MW09-6S (shallow) monitors the upper (north) section of western boundary. Two new monitoring wells were drilled in June 2018; MW18-10 located on the southern

property boundary of the landfill beside now closed TH-2. MW18-11 is located on the southwest corner of the landfill, accessed from Golden Donald Upper Road (Figure 2) . Based on the calculated groundwater flow direction within the bedrock aquifer assessed in 2018, MW18-11 is the lowest down gradient well located at the site. Additionally, MW10-08 located 300 m northwest of the landfill along Golden Donald Upper Rd, was sampled during the September and December 2018 sampling events, the well had not been sampled since 2015.

Domestic wells DMW-1b and DMW-4 are located upgradient of the site, they are not believed to be affected by landfill operation and instead provide "background" bedrock quality upgradient of the site.

Overall, on-site MW09-6S continues to exhibit the highest degree impact for bedrock groundwater monitored at and downgradient of the site, with elevated electrical conductivity, chloride, nitrate and sulphate, relative to other sampled groundwater locations.

Table 4 provides the descriptive statistics for the current program along with two newly drilled wells. Appendix C provides the entire water quality database from 2002 to 2018, including the five additional domestic wells sampled in the well receptors. Trend analysis for select indicator parameters are provided below.

Table 4: GW - Summary Statistics for Select Water Quality Parameters from 2002 to 2018

Analyte	Sampling Location	Unit	Average	Standard Deviation	Min	Max	Count	Number of Results with Exceedances
Conductivity	DMW-1b	µS/cm	1088	107	750	1220	23	0
	DMW-4	µS/cm	1058	135	790	1271	18	0
	MW09-06D	µS/cm	4776	1126	3780	6700	5	0
	MW09-6S	µS/cm	4171	974	480	6600	30	0
	MW10-08	µS/cm	2715	720	340	3500	18	0
	MW18-10	µS/cm	2530	180	2380	2730	3	0
	MW18-11 375 ft	µS/cm	558	--	558	558	1	0
	MW18-11 475 ft	µS/cm	1036	--	1036	1036	1	0
	Town Well #4	µS/cm	838	202	63	1055	24	0
	Town Well #6	µS/cm	644	87	401	727	14	0

Analyte	Sampling Location	Unit	Average	Standard Deviation	Min	Max	Count	Number of Results with Exceedances
Chloride	DMW-1b	mg/L	40.9	14.7	12.4	92.2	23	0
	DMW-4	mg/L	17.0	8.0	10.9	46.5	18	0
	MW09-06D	mg/L	600	145	358	715	5	5
	MW09-6S	mg/L	587	86	416	732	29	29
	MW10-08	mg/L	738	132	509	988	19	19
	MW18-10	mg/L	323	17	313	343	3	3
	MW18-11 375 ft	mg/L	26.6	--	26.6	26.6	1	0
	MW18-11 475 ft	mg/L	23.2	--	23.2	23.2	1	0
	Town Well #4	mg/L	77.4	12.7	57.6	105	32	0
	Town Well #6	mg/L	29.6	5.1	22.9	39.7	14	0
Nitrate (as N)	DMW-1b	mg/L	0.040	0.094	<0.010	0.397	3	0
	DMW-4	mg/L	0.361	0.227	<0.010	0.725	17	0
	MW09-06D	mg/L	55.1	16.1	27.2	67.7	5	5
	MW09-6S	mg/L	48.4	11.4	31.3	66.9	28	28
	MW10-08	mg/L	0.466	0.344	<0.010	1.11	16	0
	MW18-10	mg/L	16.8	4.5	12.9	21.7	3	3
	MW18-11 375 ft	mg/L	1.03	--	1.03	1.03	1	0
	MW18-11 475 ft	mg/L	0.043	--	0.043	0.043	1	0
	Town Well #4	mg/L	1.314	0.233	0.755	1.76	32	0
	Town Well #6	mg/L	1.006	0.142	0.781	1.30	14	0
Sulphate	DMW-1b	mg/L	130	28	108	252	23	0
	Town Well #6	mg/L	16.8	2.0	13.9	20.3	8	0
	DMW-4	mg/L	219	48	122	275	18	0
	MW09-06D	mg/L	794	136	582	945	5	5
	MW09-6S	mg/L	814	92	606	950	29	29
	MW10-08	mg/L	47.7	9.1	36.5	72.9	19	0
	MW18-10	mg/L	85.0	7.4	76.5	89.5	3	0
	MW18-11 375 ft	mg/L	39.0	--	39.0	39.0	1	0
	MW18-11 475 ft	mg/L	156	--	156	156	1	0
	Town Well #4	mg/L	39.8	2.3	35.8	44.5	32	0
	Town Well #6	mg/L	24.5	1.7	20.4	27.6	14	0

Analyte	Sampling Location	Unit	Average	Standard Deviation	Min	Max	Count	Number of Results with Exceedances
Sodium (dissolved)	DMW-1	mg/L	25.4	1.5	23.7	26.6	3	0
	DMW-1b	mg/L	29.3	5.3	23.5	47.5	17	0
	DMW-4	mg/L	35.5	10.5	17.0	51.0	12	0
	MW09-06D	mg/L	350	32	314	384	5	5
	MW09-6S	mg/L	358	43	261	444	30	30
	MW10-08	mg/L	363	65	178	450	19	18
	MW18-10	mg/L	181	12	168	190	3	0
	MW18-11 375 ft	mg/L	30.7	--	30.7	30.7	1	0
	MW18-11 475 ft	mg/L	270	--	270	270	1	1
	Town Well #4	mg/L	43.5	7.1	34	58.5	27	0
Manganese (dissolved)	DMW-1b	mg/L	0.00512	0.00294	0.0037	0.0158	17	0
	DMW-4	mg/L	0.00481	0.00286	0.0015	0.0127	12	0
	MW09-06D	mg/L	0.11164	0.08614	0.00199	0.242	5	4
	MW09-6S	mg/L	0.1168	0.0857	0.0262	0.518	30	29
	MW10-08	mg/L	0.12136	0.15384	0.00063	0.492	19	11
	MW18-10	mg/L	0.165	0.038	0.126	0.202	3	3
	MW18-11 375 ft	mg/L	0.294	--	0.294	0.294	1	1
	MW18-11 475 ft	mg/L	0.0149	--	0.0149	0.0149	1	0
	Town Well #4	mg/L	0.00126	0.00182	<0.0002	0.0068	8	0
	Town Well #6	mg/L	0.00237	0.00247	0.0008	0.0082	8	0
Iron (dissolved)	DMW-1b	mg/L	0.261	0.127	<0.010	0.404	16	8
	DMW-4	mg/L	0.065	0.161	<0.010	0.575	10	1
	MW09-06D	mg/L	0.247	0.163	<0.010	0.402	4	2
	MW09-6S	mg/L	0.170	0.347	0.01	1.43	22	5
	MW10-08	mg/L	0.462	0.963	<0.010	3.01	17	4
	MW18-10	mg/L	0.018	0.018	<0.010	0.038	2	0
	MW18-11 375 ft	mg/L	0.017	--	0.017	0.017	1	0
	MW18-11 475 ft	mg/L	0.018	--	0.018	0.018	1	0
	Town Well #4	mg/L	0.053	0.092	<0.010	0.386	10	1
	Town Well #6	mg/L	0.014	0.010	<0.010	0.033	5	0

Analyte	Sampling Location	Unit	Average	Standard Deviation	Min	Max	Count	Number of Results with Exceedances
Boron (dissolved)	DMW-1b	mg/L	0.160	0.061	0.104	0.386	17	0
	DMW-4	mg/L	0.270	0.122	0.070	0.465	12	0
	MW09-06D	mg/L	1.30	0.38	1.05	1.95	5	0
	MW09-6S	mg/L	1.589	0.338	0.921	2.16	30	0
	MW10-08	mg/L	0.0350	0.0177	0.017	0.093	19	0
	MW18-10	mg/L	0.368	0.157	0.187	0.465	3	0
	MW18-11 375 ft	mg/L	0.0339	--	0.0339	0.0339	1	0
	MW18-11 475 ft	mg/L	0.418	--	0.418	0.418	1	0
	Town Well #4	mg/L	0.0239	0.0125	0.012	0.042	22	0
	Town Well #6	mg/L	0.0330	0.0466	0.006	0.143	8	0

4.3.1 Chloride

Historically, chloride concentrations are lower at DMW-1b (average 40.9 mg/l), DMW-4 (average 17 mg/l), Town Well #4 (77.4 mg/) and Town Well #6 (average 29 mg/l) than at MW09-6S (average 587 mg/l) (Table 4). MW10-08 was sampled for the first time since 2015 and has the highest chloride concentration amongst the sampling locations with an average value of 738 mg/l (Table 4). MW10-08 was in exceedance of the GCDWQ AO guideline (250 mg/l) in 2018 with measured concentrations of 509 mg/l and 580 mg/l in September and December, respectively. MW18-10 was drilled in June 2018, and has measured chloride concentrations around 300 mg/l exceeding the GCDWQ AO guideline for all three sampling events in 2018. A slurry of drill cuttings and development water was collected from newly drilled MW18-11 at depths of 114 m (375 ft) and 145 m (475 ft) bgs. The chloride concentrations measured from these slurry samples were 26.6 mg/l (375 ft) and 23.3 mg/l (475 ft), significantly lower than other chloride concentrations measured at the site. Further, concentrations at DMW-1b and Town Well #4 have remained relatively steady over time, as have concentrations at DMW-4 and Town Well #6 (Figure 4). At MW09-6S chloride has been variable with a definite downward trend, concentrations measured in 2018 to be around 400 mg/l.

4.3.2 Electrical Conductivity

Electrical conductivity (EC) is relatively high at the monitored locations on-site as well as most locations off-site. Lowest levels are at both Town Well #4 and Town Well #6, which are around 800 µS/cm and 600 µS/cm, respectively. EC is elevated at the topographically upgradient domestic wells (DMW-1b and DMW-4); however, the levels are thought to be naturally occurring as the bedrock groundwater is highly mineralized.

EC at MW09-6S and MW09-06D are elevated above all other monitored locations and are variable, with average values of 4171 µS/cm and 4776 µS/cm, respectively (Figure 4). EC values at all locations are relatively stable with the exception of November 2012 at MW09-6S, which are anomalously low and may be incorrectly recorded. Conductivity values measured at MW09-06S remain around 4000 µS/cm for 2017

and 2018. Electrical Conductivity measured at newly drilled MW18-10 is elevated around 2500 µS/cm for all three sampling events in 2018. During the drilling of MW18-11 the electrical conductivity of a sample of development water at 145 m (475 ft) bgs was measured to be 1190 µS/cm, similar to the values measured at DMW-1b and DMW-4 (Table 4).

4.3.3 Sodium

Dissolved sodium concentrations are elevated at MW09-6S, MW09-6D, and MW10-08 exhibit elevated average sodium concentrations, with values above 350 mg/l relative to the other wells (all below 45 mg/l). Newly drilled MW18-10, has an average sodium concentration of 180 mg/l, slightly lower than MW09-06S, but elevated above the other wells. Water sampled from 145 m (475 ft) at MW18-11 during the drilling in December 2018, had a dissolved sodium concentration of 270 mg/l, the fourth highest concentration at the site. Concentrations of sodium (Figure 5) at MW09-6S have decreased from a spike observed in 2013, with a concentration of 444 mg/l measured in August 2013 to 261 mg/l, but have since decreased to the lowest recorded concentration of 285 mg/l in November 2017. Like chloride, sodium levels remain reliability low and relatively consistent at Town Well #4, DMW-1b, DMW-4, and Town Well #6.

4.3.4 Sulphate

Sulphate concentrations (Figure 6) at MW09-6S remained elevated relative to the other wells, with values measured in 2018 to be around 600 mg/l. MW09-06D was sampled during the December 2018 sampling event, and had a measured concentration of 582 mg/l, comparable to MW09-06S and elevated above the other sampling locations. The next highest sulphate concentrations in 2018 were at DMW-4 with an average of 219 mg/l, followed by DMW-1b, with an average of 132 mg/l. The lowest concentrations were measured at the two town wells, where the sulphate concentrations have remained stable and below 40 mg/l. Sulphate concentrations at MW09-6S show a similar trend to sodium, with a general decrease up until late 2011, followed by a relatively steady increase till 2016 to about 900 mg/l, with a slight decrease in 2017 to a concentration of 663 mg/l (November).

4.3.5 Nitrate

Nitrate concentrations (Figure 7) at MW09-6S are elevated above background and the other monitored locations with an average of 48.4 mg/l. Nitrate concentrations at MW09-6S have halved in the past eight years; showing a decreasing trend at this location from 60 mg/l in November 2009 to 31.3 mg/l in June 2018, but still very high, exceeding the GCDWQ MAC guideline of 10 mg/l. MW09-6D was sampled during the December 2018 sampling event and had a measured concentration of 27.2 mg/l, comparable to the concentration measured at MW09-6S. The high levels of nitrate found at MW09-6S and MW09-6D are not representative of natural groundwater quality and the most likely source is the Golden RDF.

The next highest nitrate concentrations in 2018 were at newly drilled MW18-10, with an average concentration of 16.8 mg/l. MW18-10 has been sampled three times since its installation and has been in exceedance of the GCDWQ MAC guideline (10 mg/l) during all of those sampling events. Town Well #4, which have been relatively stable with an average of 1.34 mg/l, concentrations displayed slight increase in 2018 to 1.76 mg/l, the highest recorded concentration measured in September 2018. Concentrations at DMW-4 and Town Well #6 show a variable yet increasing trends (Figure 7); however, nitrate remains below 1.3 mg/l. Nitrate at DMW-1b remained relatively stable since its addition into the program in 2011 and had concentrations below detection limits for the June and September sampling events in 2018.

Nitrate at DMW-4 showed a slight increase of 0.2 mg/l in August and again November 2014, but has since dropped to historically low levels.

4.3.6 Select Metals

As stated in Section 3.1, dissolved metals were analyzed at all domestic and monitoring well locations during all three sampling events in 2018. For monitoring wells, dissolved metals are the typical form of metals assessed.

Iron concentrations (Figure 8) at DMW-1b have been increasing since 2011 and are elevated above the other domestic well and both Town Wells with an average of 0.26 mg/l (Table 4). Dissolved iron at DMW-1b was also in exceedance of the GCDWQ AO guideline (0.3 mg/l), with a concentration of 0.321 mg/l, measured in June 2018. Concentrations of iron at MW09-6S were elevated between 2009 and 2010, but decreased to below 0.1 mg/l between May 2011 and August 2015 and again between August 2016 and November 2017, after peaking in November 2015 (1.21 mg/l). Dissolved iron concentrations at MW09-6S remain high in 2018 with a measured concentration of 1.43 mg/l (June 2018). Iron concentrations at all other sampling locations, were at or lower than 0.1 mg/l in 2018, including newly drilled MW18-10, and the development water sampled from MW18-11 at 125 m (475 ft) bgs, with values of <0.010 mg/l (MW18-10) and 0.018 mg/l (MW18-11), measured in December. The typically low concentration of iron at MW09-6S and the low concentrations at the other sampled locations suggests that the elevated iron at DMW-1b is not related to landfill activity and that the elevated iron concentrations are likely naturally occurring.

Manganese concentrations (Figure 9) at MW09-6S are elevated, with an average concentration of 0.12 mg/l. Manganese concentrations at MW09-6S decreased from the first sampling event in 2009 to mid-2012, after which time concentrations have been stable just slightly below 0.1 mg/l. Dissolved manganese concentrations sampled from the development water at 114 m (375 ft) bgs at MW18-11displayed the highest concentrations at the site with a measured value of 0.294 mg/l (December 2018). The development water sampled at 145 m (475 ft) at MW18-11 was measured to be 0.149 mg/l, half the value measured at 114 m (375 ft). MW10-08 sampled for the first time in 2018 since 2015, had concentrations below 0.002 mg/l in 2018. MW18-10 sampled for the first time in 2018 had concentrations ranging between 0.168 mg/l (June) and 0.202 mg/l (December), exceeding the GCDWQ AO guidelines of 0.05mg/l for all three sampling events in 2018. Stable trends and lower manganese values (at or below 0.008 mg/l) were detected at the other wells.

Consistent with historical data, the highest arsenic concentrations were found at DMW-1b, where concentrations exceeded guidelines during the June and September sampling events in 2018 and has been in exceedance since November 2010, with the exception of the August 2017 sampling event. However, arsenic concentrations remain below 0.001 mg/l at MW09-6S, which suggests that the presence of arsenic in DMW-1b is likely related to the parent rock material (i.e. naturally occurring), and not related to landfill activity. DMW-4 had arsenic concentrations below 0.002 mg/l for all three sampling events in 2018, displaying a decrease from 0.0421 mg/l measured in August 2017. The development water sampled at 145 m (475 ft) at MW18-11 had a dissolved arsenic concentration of 0.035 mg/l, comparable to DMW-1b and exceeding the GCDWQ AO guideline. All other sample locations have remained relatively stable and low (≤ 0.002 mg/l) including the newly drilled MW18-10, in 2018.

The highest concentrations of boron were recorded at MW09-6S, with an average concentration of 1.6 mg/l (Table 4). The trend at this location has been increasing since 2009 from 1.09 mg/l (May 2009) to 2.12 mg/l (May 2016), before decreasing slightly to 1.6 mg/l (September) in 2018. In contrast, boron concentrations at the other wells remain low with average concentrations less than 0.5 mg/l. MW10-08 had dissolved boron concentrations ranging between 0.0602 mg/l and 0.0413 mg/l in 2018. MW18-10 had concentrations around 0.5 mg/l for the September and December 2018 sampling events. MW18-11 at 145 m (475 ft) had a measured concentration of 0.42 mg/l (December 2018). Concentrations at the other wells are relatively steady over time, apart from DMW-4 which has a range of 0.07 mg/l to 0.5 mg/l within the six years it has been sampled (2013-2018), with the 2018 concentrations measured around 0.3 mg/l. Boron sources include coal combustion products, municipal sewage, leaching of landfill materials, and the production of fertilizers and pesticides. The maximum dissolved boron concentration at DMW-4 was 0.465 mg/l (November 2013), when compared to MW09-6S (maximum of 2.16 mg/l) it is far below concentrations that may be of concern at this time. However, continued monitoring is necessary to determine whether concentrations continue to rise.

4.3.7 Soil Samples

Ten soil samples were collected in June 2018 as a result of surface water runoff that was observed in April 2017 on the neighboring property located on the southern side of the Golden Landfill. One location (LOC-6) was in exceedance of Contaminated Sites Residential Low Density standard for manganese with a measured concentration of 2910 µg/g, measured in June 2018. A confirmatory soil sample event was completed in September 2018 adding an additional eighteen sampling locations concentrated around LOC-6 on the offsite neighbouring property, locations of the soil samples from both June and September 2018 can be depicted in Figure 10. The additional eighteen soil samples that were taken in September 2018 were analyzed for the metal species manganese and all soil samples were below the Contaminated Sites Residential Low Density standard.

5. CONCLUSIONS

From the analysis performed in 2018, the following conclusions are made:

C1 The environmental monitoring program was completed as planned, with the exception of an access issue at the Town Well 6, due to Town – related work being completed on the well to increase the yield.

C2 Two new wells were drilled in 2018, MW18-10 and MW18-11. MW18-10 was completed to a depth of 36 m (117 ft) bgs and MW18-11 was completed to a depth of 145 m (475 ft).

C3 Soil sampling occurred during the June 2018 sampling event and ten locations were sampled with one location, LOC-6 in exceedance of Contaminated Sites Residential Low-Density standard for manganese. A confirmatory soil sampling event was completed in September 2018, adding an additional eighteen soil sampling locations, analyzed for metal species manganese. All locations were below the Contaminated Sites Residential Low-Density standard for the September 2018 sampling event.

C4 Similar to previous years, exceedances of water quality guidelines were detected at the western property boundary of the landfill in 2018. Groundwater quality at well MW09-6S, located near the landfill boundary, continues to show evidence of impact from landfill operation. Elevated concentrations of chloride, nitrate, and sulphate along with metals including boron indicate anthropogenic impact from landfill leachate at the west property boundary. However, water quality of the southwest corner of the site (MW18-11) does not appear to be impacted.

C5 At DMW-1b and DMW-4, concentrations of arsenic and iron in 2018 were above the GCDWQ MAC, BC CSR DW, and the GCDWQ AO, respectively; these are not new exceedances and are not related to landfill activity.

C6 Four other domestic wells, completed in the bedrock aquifer hydraulically upgradient to the Golden RDF were sampled in 2018. Further, one domestic well completed within MoE 's surficial Aquifer 456, down gradient of the site was also sampled in 2018. Results from the water quality assessment of the upgradient wells completed in the bedrock aquifer showed numerous water quality exceedances that are likely naturally occurring including fluoride, sodium, arsenic, cobalt and lithium. The sampling program confirms the poor water quality within the bedrock aquifers surrounding the site.

C7 High nitrate at MW09-6S is attributed to Golden RDF leachate effects but has decreased to about one-half of the high concentrations from >65 mg/L, detected in 2009 to 2018 at about 33 mg/L.. Th downward trend shows that the parameters of concern associated with landfill activity (chloride and nitrate) are not on a continual increase of the property boundary, they are in fact decreasing naturally.

6. RECOMMENDATIONS (ACTION PLAN)

In the MoE issued Warning Letter sent to the CSRD July 27, 2018, they requested that an Action Plan detailing what steps will be taken to ensure that the landfill is being operated in a manner that prevents surface water and groundwater exceedances of parameters distinctive of leachate at the landfill boundary.

We provided the following recommendations moving forward:

R1 Surface Drainage Plan - Surface Water Run-on and Runoff at the South Property Boundary

In 2018 soils were sampled at the neighbouring property to the south of the site. From this soil assessment, no impact on soils from off-site surface water runoff was detected. The Surface Drainage Plan should continue to be implemented at the site to continue to eliminate off-site overland flow of run-on and run-

off water. Surfacing of on-site landfill leachate affected waters must be managed, as the site is frequented by wildlife and affected surface waters could be consumed by wildlife.

Further, to eliminate surfacing of leachate from the south toe of the landfill surface, an engineered material should be used to prevent subaerial exposure or discharging of leachate. Hybridized polar trees should be planted at the south property line, to help attenuate affected on-site water and soil.

To characterize the surface waters (assess if surface waters are affected or not-affected) and influence, implement an engineered Surface Drainage Plan, and continue water quality sampling of on-site surface waters, if present at the site during the tri-annual sampling events.

R2 Restrict Land and Groundwater Use in the Vicinity of the Site

We understand there are no water wells completed in the bedrock aquifer and in the use directly downgradient of the site. The CSRD should with with the MoE to communicate with the Town of Golden and both authorities should place a moratorium on use of groundwater within the bedrock aquifer downgradient of the site (southwest).

Further, should be consideration to change the zoning for the Town of Golden, so as not to include sensitive land use within 500 m of the site.

R3 Continued Sampling of New Monitoring Wells

Continue to monitor newly added monitoring wells MW18-10 and MW18-1, located at the south property boundary and southwest corner of the site, respectively. MW18-10 was only sampled three times in 2018 and additional sampling at this location should occur prior to making further decisions about drilling. At MW18-11 only development water collected during drilling of the monitoring well in 2018. If the land owner agrees, add Well ID 22653 to the annual monitoring program.

Prior to determining an off-site location to explore for drilling, 2-years more years of water level and aquifer geochemical data should be gathered. Variation in groundwater flow direction within the bedrock aquifer should be determined and the trend of chloride and nitrate concentrations overtime should be assessed. Therefore, the site would continue to be operated a monitored natural attenuation site for at least the next two-years.

R4 Potential Off-Site Migration of Landfill Leachate within the Bedrock Aquifer

Exploring contaminant migration within bedrock aquifers where the bedrock surface potentially lies deep below sand and gravel deposits, like what sits above the Town of Golden, can require over 400 feet of casing to even reach the bedrock surface. This sort of exploration for contamination within a bedrock aquifer is costly and there is always potential of intercepting unaffected fracture zones. Hence, we provided the recommendation to assess water quality over the next two-years prior to initiating another extensive drilling program. Now that groundwater flow direction within the bedrock aquifer has been established, we have a better sense of where contaminant migration within the bedrock fracture zones could potentially be occurring. As was noted above, fracture flow within bedrock can be unpredictable.

After 2-years of further data collection from the monitoring network, if further exploration of the bedrock aquifer contamination downgradient of the site is deemed appropriate, the CSRD should secure a location hydraulically downgradient of the site. At this point in time we recommend drilling at Pine Road and Golden Donald Upper Road, about 250 m southwest of MW18-10 (at 51°18'22.24" N / 116°57'14.61" W). Permissions to drill can take some time, if drilling is planned to occur on Ministry of Transportation right of way.

Further exploration within the valley bottom aquifer should only be pursued if a contaminant plume is identified within bedrock aquifer at the above recommended drilling location. Based on concentrations of chloride and nitrate at Well ID 22653, we do not believe there is perceivable impact of landfill leachate associated parameters (i.e. chloride and nitrate) within the valley bottom aquifer.

R5 If Off-site Leachate Migration is Confirmed - Close Site or Implement Leachate Collection and On-Site Management

As has been discussed, groundwater flow within the bedrock aquifer is from northeast to southwest and bedrock groundwater quality at the southwest corner landfill site does not show concentrations of chloride or nitrate that would exceed contaminated site regulation drinking water guidelines or standards. Further, the concentration of chloride and nitrate at the southwest property boundary, as was measured in 2018, appear comparable to background concentrations.

Further, although at the west property boundary chloride and nitrate concentrations exceed drinking water quality guidelines and standards in the bedrock aquifer, levels of leachate associated parameters have consistently declined at the property boundary from 2009 to 2018.

Although we have not established that off-site leachate migration is occurring; concern over potential impact to the bedrock aquifer persists. After two more years operating as a natural monitored attenuation site there should be enough data from MW18-10 to help with the most optimal placement of an off-site well for future drilling. If after installation and assessment of the off-site well, off-site leachate migration is established, the Golden RDF should either be closed or engineered for leachate collection and on-site management of landfill leachate.

R6 In 5 years complete another well survey of the area.

For the 2023 monitoirng year, a 5-year hydrogeological assessment should be competed to include another well receptor survey.

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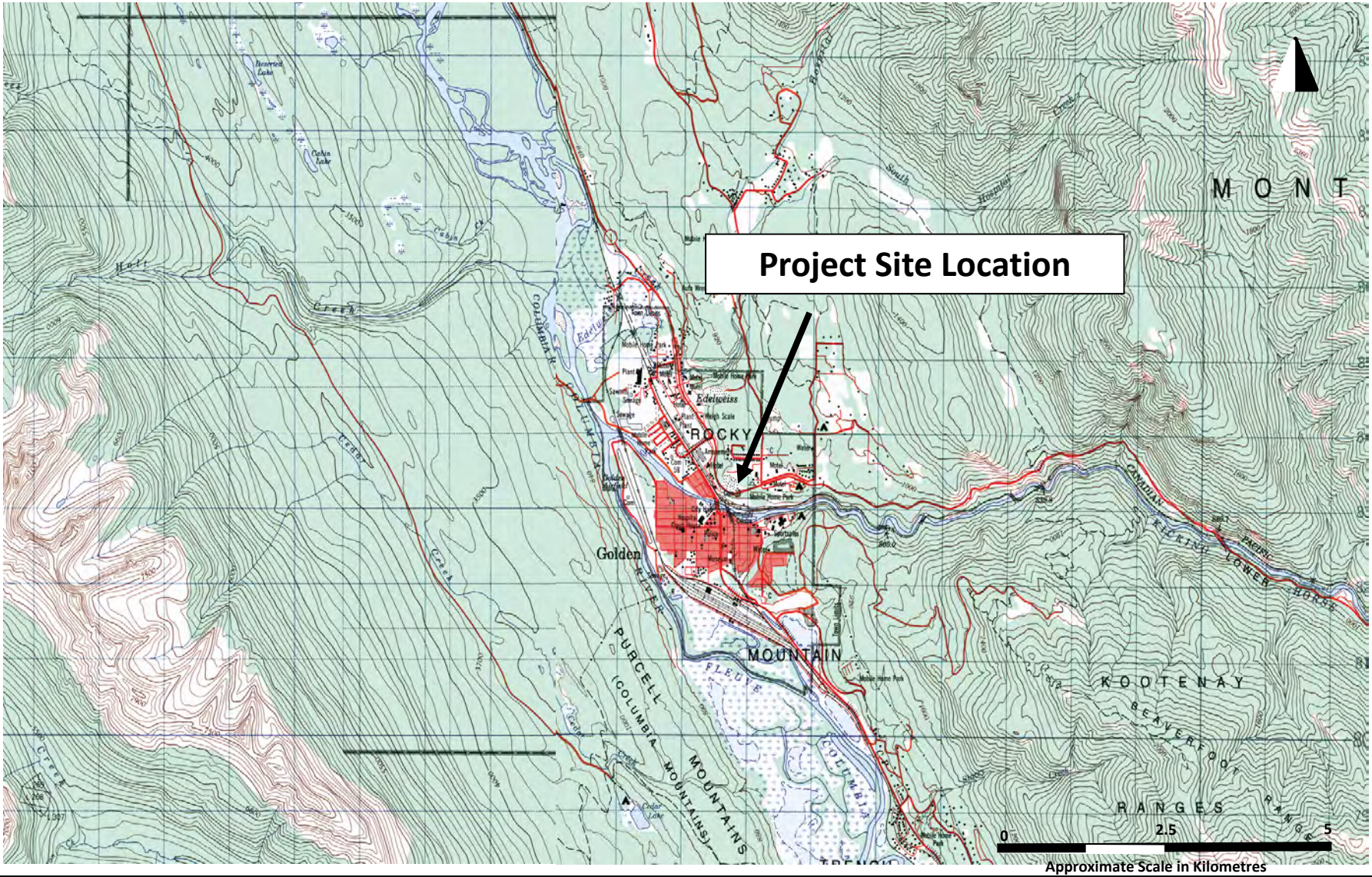
Figures



Columbia Shuswap Regional District

western water ASSOCIATES LTD

TITLE

Figure 1: General Site Map

DRAWN		DATE	March 2019	PROJECT NO.	14-024-16
CHECKED	BRM	SCALE	See figure	DWG. NO.	n/a
REVIEWED	DG	FILE NO.		FIGURE VERSION NO.	

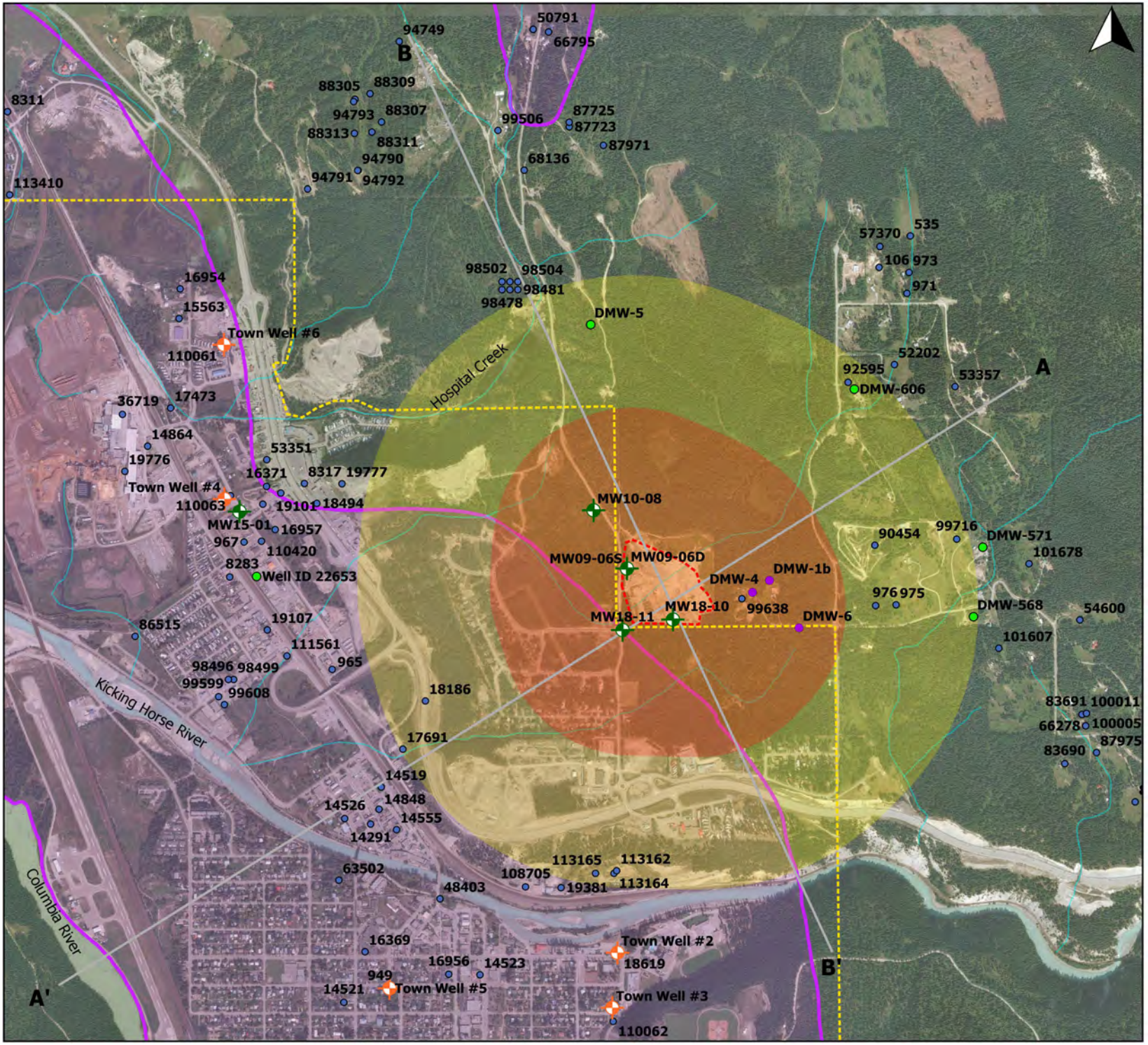


Figure 2:

Golden RDF Monitoring

Legend

- Well from GWELLS
- Domestic Monitoring Well
- Monitoring Well
- Well sampled in 2018 Receptor survey
- Production Well
- Creeks
- City Boundary
- Aquifer 456
- Landfill Boundary

Distance from landfill:

- 500 m
- 1000 m

0 200 400 600 m

western water ASSOCIATES LTD

Client: CSRD
Project Number: 14-024-16
Date: April 11, 2019
Drawn by: Tim Sivak
Checked by: Bryer Manwell

Map Projection: NAD83 UTM Zone 11

Data from DataBC (2018), ENV GWELLS (2018) and Bing Satellite (2018)

Key Map

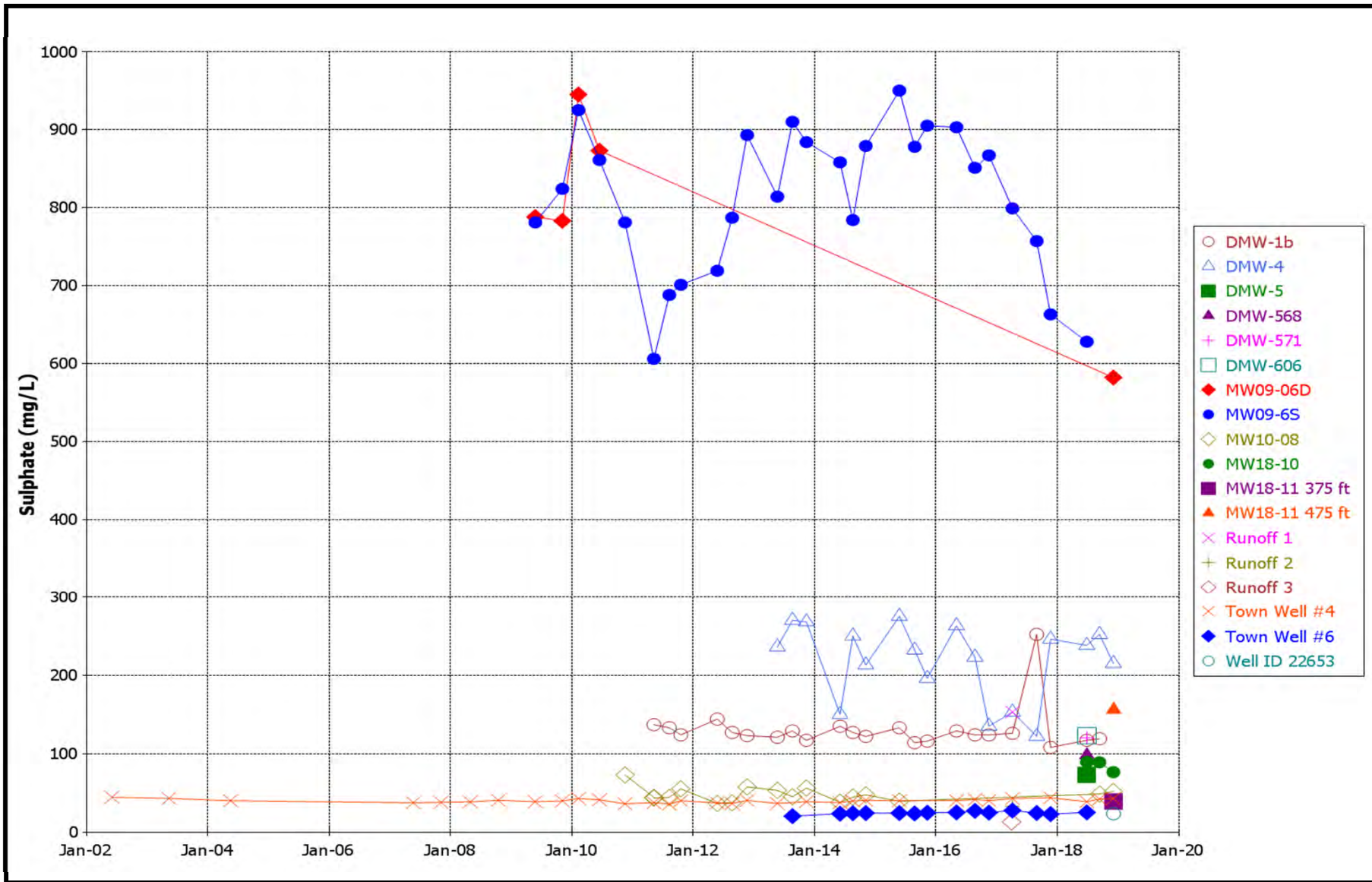


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Figure 6: Sulphate Time Series Plot, Golden RDF

DRAWN	RA	DATE	March 2019	PROJECT NO.	14-024-16
CHECKED	BRM	SCALE	n/a	DWG. NO.	n/a
REVIEWED	DG	FILE NO.		FIGURE VERSION NO.	

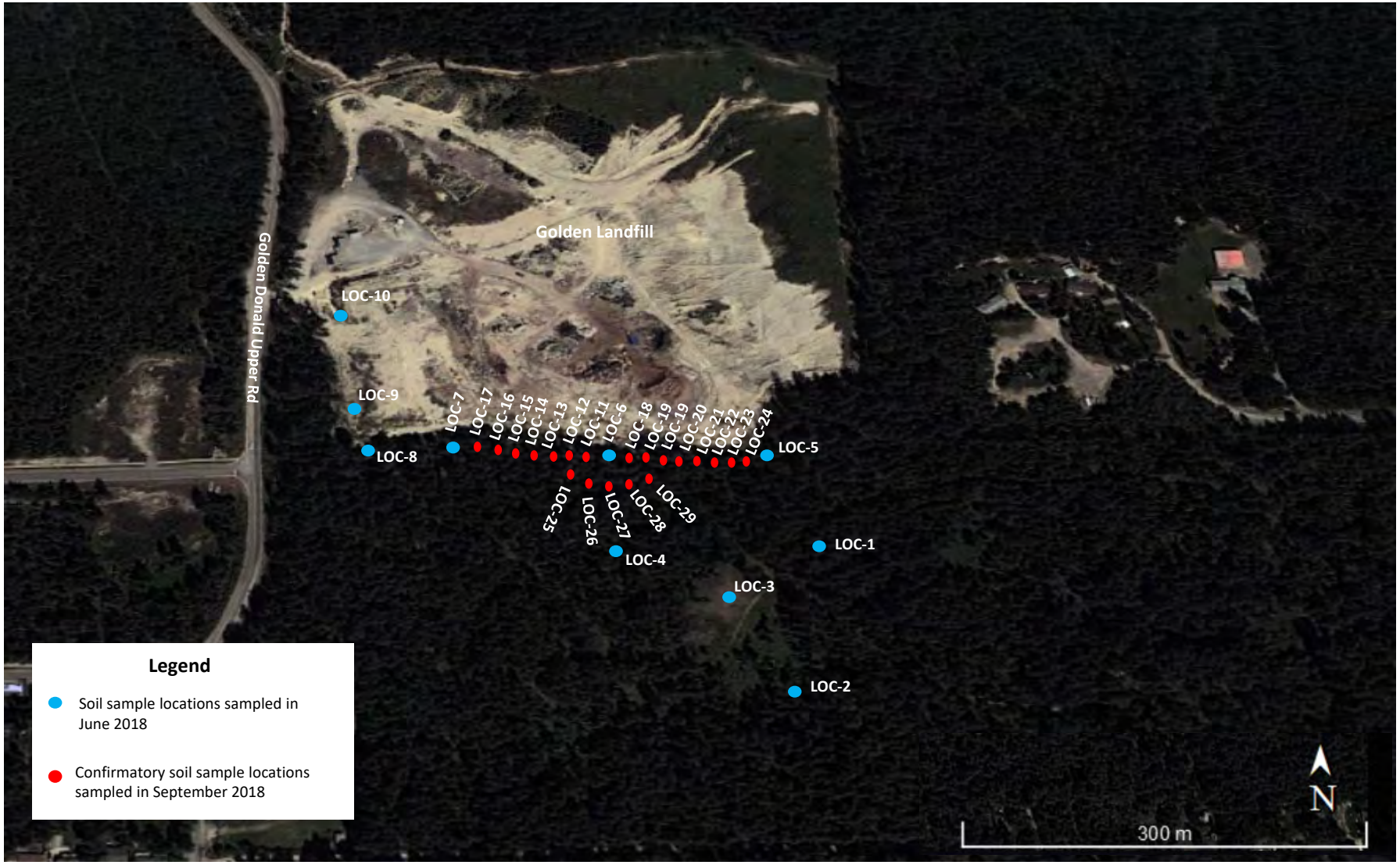

Image Source: Google Earth Pro, 2018

CSRD Golden RDF Hydrogeological Assessment

TITLE

Figure 3: Soil Sample Locations on Weissenborne Property

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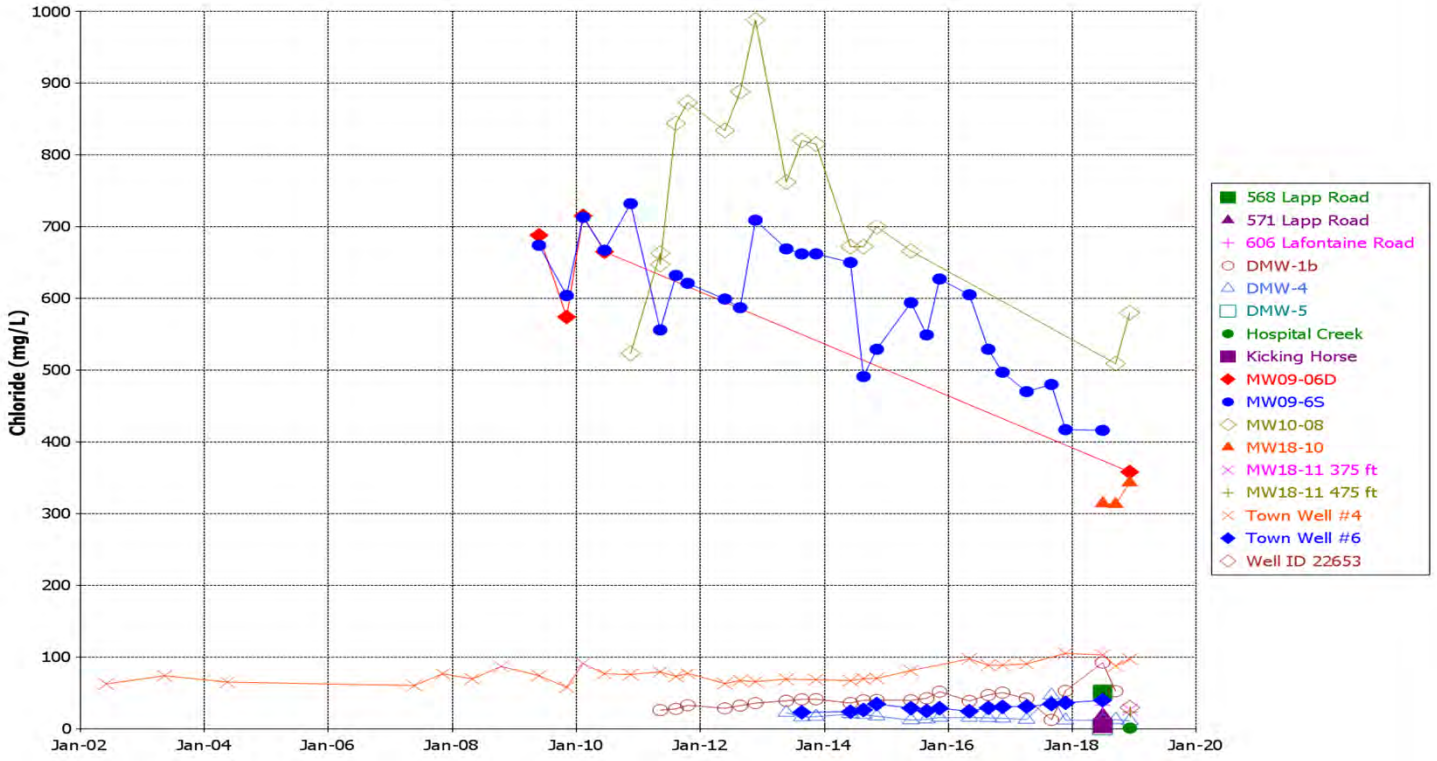
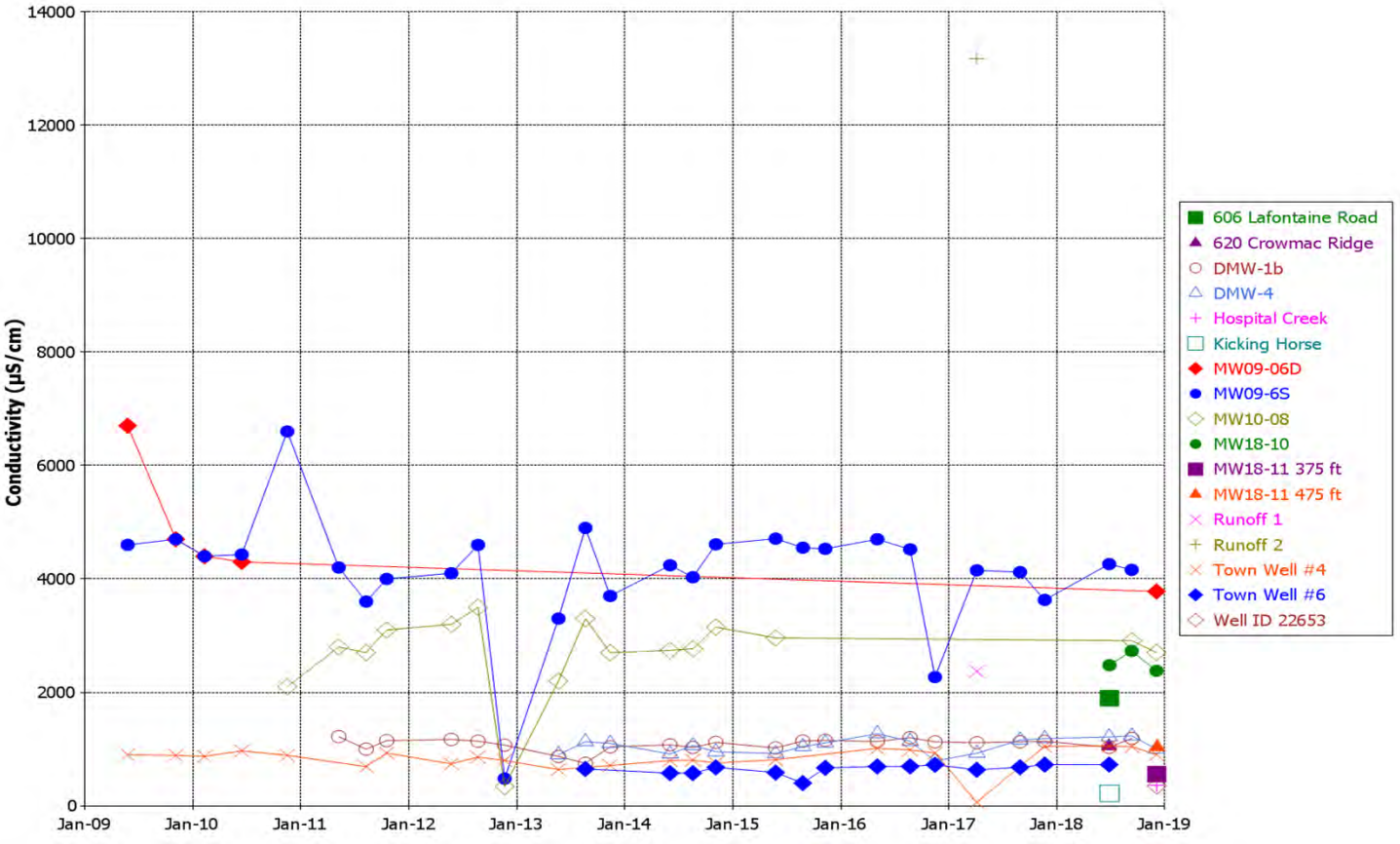
DRAWN	RA	DATE	April 2019	PROJECT NO.	14-024-16
CHECKED	BRM	SCALE	See figure	DWG. NO.	na
REVIEWED	DG	FILE NO.		FIGURE VERSION NO.	1





Columbia Shuswap Regional District

TITLE

Figure 4: Chloride (Top) and Conductivity (Bottom) Time Series Plots, Golden RDF

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DRAWN	RA	DATE	March 2019	PROJECT NO.	14-024-16
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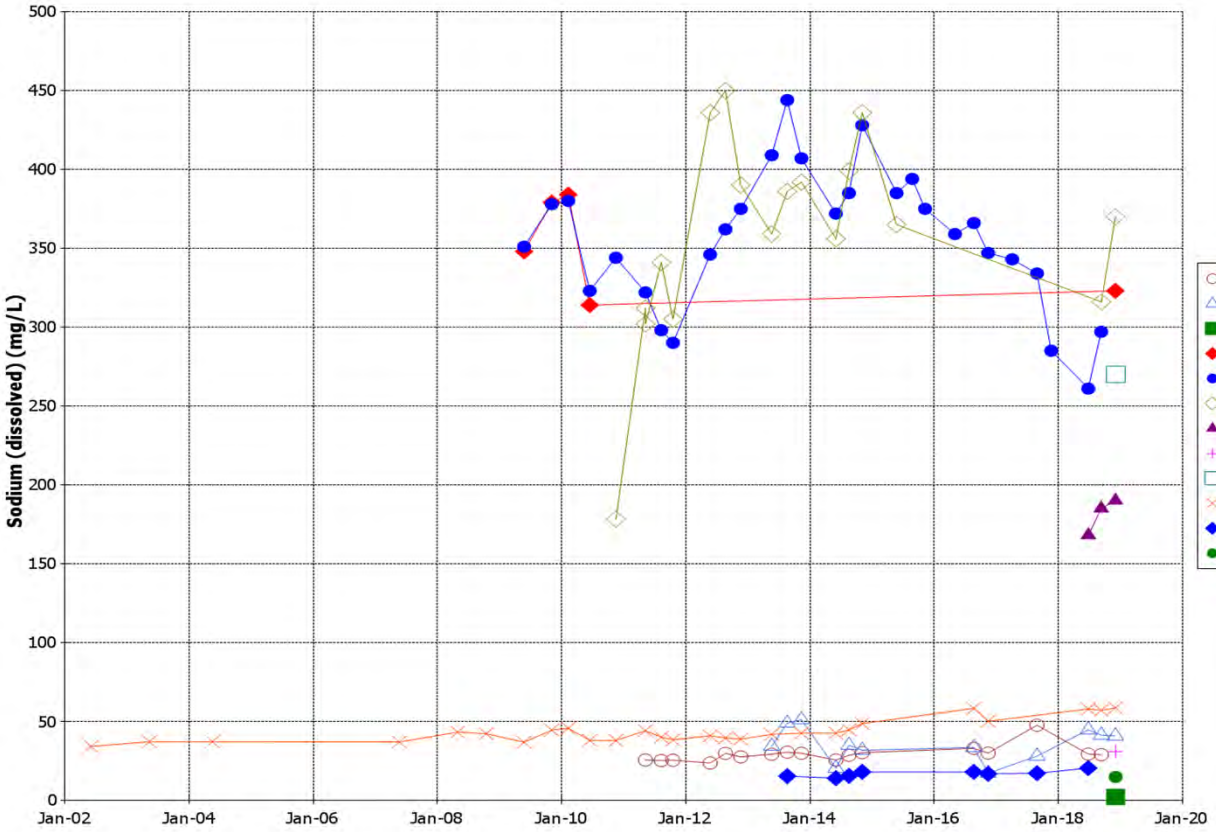
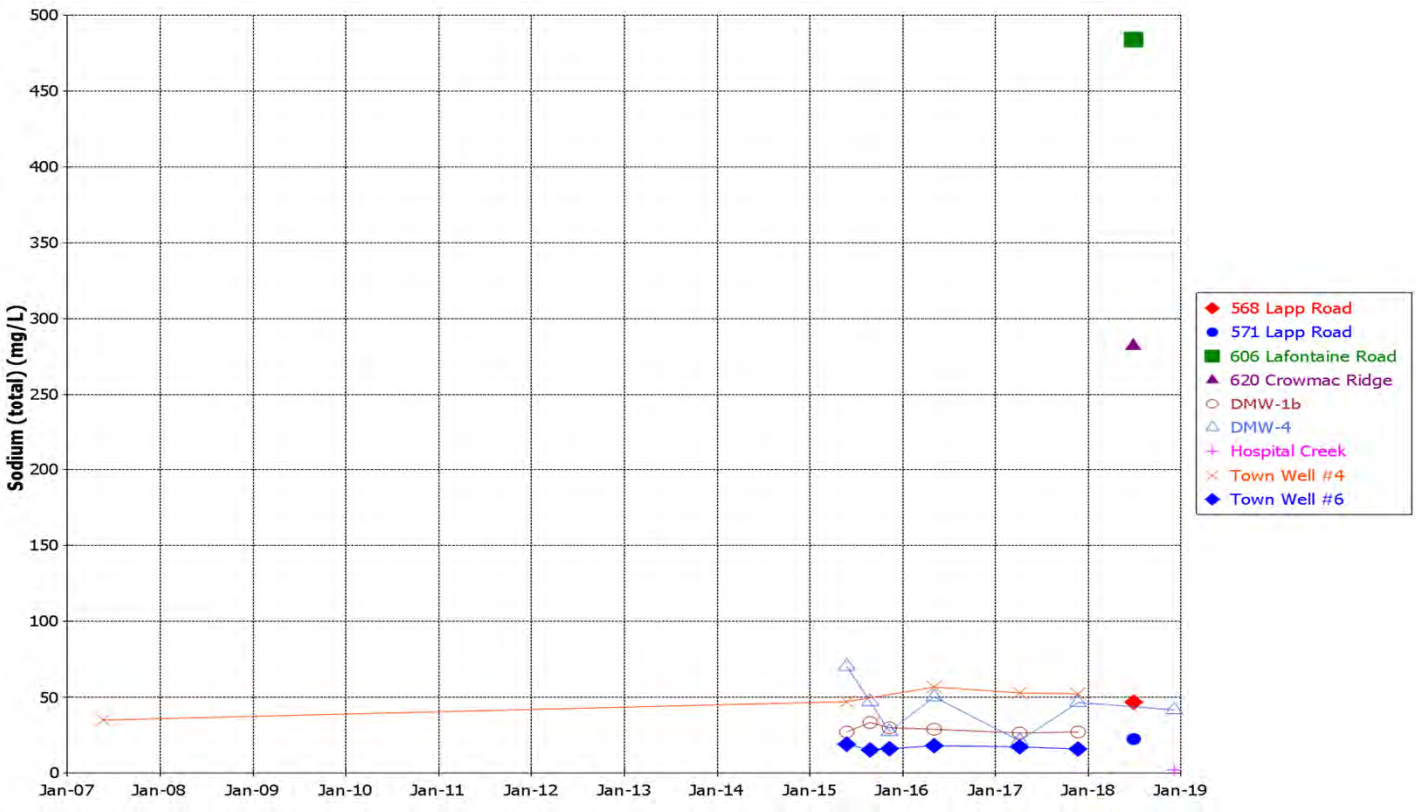
REVIEWED	DG	FILE NO.		FIGURE REV. NO.	





Columbia Shuswap Regional District

TITLE

Figure 5: Dissolved Sodium (Top) and Total Sodium (Bottom) Time Series Plots, Golden RDF

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DRAWN	RA	DATE	March 2019	PROJECT NO.	14-024-16
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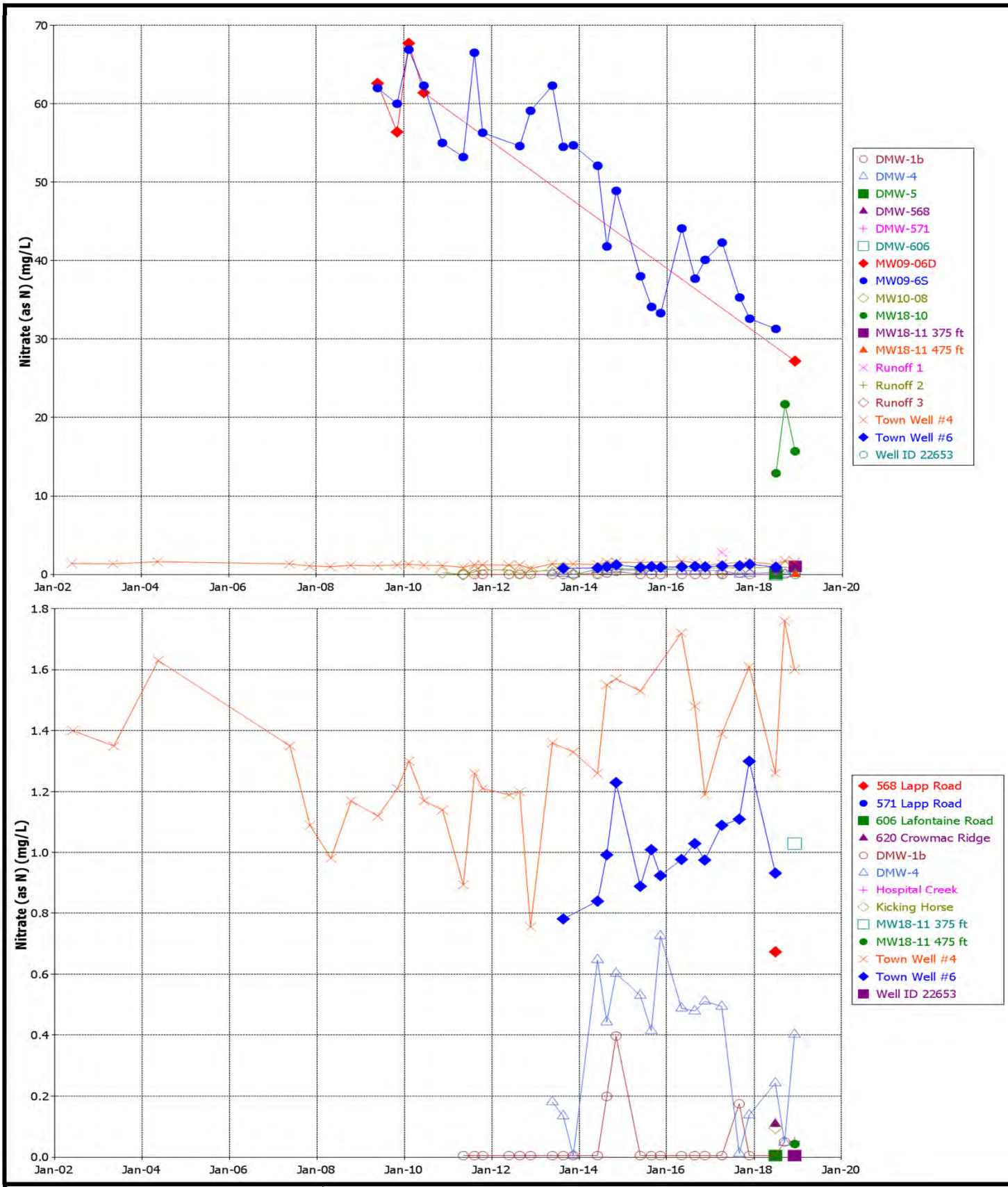
REVIEWED	DG	FILE NO.		FIGURE REV. NO.	



Columbia Shuswap Regional District

TITLE

Figure 7: Nitrate (Top) and Modified Nitrate (Bottom), Time Series Plots, Golden RDF

western water ASSOCIATES LTD

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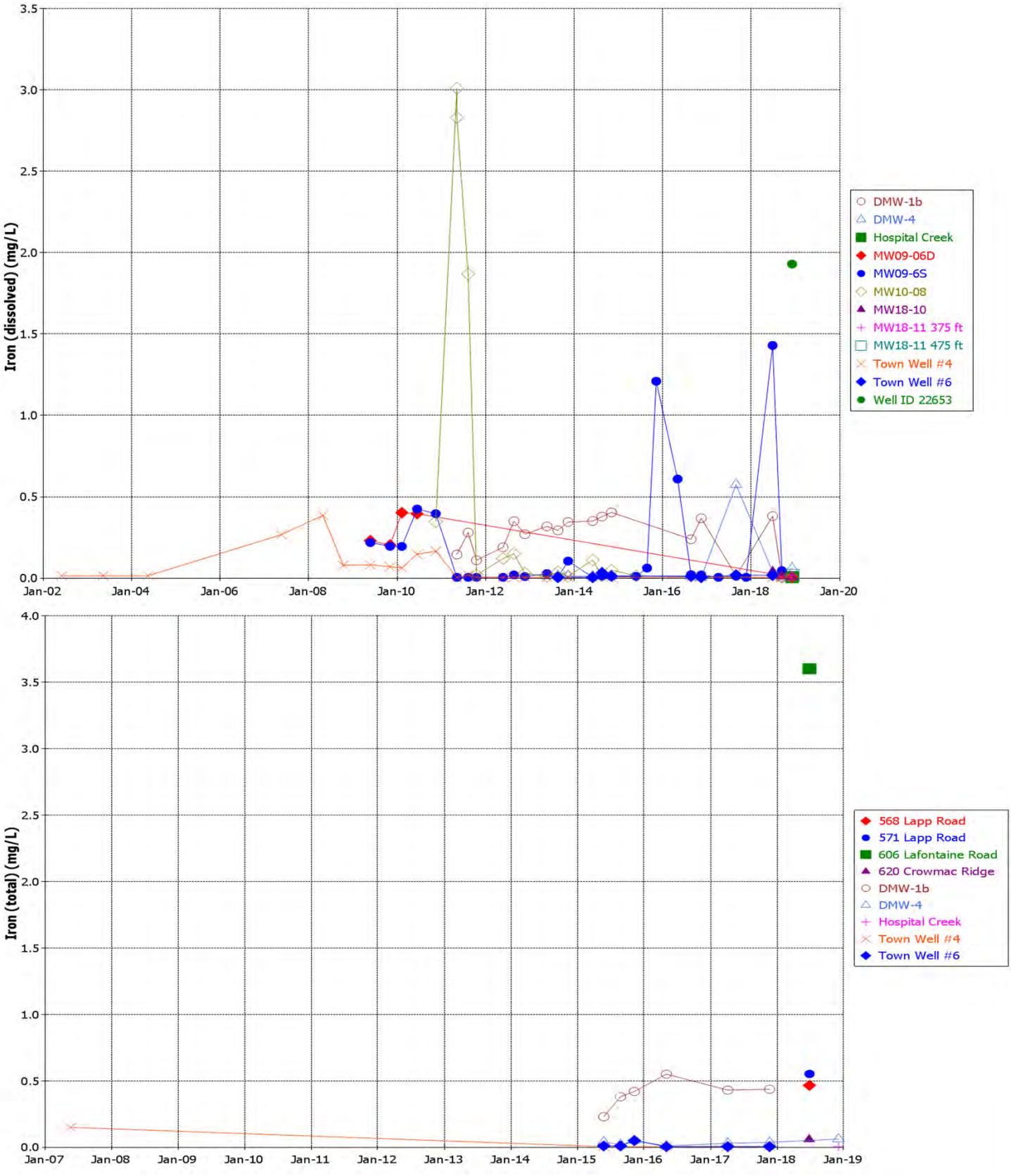
CHECKED	BRM	SCALE	n/a	DWG. NO.	n/a
REVIEWED	DG	FILE NO.		FIGURE REV. NO.	



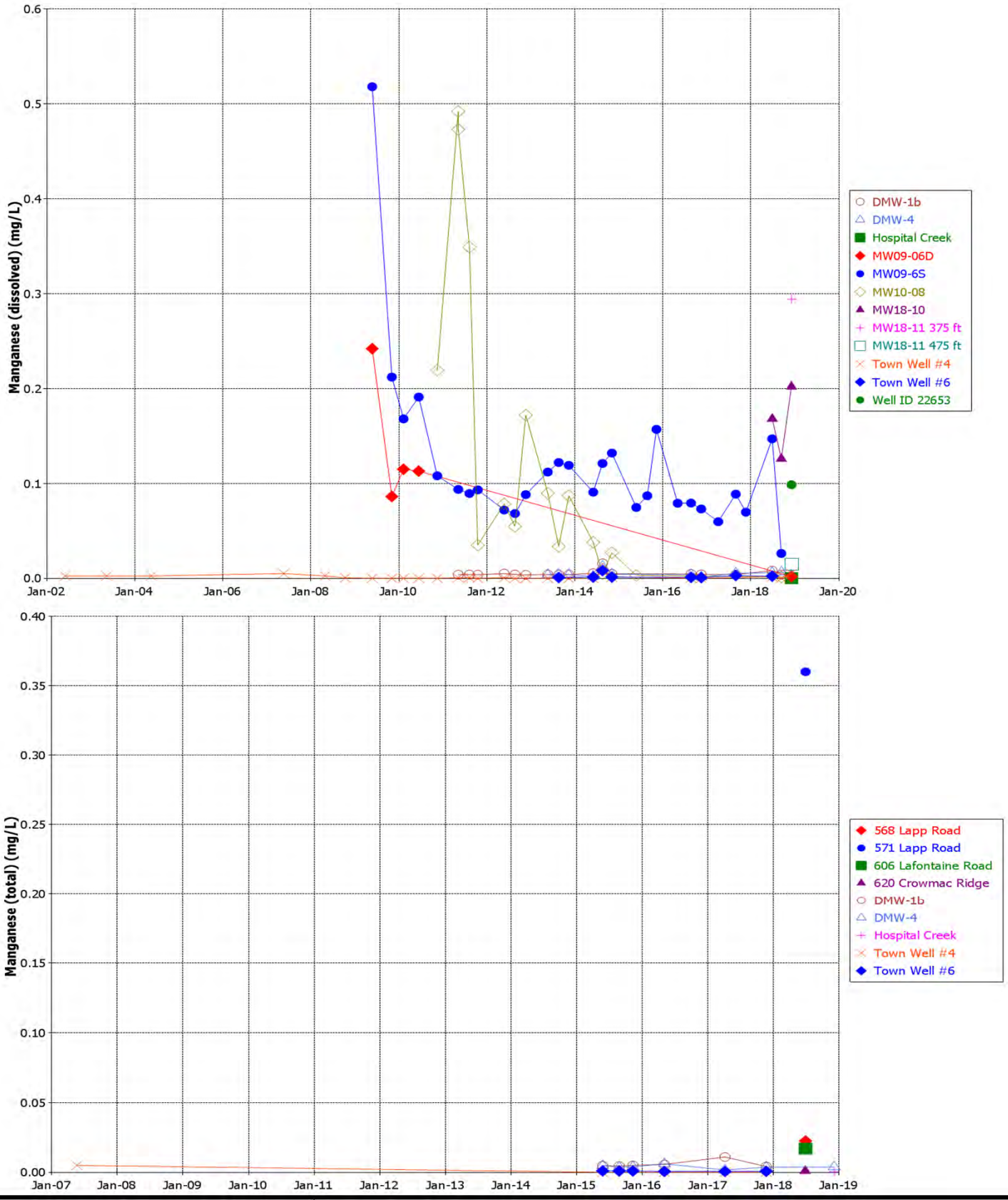
Columbia Shuswap Regional District

TITLE

Figure 8: Dissolved Iron (Top) and Total Iron (Bottom) Time Series Plots, Golden RDF

western water ASSOCIATES LTD

DRAWN	RA	DATE	March 2019	PROJECT NO.	14-024-16
CHECKED	BRM	SCALE	n/a	DWG. NO.	n/a
REVIEWED	DG	FILE NO.		FIGURE REV. NO.	



Columbia Shuswap Regional District

TITLE

Figure 9: Dissolved Manganese (Top) and Total Manganese (Bottom) Time Series Plots
Golden RDF

western water ASSOCIATES LTD

DRAWN	RA	DATE	March 2019	PROJECT NO.	14-024-16
CHECKED	BRM	SCALE	n/a	DWG. NO.	n/a
REVIEWED	DG	FILE NO.		FIGURE REV. NO.	

Appendix A

Operational Certificate – OC 17006

August 29, 2012

Tracking Number: 243578
Authorization Number: 17006

REGISTERED MAIL

Columbia Shuswap Regional District
Box 978
781 Marine Park Drive NE
Salmon Arm, BC V1E 4P1

Dear Operational Certificate Holder:

Enclosed is Amended Operational Certificate 17006 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

This operational certificate does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the operational certificate holder. 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.

...2

Ministry of Environment
Environmental Protection Division
401 - 333 Victoria St.
Nelson, BC V1L 4K3
Southern Interior Region - Kootenay
Telephone: (250) 354-6333
Facsimile: (250) 354-6332

Administration of this operational certificate will be carried out by staff from the Southern Interior Region - Kootenay. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Southern Interior Region - Kootenay, 401 - 333 Victoria St., Nelson, BC V1L 4K3.

Yours truly,

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

Enclosure

cc: Environment Canada

MINISTRY OF ENVIRONMENT

OPERATIONAL CERTIFICATE

17006

Under the Provisions of the Environmental Management Act

Columbia Shuswap Regional District

Box 978
781 Marine Park Drive NE
Salmon Arm, BC V1E 4P1

is authorized to manage waste and recyclable material from the Columbia Shuswap Regional District and environs at the Columbia Shuswap Regional District in Golden landfill located near Golden, British Columbia, 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.

This Operational Certificate supersedes all previous versions of the Operational Certificate MR-17006 issued under the authority of the *Environmental Management Act.*

1. AUTHORIZED DISCHARGE

This section applies to the discharge of refuse from municipal, commercial and light industrial sources to a sanitary landfill known as the GOLDEN LANDFILL. The site reference number for this discharge is E246600.

1.1 The authorized works are a sanitary landfill and related appurtenances approximately located as shown on the attached location map.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

1.2 The maximum quantity of waste discharges must not exceed the design capacity of the landfill as specified in the approved Design and Operations Plan. The final footprint and profile of the discharged waste must be within that specified in the Design and Operations Plan, and approximately as shown on the attached location map.

1.3 The authorized discharge is municipal solid waste as defined in the *Environmental Management Act* and other waste as may be authorized by the Director.

1.4 The legal description of the location of the authorized landfill facility is Subdivision 12 of Section 18, Township 27, Range 21, West of the 5th Meridian, Kootenay District.

1.5 The site is located approximately 2 kilometres travelling northeast on Highway 1 as shown on the location map.

2. DESIGN AND PERFORMANCE REQUIREMENTS

2.1 Design and Operating Plan

The Operational Certificate holder must prepare and maintain a current Design and Operations Plan prepared by a qualified professional. The Plan must be reviewed and updated as needed at least once every five years. The next update must be undertaken and completed in 2013. The Plan must address, but not be limited to, each of the subsections in the Landfill Criteria for Municipal Solid Waste including performance, siting, design, operational, closure and post-closure criteria. The facilities must be developed, operated and closed in accordance with the Plan. Should there be any inconsistency between this Operational Certificate and the Plan, this Operational Certificate must take precedence.

Written authorization from the Director must be obtained prior to implementing any changes to the approved plans. Based on any information obtained in connection with this facility, the Director may require revision of, or addition to, the design, operating and closure plans.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

2.2 Qualified Professionals

All facilities and information, including works, plans, assessments, monitoring, investigations, surveys, programs and reports, must be certified by Qualified Professionals.

2.3 Maintenance of Works and Emergency Procedures

The authorized works must be inspected regularly and maintained in good working order. In the event of an emergency or condition beyond the control of the Columbia Shuswap Regional District including, but not limited to, unauthorized fires arising from spontaneous combustion or other causes, or detection of surfacing leachate on the property, the Columbia Shuswap Regional District must take appropriate remedial action and notify the Regional Office. The Director may reduce or suspend operations to protect the environment until the authorized works has been restored, and/or corrective steps taken to prevent unauthorized discharges.

2.4 Additional Facilities or Works

The Director may require investigations, surveys, and the construction of additional facilities or works. The Director may also amend any information requirements of this Operational Certificate including plans, programs, monitoring, assessments and reports.

2.5 Public Health, Safety and Nuisance

The landfill must be operated in a manner such that it will not create a public nuisance or become a significant threat to public health or safety with respect to landfill gas, unauthorized access, roads, traffic, airport activity, noise, dust, litter, vectors, or wildlife attraction.

2.6 Ground and Surface Water Quality Impairment

The landfill must be operated in a manner such that ground or surface water quality does not decrease beyond that specified by the British Columbia Water Quality Guidelines, or other appropriate criteria as may be specified by the Director, at or beyond the landfill property boundary.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

The certificate holder must take all reasonable measures to ensure that BCWQG are met at or beyond the property boundary. These measures include but are not limited to:

a) Prohibiting the discharge of municipal solid waste into water.

b) Ensuring that no new waste is landfilled within 1.2 m of the highest groundwater level.

c) Ensuring that adequate surface water and groundwater diversion works are constructed and maintained to minimize surface water run-off and groundwater seepage from entering the landfill.

d) Ensuring that the management systems for surface water that has not come in contact with waste are hydraulically separate from those for managing impacted surface water.

e) Ensuring that the landfill is operated in a manner that prevents the exceedance in surface water and groundwater of anticipated leachate indicators or parameters distinctive of leachate or those specified by the Director at the landfill boundary.

f) Ensuring that the indicators in e) above, at specified groundwater monitoring wells within the property boundary are in accordance with those predicted by design and that suitable measures are taken to address the cause of any exceedances above the trigger levels identified in the most current Design and Operations Plan.

g) Ensuring that the landfill is operated in accordance with a Design & Operations Plan which specifies measures to prevent decreases in groundwater and surface water quality at and beyond the property boundary.

If exceedances to the specified water quality 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 must be submitted to the Director for review prior to conducting the work.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

2.7 Landfill Gas Management

The Landfill must not cause combustible gas concentrations to exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit at or in on-site or off-site structures.

The Operational Certificate holder must ensure that the facility is in compliance with the requirements of the Landfill Gas Management Regulation under the *Greenhouse Gas Reduction (Emissions Standards) Statutes Amendment Act*, 2008 on or before applicable dates specified in the regulation. The requirements of the regulation and its guideline documents must be incorporated by the Operational Certificate holder into the Design and Operation Plan revisions as they come into effect and as applicable.

2.8 Buffer Zone

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

3. OPERATIONAL REQUIREMENTS

3.1 Waste Compaction and Coverage

The Operational Certificate holder must ensure that waste deposition and compaction meets or exceeds the requirements of the BC Landfill Criteria or its most current version for daily, intermediate and final cover. Control must be exercised to ensure keeping freshly deposited refuse in a well defined and small / manageable working face.

3.2 Prohibited Wastes

The disposal of the following types of wastes is strictly prohibited:

(a) Hazardous Wastes other than those specifically approved for disposal to authorized landfills in the Hazardous Waste Regulation under the *Environmental Management Act*.

(b) Biomedical wastes as defined in the Guidelines for the Management of Biomedical Wastes in Canada (Canadian Council of Ministers of the Environment, February 1992),

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

(c) Bulk liquids and semi-solid wastes, which contain free liquids, as determined by US EPA Method 90954 Paint Filter Liquids Test, Test Methods for Evaluating Solid Wastes-Physical/Chemical Methods (EPA Publication No. Sw-846),

(d) Release of ozone depleting substances from the storage, handling and disposal of used appliances, equipment, or any material containing ozone depleting substances is prohibited in accordance with the requirements of the Ozone Depleting Substances Regulation. Onsite removal or evacuation of Ozone Depleting Substances (ODS) from appliances and the subsequent storage of appliances on site is permitted subject to both activities being in compliance with the Ozone Depleting Substances Regulation.

3.3 Waste Asbestos

Waste asbestos is authorized for disposal subject to compliance with the requirements of section 40 of the Hazardous Waste Regulation and the following conditions:

(a) The asbestos waste may not be mixed with any other hazardous waste.

(b) The Regional District must approve the disposal before disposal takes place.

(c) All other applicable requirements of the Hazardous Waste Regulation, including but not limited to manifesting and waste record keeping, must also be complied with.

3.4 Contaminated Soil

Soil that contains contaminants in concentrations less than "hazardous waste" as defined by the Hazardous Waste Regulation may be disposed of 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 does not include use as final cover material.

3.5 Wildlife and Vector Control

Vectors (carriers capable of transmitting a pathogen from one organism to another including, but not limited to flies and other insects, rodents, and birds) must be controlled by the application of cover material at the required frequency or by such additional methods as specified by the Director. Wildlife control fencing must be maintained around the perimeter of the landfill site and must be

electrified for at least the active bear season of each year.

This landfill must be operated so as to minimize the attraction of wildlife such as bears and birds by applying cover at required frequencies and instituting a good housekeeping program.

3.6 Site Access and Supervision

A landfill operator that has received BC Qualified Landfill Operator training, is familiar with the requirements of the Operational Certificate and the specifications of the Design and Operations Plan, must be present at all times during operating hours.

Locking gates must be maintained at all access routes to the landfill site. Gates, perimeter fencing and/or barriers must be installed where necessary to prevent unauthorized access to the site by vehicles. Gates must be locked during non-operating hours.

3.7 Dust Control

Dust created within the landfill property must be controlled, using methods and materials acceptable to the Director, such that it does not cause a public nuisance.

3.8 Litter Control

The best practical means must be used to prevent the scatter of litter. Any litter scattered into the neighbouring property, along access roads, in drainage ditches, along litter-control fences, into surrounding trees or elsewhere on the landfill site must be cleaned up. The frequency of clean up and other additional requirements for refuse scatter control must be determined by the Director.

3.9 Waste Reduction and Alternate Disposal

The Provincial Government has developed policies to promote the reduction, reuse and recycling of wastes. The Operational Certificate holder is encouraged to segregate for recycling and reuse, where possible, materials destined for disposal at this site.

Public scavenging must not be permitted at the landfill. The controlled salvaging of waste by the landfill operator or persons authorized by the

Operational Certificate holder is encouraged if areas or facilities for separation and storage of recyclable or reusable materials are provided.

In certain landfill environments, some construction and demolition debris or other wastes may create specific air and water quality concerns. If problems arise at this site that are attributable to specific wastes, the Director may require that alternate disposal/storage procedures be implemented.

3.10 Operations and Maintenance Manual

The Operational Certificate holder must prepare an Operations and Maintenance Manual to be reviewed and updated as necessary on at least an annual basis.

4. MONITORING AND REPORTING REQUIREMENTS

4.1 Landfill Monitoring

A monitoring program must be developed by a Qualified Professional and identify potential environmental impacts of the authorized facility and must address but not be limited to the Landfill Criteria for Municipal Solid Waste and Guidelines for Environmental Monitoring. The monitoring program must be updated every five years and submitted to the satisfaction of the Director. The next monitoring plan update is required to be undertaken and completed in 2013. Monitoring must be conducted in accordance with the monitoring program.

The program must be designed to assess and identify:

- The design performance of the landfill as per the Design & Operations Plan including but not limited to compliance with water quality performance standards at the landfill boundary.
- Landfill leachate as a contaminant source.
- Residential well water quality.
- Surface water quality.

The monitoring program must address, but not be limited to relevant sections of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills. The Environmental Monitoring Program must take into consideration results from previous monitoring programs and any other investigations conducted at the site to ensure that early detection of potential impacts is possible.

4.2 Sampling Techniques

Sampling must be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Gov't., Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409).

4.3 Analysis

Analyses must be carried out in accordance with procedures described in the most recent edition of the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", or by suitable alternative procedures as authorized by the Director. A copy of the above manual may be purchased from the Queen's Printer Publication Centre.

4.4 Quality Assurance

The Operational Certificate holder must produce, within 60 days on the request of the Regional Manager Environmental Protection, 'Field and Laboratory Quality Protocols and Quality Assurance Criteria' acceptable to the Director. The 'Laboratory Quality Protocols' must include the procedures used to assess precision, accuracy and blank quality, including frequency of application of those procedures, the procedures for sampling, handling (e.g. preservation, hold times) and corrective measures to be initiated when deficiencies are indicated. The 'Quality Assurance Criteria' must include the acceptance criteria for accuracy (based on recoveries for reference samples/spikes), for precision (based on deviation in field and lab duplicates) and method blanks (designed to indicate false positives).

5. LANDFILL REPORTING

5.1 Annual Report

The Operation Certificate Holder must submit an Annual Report to the Director on or before April 30th each year for the previous calendar year. The report must contain at least the following information:

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

(a) an executive summary;

(b) the type and tonnage of waste received, recycled, stored on-site and discharged / landfilled for the year;

(c) Any proposed changes to the Design and Operations Plan and the environmental monitoring program (EMP), with rationale for the changes; a description of unanticipated occurrences and any changes to the closure or post-closure plans and funds;

(d) A review of the preceding year of operation or an operations update which summarizes landfill development work completed in the subject reporting year and work planned for the subsequent year. A summary of any new information or changes to the facilities and plans, assessments, surveys, programs and reports;

(e) Occurrences or observations of wildlife (medium and large carnivores) at the facility;

(f) A statement regarding the facility's progress in reducing the regional solid waste stream being landfilled and the objectives of the Regional Solid Waste Management Plan;

(g) An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis. Trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;

(h) A list of training programs completed for landfill operators during the previous year; and

(i) Any additional information requested by the Director.

All reports must be submitted, suitably formatted and tabulated in both print and electronic format (portable document format).

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

5.2 Five Year Report

The Operation Certificate Holder must submit a Five Year Report to the Director on or before April 30th on the five year anniversary of the last submission. The next report is due by the end of 2013. The report must contain at least the following information:

(a) An executive summary;

(b) An updated Design and Operations Plan;

(c) A detailed hydrogeological assessment;

(d) The type and tonnage of waste received, recycled, stored on-site and discharged / landfilled for the year;

(e) A current topographic map detailing airspace consumption, on-site borrow pit changes and future developments;

(f) Volume and density analysis or an in-place material summary, updated estimates for the remaining capacity, site life, revised closure date for the current phase or sequence and revised closure date for the current landfill footprint;

(g) An outline of the current Environmental Monitoring Program and a compendium of all environmental monitoring data in accordance with requirements specified in the most recent version of Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills and Landfill Criteria for Municipal Solid Waste. The annual report must document any effect of the discharge on the quality of the receiving environment using appropriate statistical and graphical analysis. Trend analyses, as well as an evaluation of the impacts of the discharges on the receiving environment must be included;

(h) An update on the financial assurance mechanism including a statement of the current dollar value of the Closure Fund and the amount earmarked for the Landfill site; and

(i) Any additional information requested by the Director.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

6. LANDFILL CLOSURE PLAN

6.1 Closure Plan and Post Closure

The Operational Certificate holder must perform closure and post-closure care in accordance with all applicable requirements of the BC Landfill Criteria for Municipal Solid Waste. This Operational Certificate is issued on the condition that a Closure Plan and Final Cover Design that meets or exceeds the requirements of the criteria will be submitted to the Director during the operating life of the landfill. The Closure Plan must be reviewed every five years throughout the operating life of the landfill.

A certification by a Qualified Professional attesting that all closure works have been completed in accordance with the Closure Plan and Final Cover Design is to be submitted to the Director no later than 60 days after the implementation of the Final Cover Design.

The Operational Certificate Holder must submit a Post Closure or Aftercare Plan to the Ministry at least two years prior to the anticipated closure date of the landfill.

6.2 Closure Fund

The Operational Certificate holder must provide for the funding of progressive closure operations, final closure and operations beyond closure by maintaining a closure fund. The value of the closure fund must meet or exceed the estimated closure and post-closure costs as established in the approved Design and Operations Plan and updated in the annual report, plus a reasonable contingency for any remediation which may be required. Reported costs must be adjusted for inflation annually. Alternately, a closure and post-closure financial security acceptable to the Director may be built over time.

The Operational Certificate holder must determine and ensure that the closure fund is adequate by preparing annually a financial statement of the fund which must be made available to the Director upon request. The financial statement must report the accrued capital, interest and additions to the fund for the previous year and review the sufficiency of the fund and the rate of accrual in consideration of the projected costs of closure and post-closure obligations.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

6.3 Site Decommissioning

In accordance with Section 40 of the *Environmental Management Act* and Part 2 of the Contaminated Sites Regulation, the Operational Certificate holder must submit a site profile to the manager at least ten days prior to decommissioning the facilities authorized in Section 1.

6.4 Declaration of Landfill

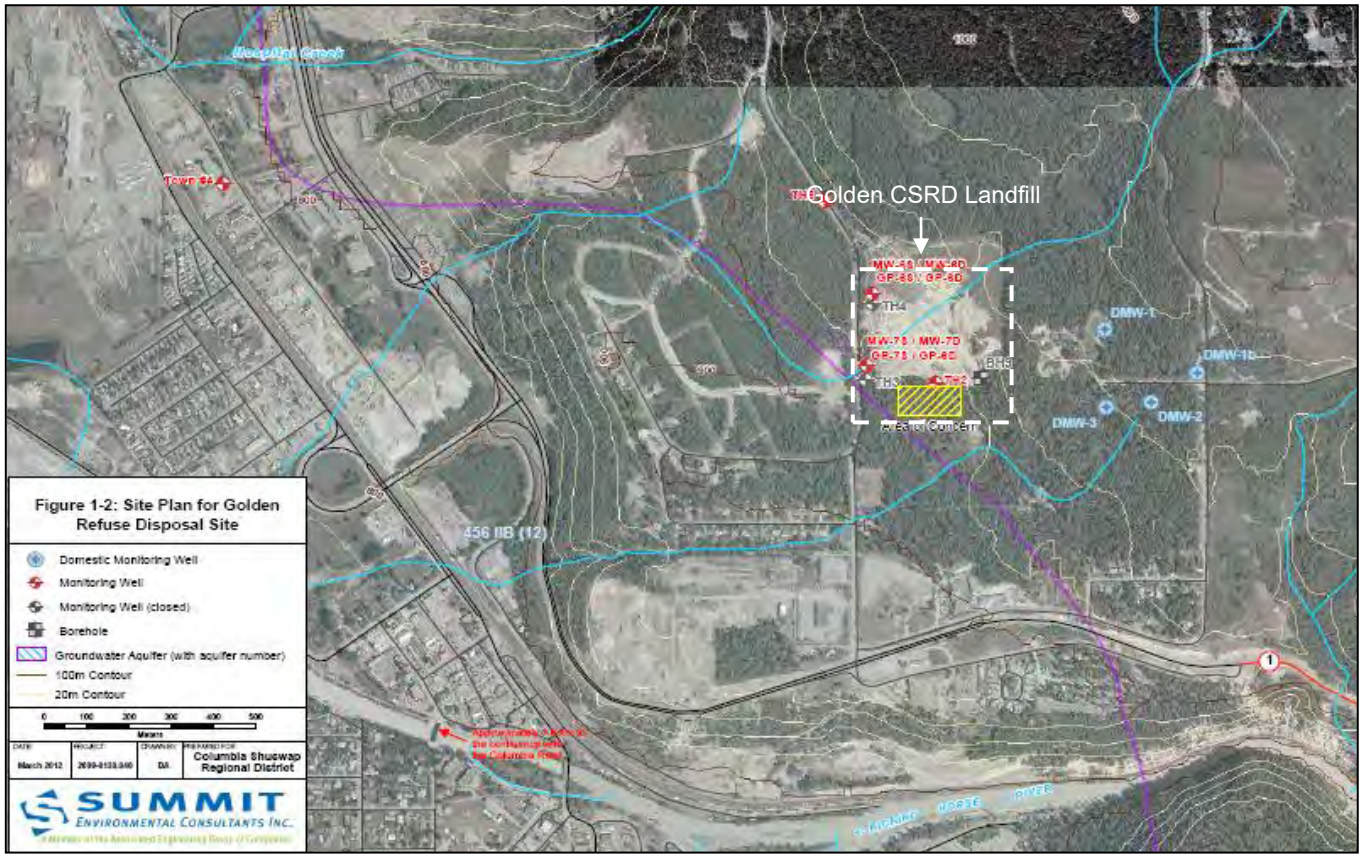
Landfills sited on titled land must register a covenant that the property was used for the purpose of waste disposal as a charge against the title to the property as provided for under Section 215.1 of the *Land Title Act.* Landfills located on crown land are to have a "notation on file" registered that the property was used for the purpose of waste disposal.

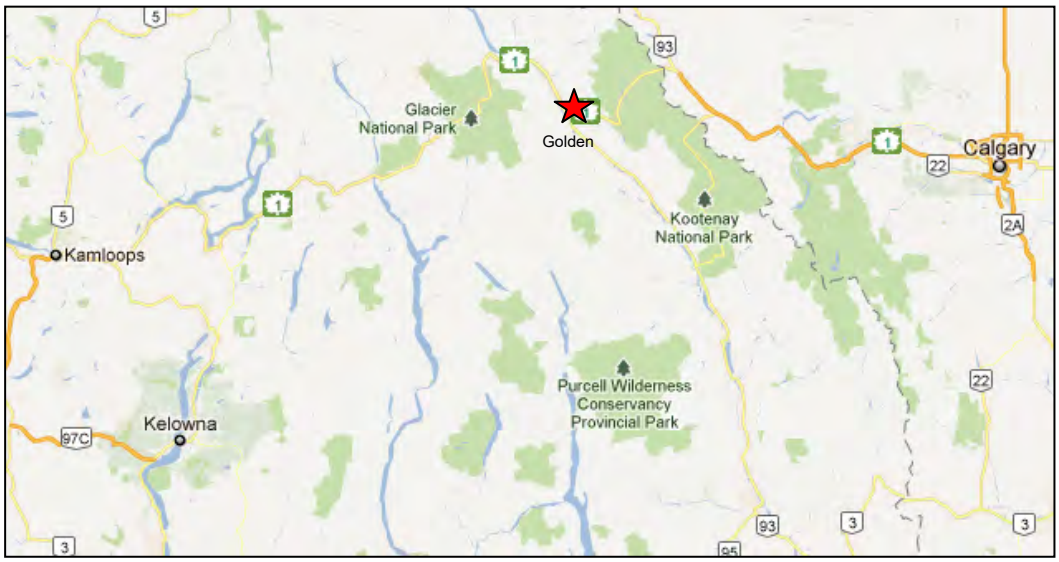
The Operational Certificate holder must, upon closure of the landfill, register a charge against the property title, or provide other legal notification acceptable to the Director that the property described in Section 1 was used for the purpose of waste disposal. The Director must be notified of the charge or legal notification.

Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

Location Map





Date issued: May 5, 2003
Date amended: August 29, 2012
(most recent)

Chris Stroich, M.Sc., P.Ag.
for Director, *Environmental Management Act*
Southern Interior Region - Kootenay

Appendix B

Well Logs

Symbol Legend

Common Symbols

 Sand

 Silty Sand

 Sandy Silt

 Clayey Sand

 Sand and Gravel

 Gravel

 Silt

 Clayey Silt

 Clay

 Silty Clay

 Sandy Silty Clay

 Silty Sand and Gravel

 Silty Gravel

 Silty Clay and Gravel

 Topsoil

 Peat

 Limestone

 Shale

Well Symbols

Pipe and Screen

NONE None

 Pipe

 Double Walled Pipe

 Sealed Pipe

 Fine Screen

 Coarse Screen

 Slotted Screen

 Slotted Screen

Top Fittings

NONE None

 Cap

 Flush-mounted Cap

 Above-ground Cap

 Connector

 Reducer

 Pipe Break

 Packer

Bottom Fittings

NONE None

 Cap

 Cone

 Screw-on Cap

 Connector

 Enlarger

 Pipe Break

 Packer

Packing and Backfill

NONE None

 Bentonite

 Clay

 Silt

 Cement

 Sand

 Sand and Gravel

 Gravel

Project No: **7130-010.01**

Client: **CSRD**

Location: **Golden, BC**

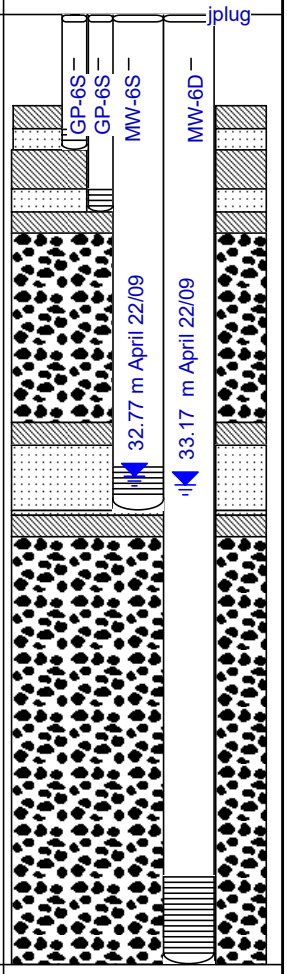
Logged by/ Checked by: **BRM/ MG**

Test Hole / Borehole I.D.: TH-6 (6")

Well I.D.: **MW-6S, MW-6D, GP-6S, GP-6D**

Location on site: **near weight scale (replaces TH4)**

Northing/ Easting/ Elevation: **0**

SUBSURFACE PROFILE			SAMPLE				
Depth	Symbol	Description	Type	I.D.	Flag for analysis	Well Details	Well Completion Details / Remarks
0 ft / 0 m		Ground Surface					
10 ft / 3 m		Light brown, GRAVEL, w. sand, loose, dry				Configuration: ♦ Two groundwater monitoring wells (each 2" diameter) ♦ Two gas monitoring probes (each 1" diameter) ♦ Schedule 40 PVC ♦ Gas piezos. are threaded ♦ 20/40 sand pack around each monitoring well Screen Assembly: ♦ No. 10 slot PVC **MW6D** -Screened in bedrock - Screened btw 59.76 m (196 ft) and 65.85 (216 ft) bgs **MW6S** -Screened in surficial deposits (overburden) -Screened btw 31.40 m (103 ft) and 34.45 m (113 ft) bgs **GP6D** -Screened btw 12.20 m (40 ft) and 16.77 m (55 ft) bgs **GP6S** -Screened btw 7.93 m (26 ft) and 9.45 m (31 ft) bgs	
30 ft / 10 m		Light brown, SILT w/ sand, trace gravel, loose, dry					
40 ft		Grey, GRAVEL w/ sand and silt, loose, dry					
50 ft		Grey, GRAVEL w/ sand and silt, loose, dry					
60 ft / 20 m		Note: larger gravel than above					
70 ft		Light brown, (f.) SAND w/ silt and trace gravel, dense, moist					
80 ft		Grey, (m.) SAND, w/ silt and gravel, dense, moist					
90 ft / 30 m		Grey, cemented GRAVEL, dense, dry					
100 ft		Yellow, SILT w/ some angular gravel and m.-c. sand, dense, moist					
110 ft		Black, Limestone bedrock					
120 ft / 40 m							
130 ft							
140 ft							
150 ft / 50 m							
160 ft							
170 ft							
180 ft / 60 m							
190 ft							
200 ft							
210 ft							
220 ft		End of Borehole				Casing height =	

SUMMIT ENVIRONMENTAL CONSULTANTS LTD.

Contractor: JR Drilling Central Ltd.

Operator(s): Jerry Opper

Drill Method: Dual Air Rotary

Ground conditions: bare

Date: April 20, 2009

Time:

Temperature: 10 degC

Sheet: 1 of 1

Project No: **7130-010.01**

Client: **CSRD**

Location: **Golden, BC**

Logged by/ Checked by: **BRM/ MG**

Test Hole / Borehole I.D.: TH-7 (6")

Well I.D.: **MW-7, GP-7S, GP-7D (replaces TH3)**

Location on site: **Golden-Donald Upper Rd.**

Northing/ Easting/ Elevation: **0**

SUBSURFACE PROFILE			SAMPLE				
Depth	Symbol	Description	Type	I.D.	Flag for analysis	Well Details	Well Completion Details / Remarks
0 ft / 0 m		Ground Surface					
0–10 ft		Yellow/ brown, SILT, loose, damp					
10–20 ft		Grey, SILTand clay, dense, moist					
20–30 ft		Grey, SILT, dense, moist					
30–40 ft / 10 m		Light brown, SILT w/ (f.) sand and gravel, loose, moist, fining upwards					
40–50 ft		Grey, cemented GRAVEL w/ sand and silt, dense, damp					
50–60 ft / 20 m		Grey, SILT trace sand, dense, moist					
60–70 ft		Grey, GRAVEL w/ (m.) sand and silt, dense, moist					
70–80 ft		Grey, (f.-m.) SAND w/ silt, dense, moist, coarsening upward					
80–90 ft / 30 m		Grey, cemented GRAVEL, dense, dry					
90–100 ft		Grey, (f.) angular GRAVEL w/ sand and silt, dense, dry,					
100–110 ft							
110–120 ft							
120–130 ft / 40 m		End of Borehole					
130–140 ft							

Configuration:

- One groundwater monitoring well (2" diameter)
- Two gas monitoring probes (each 1" diameter)
- Schedule 40 PVC
- Gas probes are threaded
- 20/40 sand pack around each monitoring well

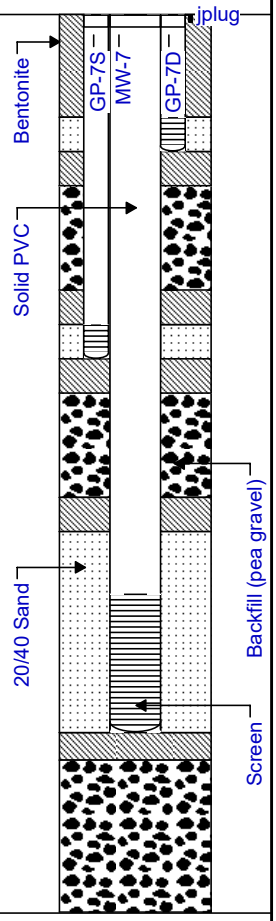
Screen Assembly:
- No. 10 slot PVC

MW-7
-Screened in the surficial deposits (overburden)
-Screened btw 25.6 m (84 ft) and 31.7 m (104 ft) bgs

GP-7D
-Screened btw 13.72 m (45 ft) and 15.24 m (50 ft) bgs

GP-7S
-Screened btw 4.5 m (15 ft) and 6.10 m (20 ft) bgs

Casing Height:
1.2 m (3.9 ft)



SUMMIT ENVIRONMENTAL CONSULTANTS LTD.

Contractor: JR Drilling Central Ltd.
Operator(s): Jerry Opper
Drill Method: Dual Air Rotary
Ground conditions: bare

Date: April 23, 2009
Time:
Temperature: 7 deg C
Sheet: 1 of 1

Project No: **7130-010.01**

Client: **CSRD**

Location: **Golden, BC**

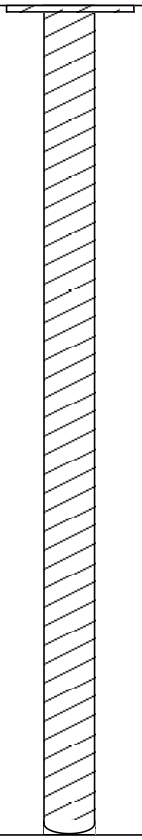
Logged by/ Checked by: **BRM/ MG**

Test Hole / Borehole I.D.: TH3

Well I.D.: **TH-3 (well closure)**

Location on site: **on Golden-Donald Upper Rd**

Northing/ Easting/ Elevation: **0**

SUBSURFACE PROFILE			SAMPLE				
Depth	Symbol	Description	Type	I.D.	Flag for analysis	Well Details	Well Completion Details / Remarks
0 ft / 0 m		Ground Surface				TH-3 was replaced by MW-7. TH-3 was decommissioned according to the Groundwater Protection Regulation. The surface casing was removed, the 2" piezometer was cut approximately 4" below ground surface and bentonite chips were poured into the casing. Bentonite was poured around the outer annulus of the piezometer to bring the hole to ground surface.	
10 / 10							
20							
30							
40							
50							
60 / 20		End of Borehole					
70							

SUMMIT ENVIRONMENTAL CONSULTANTS LTD.

Contractor: JR Drilling

Operator(s): Jerry

Drill Method:

Ground conditions: bare

Date: April 20, 2009

Time:

Temperature: 10 degC

Sheet: 1 of 1

KALA GROUNDWATER CONSULTING LTD. **TESTHOLE LOG**

CLIENT:	RCP	PROJECT:	Hydrogeologial	TESTHOLE:	BH95-03
LOCATION:	Golden Landfill		Assessment - Golden BC	PROJECT NO:	KE95-057
DRILL RIG:	Becker Hammer	SURF ELV:	908.5m ASL.	CO-ORDINATES:	

DEPTH (m) ELV. (m)	INDEX: METHANE %	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES		COMPLETION DETAILS
	0 5 10 15 20						
Gravel					Depth (m)	N	Stickup 1.2m
	0-8.54		**Silt**-some fine sand, some gravel, fine to coarse, iso. cobbles, non-plastic, red/brown, dense, damp		AR1 1.5		50mm dia. Solid pipe
2.0 906.5							Bentonite Grout
					AR2 3.0		
					D1 3.5/3.95	50	
4.0 904.5							
					AR3 4.5		
6.0 902.5							Top 6.0m
					AR4 6.0		
					D2 6.5/6.95	50	
8.0 900.2							
	8.54-11.3		**Silt**-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist.		AR5 7.5		
10.0 898.2							Sand
					AR6 10.0		
	11.3-15.5		**Silt**-some fine sand, trace gravel, fine to coarse, non-plastic, grey/brown, hard, moist				
12.0 896.2							
					AR7 11.5		
14.0 894.2					AR8 13.0		0.010"
					D3 13.5/13.9	50	slotted
					AR9 14.0		pipe
16.0 892.2	15.5-18.3		**Sand**-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp.		AR10 15.0		
					D4 16/16.45	75	
					AR11 16.5		
18.0 890.2					AR12 18.0		
							18.3m
20.0 888.2			*End of TH95-01 at 18.3m - No groundwater seepage Monitoring Well installed*				
22.0							

Prepared by: Paul Blackett	Reviewed by:	Figure: 3
Groundwater Depth: no groundwater	Borehole Depth: 18.3m below surface	Date: 10/9/95

Project No: **7130-010.01**

Client: **CSRD**

Location: **Golden, BC**

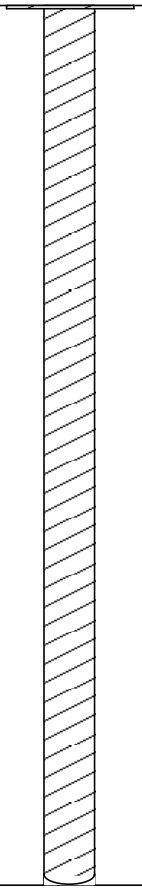
Logged by/ Checked by: **BRM/ MG**

Test Hole / Borehole I.D.: TH4

Well I.D.: **TH-4 (well closure)**

Location on site: **near weight scale**

Northing/ Easting/ Elevation: **0**

SUBSURFACE PROFILE			SAMPLE				
Depth	Symbol	Description	Type	I.D.	Flag for analysis	Well Details	Well Completion Details / Remarks
0 ft / 0 m		Ground Surface				TH-4 was replaced by MW-6S. TH-4 was decommissioned according to the Groundwater Protection Regulation. The surface casing was removed, the 2" piezometer was cut approximately 4" below ground surface and bentonite chips were poured into the casing. Bentonite was poured around the outer annulus of the piezometer to bring the hole to ground surface.	
10 / 10							
20							
30 / 20							
40							
50							
60 / 30							
70							
80							
90							
100		End of Borehole					
110							

SUMMIT ENVIRONMENTAL CONSULTANTS LTD.

Contractor: JR Drilling

Operator(s): Jerry

Drill Method:

Ground conditions: bare

Date: April 20, 2009

Time:

Temperature: 10 degC

Sheet: 1 of 1

KALA GROUNDWATER CONSULTING LTD. TESTHOLE LOG

CLIENT: RCP	PROJECT: Hydrogeologial	TESTHOLE:	BH95-04
LOCATION: Golden Landfill	Assessment - Golden BC	PROJECT NO:	KE95-057
DRILL RIG: Becker Hammer	SURF ELV: 916.9m ASL.	CO-ORDINATES:	

DEPTH (m) ELV. (m)	INDEX: METHANE % (0 5 10 15 20)	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES	COMPLETION DETAILS
Grass					Depth (m) N	Stickup 1.2m
	0-3.35		**Silt**-and fine sand, trace gravel fine to coarse, occ. cobbles, non-plastic, dense, yellow/brown, damp.		AR1 1.5	50mm dia. Solid pipe
2.0 914.9						Bentonite Grout & backfill
					AR2 3.0	
					D! 3.5/3.95 35	
4.0 912.9	3.35-5.49		**Gravel**-fine to coarse, and silt, trace sand fine to coarse, occ. cobbles, light brown, moist.		AR3 4.5	
6.0 910.9	5.49-11.0		**Silt**-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, grey/brown, hard, moist.		AR4 6.0	
					D2 6.5/6.95 50	
8.0 908.9					AR5 7.5	
10.0 906.9						Sand
					AR6 10.0	
					D3 10/10.45 45	
12.0 904.9	11.0-12.8		**Sand**-fine to medium, and gravel, fine to coarse, iso. cobbles, trace silt, dense, red/brown, moist.		AR7 11.5	
	12.8-17.7		**Sand**- fine to medium, and silt, little gravel fine to coarse, iso. cobbles, brown, hard, moist.		AR8 13.0	0.010" slotted pipe
14.0 902.9					D2 13.5/13.9 50	
					AR9 14.0	
16.0 900.2					AR10 15.0	
					D4 15/15.45 70	
					AR11 16.5	
18.0 898.2	17.7-30.48		**Sand** - fine and silt, trace gravel, fine to coarse, brown, hard, moist.		AR12 18.0	
					AR13 22.0	
20.0 896.2					AR 14 25.0	Top 20.0m
			End of TH95-01 at 30.48m - No groundwater seepage		AR15 27.5	
30.0 894.2			*Monitoring Well installed*		AR 16 30.0	Bot 30.5m

Prepared by: Paul Blackett	Reviewed by:	Figure:
Groundwater Depth: no groundwater	Borehole Depth: 30.5m below surface	Date: 10/9/95

MODIFIED UNIFIED CLASSIFICATION SYSTEM FOR SOILS

MAJOR DIVISION			GROUP SYMBOL	GRAPH SYMBOL	COLOR CODE	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE-GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 200 SIEVE)	GRAVELS MORE THAN HALF COARSE GRAINS LARGER THAN NO 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)	GW		RED	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 4$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			GP		RED	POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME FINES)	GM		YELLOW	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12% — ATTERBERG LIMITS BELOW "A" LINE OR P.I. LESS THAN 4
			GC		YELLOW	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	CONTENT OF FINES EXCEEDS 12% — ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
	SANDS MORE THAN HALF FINE GRAINS SMALLER THAN NO 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)	SW		RED	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 6$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			SP		RED	POORLY GRADED SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME FINES)	SM		YELLOW	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12% — ATTERBERG LIMITS BELOW "A" LINE P.I. LESS THAN 4
			SC		YELLOW	CLAYEY SANDS, SAND-CLAY MIXTURES	CONTENT OF FINES EXCEEDS 12% — ATTERBERG LIMITS ABOVE "A" LINE P.I. MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT PASSES 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	$W_L < 50\%$	ML		GREEN	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (see below)
		$W_L > 50\%$	MH		BLUE	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART NEGLIGIBLE ORGANIC CONTENT	$W_L < 30\%$	CL		GREEN	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	
		$30\% < W_L < 50\%$	CI		GREEN-BLUE	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		$W_L > 50\%$	CH		BLUE	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SILTS & CLAYS BELOW "A" LINE ON CHART	$W_L < 50\%$	OL		GREEN	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY
		$W_L > 50\%$	OH		BLUE	ORGANIC CLAYS OF HIGH PLASTICITY	
HIGHLY ORGANIC SOILS			Pt		ORANGE	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE

SPECIAL SYMBOLS

BEDROCK (Undifferentiated)

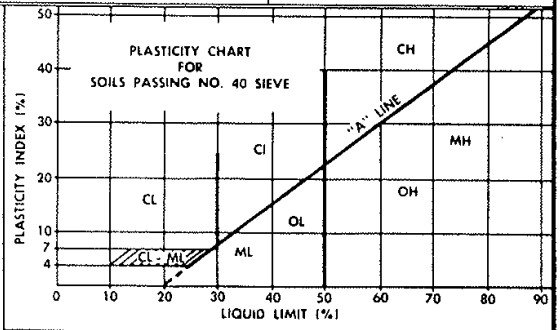
VOLCANIC ASH

SOIL COMPONENTS

FRACTION	U S STANDARD SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS	
	PASSING	RETAINED	PERCENT	DESCRIPTOR
GRAVEL			50 - 35	and
coarse	76 mm	19 mm		
fine	19 mm	No 4	35 - 20	some
SAND				
coarse	4.75 mm	2.00 mm	20 - 10	little
medium	2.00 mm	425 μm		
fine	425 μm	75 μm	10 - 1	trace
SILT (non plastic) or CLAY (plastic)	75 μm			

OVERSIZE MATERIAL

Rounded or subrounded	Not rounded
COBBLES 76 mm to 203 mm	ROCK FRAGMENTS > 76 mm
BOULDERS > 203 mm	ROCKS > 0·76 cubic metre in volume



1. ALL SIEVE SIZES MENTIONED ON THIS CHART ARE U.S. STANDARD, A.S.T.M. E.11.
2. BOUNDARY CLASSIFICATIONS POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN COMBINED GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL SAND MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%.

Kala Groundwater Consulting Ltd.
Vernon Kamloops

Testhole Log - TH95-01	
Depth (m)	**Soil Description**
0-5.8	**Silt**-and fine sand, little gravel fine to coarse, iso. cobbles, non-plastic, dense, yellow/brown, moist.
5.8-6.71	**Silt**-and sand fine to medium, some gravel fine to coarse, non-plastic, hard, grey, moist.
6.71-8.54	**Silt**-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, gre/brown, hard, moist.
8.54-11.3	**Silt**-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist.
11.3-14.9	**Silt**-some fine sand, trace gravel, fine to coarse, occ. cobbles, non-plastic, red/brown, hard, damp.
14.9-18.9	**Clay**-and silt, trace fine sand, trace fine gravel, iso. cobbles, low to none plastic, grey, hard, moist.
	End of TH95-01 at 18.9m - No groundwater seepage - Monitoring Well installed

Testhole Log - TH95-02	
Depth (m)	**Soil Description**
0-9.76	**Sand**-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp. *Upper 0.3m fill*
9.76-12.8	**Sand**-afine and silt, some gravel fine to coarse, iso. cobbles, dense, red/brown, moist.
12.8-15.5	**Sand**-fine, some silt, some gravel fine to coarse, occ. cobbles. dense, red/brown, moist.
15.5-16.5	**Silt**-some fine sand, trace gravel, fine to coarse, non-plastic, iso. grey/brown, cobbles, stiff, moist.
16.5-20.1	**Silt**-little fine sand, trace clay, trace gravel, fine to coarse, occ. cobbles, non-plastic, red/brown, hard, damp.
20.1-22.9	**Silt** - some sand, fine to coarse, trace gravel fine to coasre, iso. cobbles, grey, very hard, non-plastic,
	End of TH95-02 at 22.9m - No groundwater seepage - Monitoring Well installed

Testhole Log - TH95-03	
Depth (m)	**Soil Description**
0-8.54	**Silt**-some fine sand, some gravel, fine to coarse, iso. cobbles, non-plastic, red/brown, dense, damp
8.54-11.3	**Silt**-and fine sand, trace gravel, fine to coarse, non-plastic, iso. cobbles, grey, hard, moist
11.3-15.5	**Silt**-some fine sand, trace gravel, fine to coarse, non-plastic, grey/brown, hard, moist
15.5-18.3	**Sand**-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp.
	End of TH95-03at 18.3m - No groundwater seepage -Monitoring Well installed

Testhole Log - TH95-04	
Depth (m)	**Soil Description**
0-3.35	**Silt**-and fine sand, trace gravel fine to coarse, occ. cobbles, non-plastic, dense, yellow/brown, damp.
3.35-5.49	**Gravel**-fine to coarse, and silt, trace sand fine to coarse, occ. cobbles, light brown, moist.
5.49-11.0	**Silt**-and fine sand, trace coarse sand, trace gravel, fine to coarse, iso. cobbles, non-plastic, gre/brown, hard, moist.
11.0-12.8	**Sand**-fine to medium, and gravel, fine to coarse, iso. cobbles, trace silt, dense, red/brown, moist.
12.8-17.7	**Sand**- fine to medium, and silt, little gravel fine to coarse, iso. cobbles, brown, hard, moist.
17.7-30.48	**Sand** - fine and silt, trace gravel, fine to coarse, brown, hard, moist.
	End of TH95-04 at 26.2m - No groundwater seepage - Monitoring Well installed

Testhole Log - TH95-05	
Depth (m)	**Soil Description**
0-1.3	**Silt**-and fine sand, little gravel fine to coarse, iso. cobbles, non- plastic, dense, yellow/brown, moist.
1.3-3.1	**Waste**-municipal debris, paper,tin plastics,mixed with soil, damp.
3.1-3.4	**Sand**-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
3.4-5.1	**Waste**-municipal debris, paper,tin plastics,mixed with soil, damp.
5.1-5.4	**Sand**-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
5.4-6.2	**Waste**-municipal debris, paper,tin plastics,mixed with soil, damp.
6.2-7.1	**Sand**-fine to medium, some silt, little gravel, fine to coarse, compact, brown, moist.
	End of TH5 at 7.1m no groundwater-temporary installation

KALA GROUNDWATER CONSULTING LTD. **TESTHOLE LOG**

CLIENT: RCP	PROJECT: Hydrogeologial	TESTHOLE:	BH95-02
LOCATION: Golden Landfill	Assessment - Golden BC	PROJECT NO:	KE95-057
DRILL RIG: Becker Hammer	SURF ELV: 914.0m ASL	CO-ORDINATES:	

DEPTH (m) ELV. (m)	INDEX: 0 20 40 60 80 100 120 140	Plot	SOIL DESCRIPTION	Lab Test	SAMPLES		COMPLETION DETAILS
Grass					Depth (m)	N	Stickup 1.2m
	0-9.76		**Sand**-fine and silt, some gravel fine to coarse, occ. cobbles, dense, light brown, damp. *Upper 0.3m fill*		AR1 1.5		50mm dia. Solid pipe
2.0 912							Bentonite Grout
					AR2 3.0		
4.0 910							
					AR3 4.5		
6.0 908							Top 6.0m
					AR4 6.0		
					D1 6.5/6.95	50	
8.0 906							
					AR5 7.5		
	9.76-12.8		**Sand**-fine and silt, some gravel fine to coarse, iso. cobbles, dense, grey, moist.				
10.0 904							Sand
					AR6 10.0		
12.0 902							
					AR7 11.5		
	12.8-15.5		**Sand**-fine, some silt, some gravel fine to coarse, occ. cobbles. dense, red/brown, moist.		AR8 13.0		0.010"
14.0 900					D2 13.5/13.9	50	slotted pipe
					AR9 14.0		
	15.5-16.5		**Silt**-some fine sand, trace gravel, fine to coarse, non-plastic, iso. grey/brown, cobbles, stiff, moist.				
16.0 898					AR10 15.0		
	16.5-20.1		**Silt**-little fine sand, trace clay, trace gravel, fine to coarse, occ. cobbles,. non-plastic, red/brown, hard, damp				
					AR11 16.5		
18.0 896							
					AR12 18.0		
20.0 894							
	20.1-22.9		**Silt** - some sand, fine to coarse, trace gravel fine to coarse, iso.cobbles, grey, very hard, non-plastic, moist.		D3 20/20.45	80	
22.0 892			*End of TH95-01 at 18.9m - No groundwater seepage Well installed*				Well base 22.9m

Prepared by: Paul Blackett	Reviewed by:	Figure:
Groundwater Depth: no groundwater	Borehole Depth: 22.9m below surface	Date: 10/9/95

Project No: 2010-8835.010.006

Well I.D.: BH9

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 928 m asl

Location: Golden Landfill

Stabilized Water Level: n/a

Top of Casing Elevation: 0

Location on site: 5 m SE of landfill

Reviewed by: Tilman Roschinski

Logged by: Bryer Manwell

Subsurface Geology

Depth (ft / m)	Symbol	Description	Well Details and Notes	Well Construction
0 ft / 0 m		Ground Surface		
0 – 50 ft / 0 – 15 m		**SILT** Silt, occasional cobbles, dry to moist, yellowish-grey.	No well installed.	Natural slough
55 ft		End of Borehole		

SUMMIT ENVIRONMENTAL CONSULTANTS INC.
A Member of the Associated Engineering Group of Companies

Contractor: Target Drilling Inc.

Drill Method: Coring

Boring Diameter/ Depth: 6 in

Operator(s):

Date: Oct 8 2010

Sheet: 1 of 1

Project No: 2010-8835.010.006

Well I.D.: TH-8

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 915 m asl

Location: Golden Landfill

Stabilized Water Level: 14 m btoc

Top of Casing Elevation: flush mount

Location on site: 150 m NW of landfill on Golden Donald Upper Road

Reviewed by: Tilman Roschinski

Logged by: Bryer Manwell

Subsurface Geology

Depth (ft)	Depth (m)	Symbol	Description	Well Details and Notes	Well Construction
-1			Ground Surface		
4			**SAND AND GRAVEL** Sand and gravel, trace fines, light brown.	Flush mount casing, well sealed with j-plug	Flush mount casing
9					
14	5				
19					
24					
29					
34	10				bentonite grout
39					
44					
49	15		**CLAYEY TILL** Clay matrix, some gravel, trace sand, dense, wet.		Oct 7 2010
54			**REGOLITH**		

SUMMIT ENVIRONMENTAL CONSULTANTS INC.
A Member of the Associated Engineering Group of Companies

Contractor: Target Drilling Inc.

Drill Method: Coring

Boring Diameter/ Depth: 6 in / 27.3 m

Operator(s):

Date: Oct 5-7 2010

Project No: 2010-8835.010.006

Well I.D.: TH-8

Client: CSRD

First Water: n/a

Ground Elevation: Approx. 915 m asl

Location: Golden Landfill

Stabilized Water Level: 14 m btoc

Top of Casing Elevation: flush mount

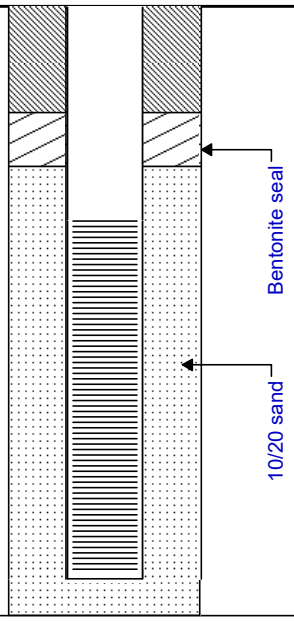
Location on site: 150 m NW of landfill on Golden Donald Upper Road

Reviewed by: Tilman Roschinski

Logged by: Bryer Manwell

Subsurface Geology

Depth	Symbol	Description	Well Details and Notes	Well Construction
60		**SLATE BEDROCK** Slaty bedrock, in places phyllitic, grey, fractured, some fractures filled with clay.	1 m bentonite seal	
65		**QUARTZ BEDROCK** Quartz, likely a large vein. Fluid mixing with sedimentary deposits on either end.		
70	21	**SLATE BEDROCK** Slaty bedrock, as above.	Screen depth: 67-87 ft (20.4 - 26.5 m)	
75		**QUARTZ BEDROCK** Quartz, as above.	Screen details: -10 slot PVC, 2 inch diameter -10/20 sand pack	
80		**SLATE BEDROCK** Slaty bedrock, as above		
85	26			
90		End of Borehole		
95				
100	31			
105				
110				



Contractor: Target Drilling Inc.

Operator(s):

Drill Method: Coring

Date: Oct 5-7 2010

Boring Diameter/ Depth: 6 in / 27.3 m

Sheet: 2 of 2

BRITISH COLUMBIA

Report 1 - Detailed Well Record

Well Tag Number: 99638 Owner: KATS CONTRACTING Address: 532 HIETALA ROAD Area: GOLDEN WELL LOCATION: KOOTENAY Land District District Lot: Plan: Lot: Township: 27 Section: 18 Range: 21 Indian Reserve: Meridian: W5M Block: A Quarter: Island: BCGS Number (NAD 27): 082N036121 Well: Class of Well: Water supply Subclass of Well: Domestic Orientation of Well: Vertical Status of Well: New Well Use: Private Domestic Observation Well Number: Observation Well Status: Construction Method: Diameter: inches Casing drive shoe: Y N Well Depth: 276 feet Elevation: feet (ASL) Final Casing Stick Up: 6 inches Well Cap Type: PLASTIC CAP Bedrock Depth: 18 feet Lithology Info Flag: N File Info Flag: N Sieve Info Flag: N Screen Info Flag: N Site Info Details: Other Info Flag: Other Info Details:	Construction Date: 2000-10-25 00:00:00.0 Driller: Owen's Drilling Ltd. Well Identification Plate Number: Plate Attached By: Where Plate Attached: PRODUCTION DATA AT TIME OF DRILLING: Well Yield: 6 (Driller's Estimate) U.S. Gallons per Minute Development Method: Air lifting Pump Test Info Flag: N Artesian Flow: Artesian Pressure (ft): Static Level: 50 feet WATER QUALITY: Character: Colour: Odour: Well Disinfected: N EMS ID: Water Chemistry Info Flag: N Field Chemistry Info Flag: Site Info (SEAM): Water Utility: Water Supply System Name: Water Supply System Well Name: SURFACE SEAL: Flag: N Material: Method: Depth (ft): Thickness (in): Liner from To: feet WELL CLOSURE INFORMATION: Reason For Closure: Method of Closure: Closure Sealant Material: Closure Backfill Material: Details of Closure:

Screen from	to feet	Type	Slot Size

Casing from	to feet	Diameter	Material	Drive Shoe
0	36	6	Steel	Y
36	276	5.88	Open hole	N

GENERAL REMARKS:
260' OF PVC LINER. BOTTOM 40' PERFORATED. SHOE: 1X6" CARBIDE BOTTON. RECOMMENDED PUMP TYPE: SUB

LITHOLOGY INFORMATION:

From	0 to	18 Ft.	CLAY, GRAVEL, COBBLES	
From	18 to	36 Ft.	BEDROCK, BROKEN	
From	36 to	150 Ft.	2 Gallons per Minute (U.S./Imperial)	bedrock
From	150 to	257 Ft.	2 Gallons per Minute (U.S./Imperial)	bedrock
From	256 to	276 Ft.	1 Gallons per Minute (U.S./Imperial)	bedrock

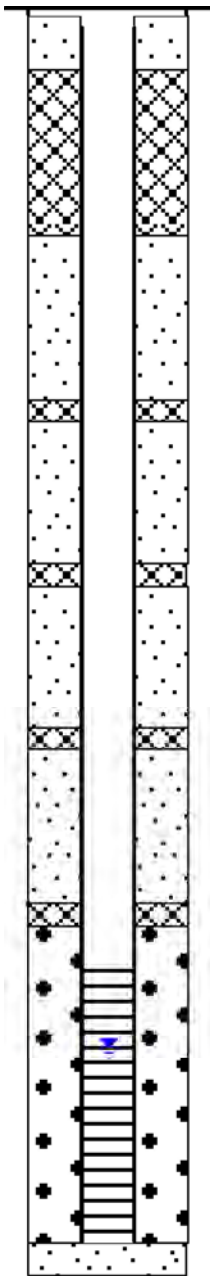
- Return to Main
- Return to Search Options
- Return to Search Criteria

Monitoring Well ID: MW18-10

Project Number: 14-024-21 **Client:** CSRD

Project: Golden RDF Additional Drilling **Location:** Golden, BC

western water

Depth Below Ground Surface	Symbol	Lithology	Well Construction	Well Completion Details
ft / m		Ground Surface		Lockable steel wellcap with a 0.81 m (32") stick up
0 / 0		**Topsoil**		8" Steel casing from 0.81m (3 ft) above ground surface (ags) to 35.65 m (117 ft) below ground surface (bgs).
		Sand and gravel, medium grained sand, sub angular gravel, moderately to poorly sorted, brown, dry.		Bentonite fill from 0 m (0 ft) to 6.1 m (20 ft) bgs, 10.7 m (35 ft) to 11.3 m (37 ft) bgs,15.2 m (50 ft) to 15.8 m (52 ft) bgs 19.8 m (65 ft) to 20.4 m (67 ft) bgs and from 24.7 m (81 ft) to 25.3 m (83 ft) bgs.
15				Natural fill from 6.1 m (20 ft) to 10.7 m (35 ft) bgs, 11.3 m (37 ft) to 15.2 m (50 ft) bgs, 15.8 m (52 ft) to 19.8 m (65 ft) bgs and from 20.4 m (67 ft) to 24.7 m (81 ft) bgs.
30				
45 / 15		**Sand and gravel,** medium to coarse grained sand, sub angular gravel, grey, dry.		
		Sand and gravel, medium grained sand, sub angular gravel, moderately sorted, brown, moist at 58 ft.		
60		**Sand and gravel,** with silt, fine to medium grained sand, sub angular gravel, moderately sorted, grey, moist.		
75		**Bedrock,** grey, mapped as argillite, shale and limestone, dry.		Sand pack with 10 filter sand from 25.3 m (83 ft) to 35 m (115 ft) bgs.
90 / 30				Water Level 28.53 m (94 ft) bgs June 25, 2018.
105				3 m (10 ft) length of threaded 10 slot screen from 32 m (105 ft) bgs to 35.1 m (115 ft) bgs.
				0.3 m (1 ft) length sandpack from 35.4 m (116 ft) bgs to 35.7 m (117 ft) bgs.

Coordinates: 503411.92 m E 5684049.84 m N 11 U

Static Water Level: 28.53 m June 26, 2018

Ground Elevation: 919 m above sea level (asl)

Total Borehole Depth: 35.65 m (117 ft) bgs

Drilling Contractor: JR Drilling

Drilling Method: Dual Air Rotary

Date of Completion: June 25, 2018

Drawn By: RA **Checked By:** BRM **Logged By:** RA **Sheet:** 1 of 1

Monitoring Well ID: MW18-11

Project Number: 14-024-21 **Client:** CSRD

Project: Golden RDF **Location:** Golden, BC

western water

Depth Below Ground Surface	Symbol	Lithology	Well Construction	Well Completion Details
ft / m		Ground Surface		Lockable steel wellcap with 1.1 m (35") stick up
0 – 0		**Silt**, with tracel gravel, loose, brown, dry.		
15		**Silt,** loose, grey, dry.		4.6 m (15 ft) length bentonite surface seal from 0 m (0 ft) bgs to 4.6 m (15 ft) below ground surface (bgs)
30				
45 – 15		**Silt with gravel,** coarsening downwards, loose, brown, dry.		
60		**Gravel,** with trace sand and silt, fine grained sand, sub angular to sub rounded gravel, angular silt, loose, brown, moist at 44.2 m (145 ft) bgs.		6" Steel casing from 1.1 m (3.5 ft) above ground surface (ags) to 115.8 m (380 ft) bgs
75				
90 – 30				
105				
120				5" Steel casing from 0 m (0 ft) bgs to 125 m (410 ft) bgs
135				
150 – 45				
165				
180				
195 – 60				
210				
225		**Silt,** loose, brown, dry.		
		Gravel, with trace silt, sub angular to rounded silt, loose, brown, dry.		
240 – 75		**Gravel,** with trace sand, fine grained sand, loose, brown, dry.		

Coordinates: 503205.13 m E 5684006.34 m N 11 U

Static Water Level: 114 m (374 ft) December 6, 2018

Ground Elevation: 915 m above sea level (masl)

Total Borehole Depth: 115.8 m (380 ft)

Drilling Contractor: JR Drilling Kamloops

Drilling Method: Dual Air Rotary

Date of Completion: December 3 - 6, 2018

Drawn By: RA **Checked By:** BRM **Logged By:** RA/BRM

Monitoring Well ID: MW18-11

Project Number: 14-024-21 **Client:** CSRD

Project: Golden RDF **Location:** Golden, BC

western water

Depth Below Ground Surface ft / m	Symbol	Lithology	Well Construction	Well Completion Details
255 / 90		**Silt and gravel,** layered, loose, brown, dry		
270		**Silt,** fine grained, loose to compact, brown dry.		
285 / 300 / 315				
330 / 105		**Silt,** with clay stringers, fine grained, loose to compact, dark grey, moist at 108.2 m (355 ft) bgs to 115.8 m (380 ft) bgs.		
345 / 360 / 375				Static Water Level 114 m (374 ft) bgs - December 6, 2018
390 / 120		**Weathered Bedrock**, grey, mapped as argillite, shale and limestone, loose, dry.		
405		**Bedrock**, grey, mapped as argillite, shale and limestone, moist.		4" PVC liner from 125 m (410 ft) bgs to 128 m (421 ft) bgs
420		**Depth of Well**		4" PVC liner threaded from 127 m (416 ft) bgs to 128 m (421 ft) bgs - 1.5 m (5 ft)
435 / 135				
450 / 465 / 480				
495 / 150				

Coordinates: 503205.13 m E 5684006.34 m N 11 U

Static Water Level: 114 m (374 ft) December 6, 2018

Ground Elevation: 915 m above sea level (masl)

Total Borehole Depth: 115.8 m (380 ft)

Drilling Contractor: JR Drilling Kamloops

Drilling Method: Dual Air Rotary

Date of Completion: December 3 - 6, 2018

Drawn By: RA **Checked By:** BRM **Logged By:** RA/BRM

Appendix C

Water Quality Database

Legend for Reports for CSRD Refuse Disposal Sites Water Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
BC CSR DW	BC CSR, Schedule 3.2, Generic Numerical Water Standards for Drinking Water (2017 and updates)
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
GCDWQ AO	Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives
GCDWQ MAC	Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
BC CSR DW	Highlighted value exceeds BC CSR DW
GCDWQ AO	Highlighted value exceeds GCDWQ AO
GCDWQ MAC	Highlighted value exceeds GCDWQ MAC
SL Criteria Override	Highlighted value exceeds sampling location criteria override

Golden Refuse Disposal Site

Water Quality Results

Analyte	Unit	Guideline GCDWQ MAC	Guideline GCDWQ AO	Guideline BC CSR DW	Sampling Location	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-568	DMW-571	DMW-606
					Date Sampled	09-May-11	10-Aug-11	18-Oct-11	24-May-12	22-Aug-12	20-Nov-12	21-May-13	20-Aug-13	12-Nov-13	02-Jun-14	18-Aug-14	04-Nov-14	25-May-15	25-Aug-15	09-Nov-15	03-May-16	22-Aug-16	14-Nov-16	05-Apr-17	29-Aug-17	20-Nov-17	26-Jun-18	11-Sep-18	21-May-13	20-Aug-13	12-Nov-13	02-Jun-14	18-Aug-14	04-Nov-14	25-May-15	25-Aug-15	09-Nov-15	03-May-16	22-Aug-16	14-Nov-16	05-Apr-17	29-Aug-17	20-Nov-17	26-Jun-18	11-Sep-18	03-Dec-18	27-Jun-18	27-Jun-18	27-Jun-18
					Lab Sample ID	K1E0403-05	K1H0536-03	K1J0685-03	2051369-01	2081484-03	2111131-03	3051354-03	3081378-03	3110772-03	4060249-03	4081094-03	4110161-03	5051773-04	5081710-02	5110693-01	6050336-02	6081698-02	6111141-04	7040434-07	7090074-04	7111886-05	8062674-02	8090975-04	3051354-05	3081378-04	3110772-04	4060249-04	4081094-04	4110161-04	5051773-03	5081710-03	5110693-02	6050336-03	6081698-03	6111141-05	7040434-06	7090074-03	7111886-06	8062674-03	8090975-05	8120636-04	8062808-02	8062808-03	8062808-01
					Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal			
Field Results																																															
Conductivity	µS/cm	NG	NG	NG		1220	1000	1150	1170	1140	1070	870	750	1040	1075	1030	1118	1021	1142	1155	1134	1201	1127	1113	1128	1137	1033	1189	900	1130	1100	914	1062	953	922	1043	1109	1271	1139	790	927	1159	1187	1214	1232	1000			
Depth to Water	m	NG	NG	NG				9.890																																							
Dissolved oxygen	mg/L	NG	NG	NG											0.29	0.59	1.98	1.21	2.34	0.34	0.01	4.73			2.53	4.67		0.32				2.33	0.30	3.22	2.98	2.04	0.40	0	9.12	4.63		0.54	4.21		4.34	3.79			
Dissolved oxygen (percent)	%	NG	NG	NG											2.8	3.5	16.5	10.6	20.5			40.3			23.0	39.8		2.7				20.00	2.6	27.4	25.8	17.9			36.6	40.0		5.0	36.1		36.21	31.9			
Field measured depth to bottom	m	NG	NG	NG																																										
Flow rate - container	L/s	NG	NG	NG																																										
Ground Elevation	m	NG	NG	NG		975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975	975																		
Oxidation reduction potential	mV	NG	NG	NG		-199	40	162	99	44	-12	124	8	19	-41	-86	-65	-28	-26	53	-35	97	29	83	17		-161	-182	235	68	204	78	77	-8	69	-5	37	80	206	152	235	-47		96	72	152			
pH		NG	7.0 - 10.5 [2.1]	NG		7.40	7.31	7.23	7.15	7.54	7.4	7.36	7.22	7.16	7.3	7.3	7.0	7.5	7.2	6.3	7.3	7.3	7.4	7.7	7.4	7.3	7.34	7.28	7.25	7.16	7.11	7.3	7.1	7.1	7.5	7.3	6.3	7.1	7.3	7.3	7.6	7.4	7.2	7.42	7.23	7.18			
Temperature	°C	NG	15	NG		8.8	9.5	6.1	8.2	10.0	8.0	8.7	7.7	8.0	7.8	9.1	8.2	9.8	8.5	8.0	8.1	7.9	9.1	6.8	9.6	7.9	8.0	7.8	8.7	7.8	7.2	7.9	8.6	8.2	9.0	8.2	8.0	8.5	8.2	7.7	7.8	9.5	8.0	7.9	7.9	7.1			
Lab Results																																															
Chlorinated Hydrocarbons																																															
1,2-Dichlorobenzene	mg/L	0.2	0.003	0.200 [3.1]																				<0.0005				<0.0005											<0.0005				<0.0005			
1,3-Dichlorobenzene	mg/L	NG	NG	NG																				<0.0010				<0.0010											<0.0010				<0.0010			
1,4-Dichlorobenzene	mg/L	0.005	0.001	0.005 [3.2]																				<0.0010				<0.0010											<0.0010				<0.0010			
1,1-Dichloroethane	mg/L	NG	NG	0.030																				<0.0010				<0.0010											<0.0010				<0.0010			
1,2-Dichloroethane	mg/L	0.005	NG	0.005																				<0.0010				<0.0010											<0.0010				<0.0010			
1,1-Dichloroethylene	mg/L	0.014	NG	0.014																				<0.0010				<0.0010											<0.0010				<0.0010			
cis-1,2-Dichloroethylene	mg/L	NG	NG	0.008																				<0.0010				<0.0010											<0.0010				<0.0010			
trans-1,2-Dichloroethylene	mg/L	NG	NG	0.080																				<0.0010				<0.0010											<0.0010				<0.0010			
Monochlorobenzene	mg/L	0.08	0.03	0.080 [3.3]																				<0.0010				<0.0010											<0.0010				<0.0010			
1,1,2,2-Tetrachloroethane	mg/L	NG	NG	0.0008																				<0.0005				<0.0005											<0.0005				<0.0005			
Tetrachloroethylene	mg/L	0.01	NG	0.030																				<0.0010				<0.0010											<0.0010				<0.0010			
1,1,1-Trichloroethane	mg/L	NG	NG	8.000																				<0.0010				<0.0010											<0.0010				<0.0010			
1,1,2-Trichloroethane	mg/L	NG	NG	0.003																				<0.0010				<0.0010											<0.0010				<0.0010			
Trichloroethylene	mg/L	0.005	NG	0.005																				<0.0010				<0.0010											<0.0010				<0.0010			
General																																															
Alkalinity (bicarbonate, as CaCO3)	mg/L	NG	NG	NG																	481	482	480	504	432	481	477	522										419	410	396	399	489	439	409	452	411	504	546	932
Alkalinity (carbonate, as CaCO3)	mg/L	NG	NG	NG																	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0										<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (hydroxide, as CaCO3)	mg/L	NG	NG	NG																	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0										<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (phenolphthalein, as CaCO3)	mg/L	NG	NG	NG																	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0										<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (total, as CaCO3)	mg/L	NG	NG	NG		509	509	495	486	480	512	497	463	479	499	479	478	490	478	500	481	482	480	504	432	481	477	522	437	427	435	392	399	416	430	429	422	419	410	396	399	489	439	409	452	411	504	546	932
Bicarbonate Alkalinity (as HCO3)	mg/L	NG	NG	NG																	587	588	586	614	527	587	582	637										511	500	483	486	596	536	499	552	502	615	667	1140
Carbonate Alkalinity (as CO3)	mg/L	NG	NG	NG																	<1	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600										<1	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600
Hydroxide Alkalinity (as OH)	mg/L	NG	NG	NG																	<1	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340										<1	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340
Bromide	mg/L	NG	NG	NG														<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10							<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10			
Chemical Oxygen Demand	mg/L	NG	NG	NG																																												
Chloride	mg/L	NG	250	250 [3.4]		26.0	27.7	32.7	28.4	32.2	35.7	38.9	40.9	41.1	35.8	39.7	40.1	39.7	42.4	51.7	38.7	47.1	50.4	42.1	12.4	52.8	92.2	52.3	22.4	16.2	16.9	20.6	19.7	17.4	12.1	13.2	15.7	15.7	15.1	14.5	12.8	46.5	11.7	11.8	12.6	10.9	51.1	20.0	32.7
Colour	CU	NG	15	NG																																												
Conductivity	µS/cm	NG	NG	NG		1120	1090	1100	1150	1120	1120	1110	1140	1150	1160	1140	1160	1150	1120	<2	1170	1160	1180	1140	1170	1170	1150	1180	1160	1220	1230	979	1170	1120	1220	1130	1090	1210	1100	951	955	1160	1190	1140	1180	1100	1200	1190	2010
Total cyanide	mg/L	0.2 [3.1]	NG	0.200 [3.5]																																												
Fluoride	mg/L	1.5	NG	1.500					1.10	0.81	1.05	1.23	1.31	1.02	1.13	0.84	1.15	1.25	1.28	1.31	1.28	1.28	1.25	1.25	0.73	1.30	1.35	1.38	0.48	0.61	0.52	0.28	0.32	0.42	0.89	0.74	0.48	0.69	0.49	0.42	0.34	1.45	0.79	0.71	0.72	0.62	0.51	0.81	6.83
Hardness, Total (dissolved as CaCO3)	mg/L	NG	NG	NG		655	590	550	654	618	590	629	644	641	692	650	606				700	697	644	676	595		613	613	619	641	643	571	635	584				733	625	522	515	649		572	587	551			
Hardness, Total (total as CaCO3)	mg/L	NG	NG	NG														649	678	645						582										619	611	587						565				671	726	167
Langelier Index		NG	NG	NG																																											1.1	1.3	1.1
pH		NG	7.0 - 10.5 [2.1]	NG		7.84	7.79	7.79	7.86	7.85	7.09	7.78	7.86	7.86	7.89	7.66	7.81	7.74	7.70	7.63	7.60	7.73	7.89	7.67	7.92	7.86	7.80	7.79	7.76	7.84	7.77	7.90	7.64	7.81	7.79	7.74	7.72	7.66	7.72	7.87	7.76	7.87	7.95	7.89	7.80	7.83	7.89	7.97	8.02
Sulphate	mg/L	NG	500 [2.3]	500 [3.6]		137	133	124	144	127	123	121	129	117	135	127	122	133	114	116	129	124	124	126	252	108	117	119	236	270	268	150	250	213	275	232	196	263	223	135	153	122	246	238	252	215	98.2	120	123
Temperature of observed pH	°C	NG	NG	NG																																											23.7	23.8	23.6
Total dissolved solids (computed)	mg/L	NG	500	NG																																											714	720	1280
Total organic carbon	mg/L	NG	NG	NG																																												
Total suspended solids	mg/L	NG	NG	NG		<1	<1	<1	1	17	12	4	<1	1	<1	1	<1	<2	<2	<3	<2	<2	<2	<2	<2.0	2.8	<2.0	<2.5	<1	<1	1	<1	<1	<1	<2	<2	<3	2	<2	<2	<2	2.0	<2.0	<2.0	<2.0	<3.3			
Turbidity	NTU	N [1.2]	NG	NG		2.0	3.4	1.8	1.6	3.0	3.4	3.0	3.4	3.2	4.3	3.7	4.3	1.5	3.0	4.5	4.8	1.68	1.49	2.40	0.63	5.34	4.61		0.2	0.2	0.3	5.5	0.2	0.2	0.5	0.2	0.2	0.2	0.30	0.24	0.25	7.35	0.37	0.32		0.58	2.38	1.96	42.6
Halogenated Methanes																																															
Bromodichloromethane	mg/L	0.100 [1.3]	NG	0.100 [3.7]																				<0.0010				<0.0010											<0.0010				<0.0010			
Bromoform	mg/L	0.100 [1.4]	NG	0.100 [3.8]																				<0.0010				<0.0010											<0.0010				<0.0010			
Carbon tetrachloride	mg/L	0.002	NG	0.002																				<0.0005				<0.0005											<0.0005				<0.0005			
Chloroform	mg/L	0.100 [1.5]	NG	0.100 [3.9]																				<0.0010				<0.0010											<0.0010				<0.0010			
Dibromochloromethane	mg/L	0.100 [1.6]	NG	0.100 [3.10]																				<0.0010				<0.0010											<0.0010				<0.0010			
Dibromomethane	mg/L	NG	NG	NG																				<0.0010				<0.0010											<0.0010				<0.0010			
Dichloromethane	mg/L	0.05	NG	0.050																				<0.0030				<0.0030											<0.0030				<0.0030			
Total Trihalomethanes (calculated)	mg/L	0.100 [1.7]	NG	0.100 [3.11]																				<0.0020				<0.0020											<0.0020				<0.0020			
Trichlorofluoromethane	mg/L	NG	NG	1.000																				<0.0010				<0.0010											<0.0010				<0.0010			
Metals																																															
Aluminum (dissolved)	mg/L	NG	N [2.4]	9.500 [3.12]		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	0.005	<0.005							<0.005	<0.005		<0.0050		0.0202	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				<0.005	<0.005		<0.0050		0.0128	<0.0050	<0.0050			
Aluminum (total)	mg/L	NG	N [2.5]	9.500 [3.13]														0.005	<0.005	<0.05	<0.005			0.005		<0.0050										<0.005	<0.005	<0.05	<0.005			<0.005		<0.0050			<0.0050	0.0079	<0.0050	0.0173
Antimony (dissolved)	mg/L	0.006	NG	0.006		0.0002	0.0002	<0.0020	0.0001	0.0002	0.0004	0.0004	0.0004	0.0005	0.0003	0.0003	0.0002							<0.0001	<0.0001		<0.00020		<0.00020	<0.00020	0.0004	0.0005	0.0005	0.0004	0.0004	0.0003				<0.0001	0.0002		<0.00020		<0.00020	<0.00020	<0.00020			
Antimony (total)	mg/L	0.006	NG	0.006														<0.0001	<0.0001	<0.001	<0.0001			0.0003		<0.00020										0.0002	0.0003	<0.001	0.0002			0.0001		<0.00020			<0.00020	0.00021	<0.00020	<0.00020
Arsenic (dissolved)	mg/L	0.010 [1.8]	0.0260	0.0362	0.0285	0.0196	0.0419	0.0392	0.0388	0.0397	0.0382	0.0351	0.0378	0.0436								0.0421	0.0407		0.00124		0.0434	0.0411	0.0013	0.0013	0.0014	0.0012	0.0014	0.0013				0.0010	0.0009		0.0421		0.00124	0.00137	0.00146			
Arsenic (total)	mg/L	0.010 [1.9]	NG	0.010														0.0236	0.0489	0.042	0.0375			0.0326		0.0476										0.0014	0.0018	<0.005	<0.0005			0.0010		0.00149			0.00161	<0.00050	<0.00050	0.00239
Barium (dissolved)	mg/L	1.0	NG	1.000		0.0242	0.022	0.021	0.024	0.023	0.022	0.023	0.023	0.023	0.024	0.024	0.026							0.025	0.024		0.0149		0.0225	0.0222	0.015	0.014	0.015	0.015	0.017	0.017				0.017	0.015		0.0223		0.0159	0.0155	0.0224			
Barium (total)	mg/L	1.0	NG	1.000														0.022	0.026	<0.05	0.024			0.025		0.0246										0.017	0.016	<0.05	0.019			0.016		0.0165			0.0154	0.0953	0.0833	0.0253
Beryllium (dissolved)	mg/L	NG	NG	0.008		0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0002	0.0001	0.0001							<0.0001	<0.0001		<0.00010		0.00011	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001	<0.0001		0.00011		<0.00010	<0.00010	<0.00010			
Beryllium (total)	mg/L	NG	NG	0.008														<0.0001	0.0001	<0.001	0.0001			<0.0001		0.00011										<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010			<0.00010			
Bismuth (dissolved)	mg/L	NG	NG	NG		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001							<0.0001	<0.0001		<0.00010		<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				<0.0001	<0.0001		<0.00010		<0.00010	<0.00010	<0.00010			
Bismuth (total)	mg/L	NG	NG	NG														<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010										<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010			<0.00010			
Boron (dissolved)	mg/L	5	NG	5.000		0.143	0.135	0.104	0.138	0.137	0.133	0.145	0.166	0.158	0.153	0.138	0.134							0.191	0.172		0.386		0.156	0.134	0.263	0.415	0.465	0.070	0.286	0.218				0.267	0.092		0.148		0.355	0.336	0.330			
Boron (total)	mg/L	5	NG	5.000														0.146	0.139	0.14	0.146			0.137		0.101										0.659	0.392	0.20	0.444			0.106		0.386			0.335	0.213	0.0545	0.961
Cadmium (dissolved)	mg/L	0.005	NG	0.005		<0.00001	<0.00001	<0.00001	0.00003	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	0.00001	0.00001							0.00003	0.00001		<0.000010		<0.000010	<0.000010	0.00002	0.00003	<0.00001	0.00002	0.00001	0.00002				0.00003	0.00001		<0.000010		0.000014	0.000015	<0.000010			
Cadmium (total)	mg/L	0.005	NG	0.005														<0.00001	<0.00001	<0.0001	<0.00001			<0.00001		<0.000010										0.00001	<0.00001	<0.0001	<0.00001			<0.00001		<0.000010			0.000010	<0.000010	<0.000010	0.000121
Calcium (dissolved)	mg/L	NG	NG	NG		71.9	63.2	65.9	61.2	63.9	64.0	68.7	71.8	73.4	74.0	73.1	70.5							74.5	70.8		75.4		71.2	70.8	78.2	80.7	82.5	75.1	86.4	79.9				77.8	68.9		70.7		74.9	78.6	67.9			
Calcium (total)	mg/L	NG	NG	NG														74.3	75.8	75.1	79.2			77.3		65.9										79.0	81.9	81.6	97.0			73.2		76.1			68.6	91.9	95.6	34.4
Chromium (dissolved)	mg/L	0.05	NG	0.050 [3.14]		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005							<0.0005	<0.0005		<0.00050		<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005				<0.0005	<0.0005		<0.00050		<0.00050	<0.00050	<0.00050			
Chromium (total)	mg/L	0.05	NG	0.050 [3.15]														<0.0005	<0.0005	<0.005	<0.0005			<0.0005		<0.00050										<0.0005	<0.0005	<0.005	<0.0005			<0.0005		<0.00050			<0.00050	0.00076	<0.00050	<0.00050
Cobalt (dissolved)	mg/L	NG	NG	0.001		0.00011	0.00009	<0.00005	0.00017	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00013	0.00012	0.00008							0.00007	<0.00005		0.00075		0.00011	<0.00010	0.00084	0.00075	0.00059	0.00126	0.00133	0.00106				0.00091	0.00088		<0.00010		0.00080	0.00112	0.00076			
Cobalt (total)	mg/L	NG	NG	0.001														0.00014	<0.00005	<0.0005	<0.00005			0.00050		<0.00010										0.00079	0.00083	0.0009	0.00125			0.00077		0.00068			0.00075	0.00049	0.00445	0.00104
Copper (dissolved)	mg/L	NG	1.0	1.500 [3.16]		0.0006	0.0008	0.0020	0.0002	0.0002	0.0014	0.0004	<0.0002	<0.0002	0.0007	<0.0002	0.0004							0.0004	0.0185		0.00361		0.00069	<0.00040	0.0036	0.0030	0.0024	0.0668	0.0060	0.0065				0.0043	0.0593		0.00044		0.00594	0.0263	0.00315			
Copper (total)	mg/L	NG	1.0	1.500 [3.17]														0.0078	0.0009	<0.002	0.0003			0.0079		0.00073										0.0100	0.0027	0.006	0.0071			0.0394		0.00181			0.00488	0.0582	0.00719	0.00196
Iron (dissolved)	mg/L	NG	0.3	6.500 [3.18]		0.145	0.28	0.11	0.19	0.35	0.27	0.318	0.294	0.345	0.351	0.378	0.404							0.239	0.368		0.014		0.381	<0.010	0.014	0.014	0.013	0.011	0.021	0.014				0.011	<0.010		0.575		0.039	<0.010	0.060			
Iron (total)	mg/L	NG	0.3	6.500 [3.19]														0.23	0.38	0.42	0.55			0.43		0.437										0.04	0.02	<0.10	0.01			0.03		0.037			0.062	0.466	0.552	3.60
Lead (dissolved)	mg/L	0.005 [1.10]	NG	0.010		0.0002	0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	0.0002	<0.0001							<0.0001	0.0003		<0.00020		<0.00020	<0.00020	0.0003	0.0004	0.0002	0.0003	0.0002	0.0003				<0.0001	0.0004		<0.00020		0.00028	<0.00020	0.00032			
Lead (total)	mg/L	0.005 [1.11]	NG	0.010														0.0022	0.0003	<0.001	0.0003			0.0002		<0.00020										0.0004	0.0003	<0.001	0.0003			0.0002		<0.00020			0.00078	0.00124	<0.00020	0.00134

Golden Refuse Disposal Site

Water Quality Results

Analyte	Unit	Guideline GCDWQ MAC	Guideline GCDWQ AO	Guideline BC CSR DW	Sampling Location	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-1b	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-4	DMW-568	DMW-571	DMW-606
					Date Sampled	09-May-11	10-Aug-11	18-Oct-11	24-May-12	22-Aug-12	20-Nov-12	21-May-13	20-Aug-13	12-Nov-13	02-Jun-14	18-Aug-14	04-Nov-14	25-May-15	25-Aug-15	09-Nov-15	03-May-16	22-Aug-16	14-Nov-16	05-Apr-17	29-Aug-17	20-Nov-17	26-Jun-18	11-Sep-18	21-May-13	20-Aug-13	12-Nov-13	02-Jun-14	18-Aug-14	04-Nov-14	25-May-15	25-Aug-15	09-Nov-15	03-May-16	22-Aug-16	14-Nov-16	05-Apr-17	29-Aug-17	20-Nov-17	26-Jun-18	11-Sep-18	03-Dec-18	27-Jun-18	27-Jun-18	27-Jun-18
					Lab Sample ID	K1E0403-05	K1H0536-03	K1J0685-03	2051369-01	2081484-03	2111131-03	3051354-03	3081378-03	3110772-03	4060249-03	4081094-03	4110161-03	5051773-04	5081710-02	5110693-01	6050336-02	6081698-02	6111141-04	7040434-07	7090074-04	7111886-05	8062674-02	8090975-04	3051354-05	3081378-04	3110772-04	4060249-04	4081094-04	4110161-04	5051773-03	5081710-03	5110693-02	6050336-03	6081698-03	6111141-05	7040434-06	7090074-03	7111886-06	8062674-03	8090975-05	8120636-04	8062808-02	8062808-03	8062808-01
					Sample Type				Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal			
Lithium (dissolved)	mg/L	NG	NG	0.008	0.0238	0.0218	0.0209	0.0196	0.0228	0.0227	0.0251	0.0251	0.0259	0.0264	0.0252	0.0252																														
Lithium (total)	mg/L	NG	NG	0.008													0.0243	0.0244	0.026	0.0265				0.0236		0.0217																	0.0435	0.0518	0.00868	0.137
Magnesium (dissolved)	mg/L	NG	NG	NG	116	104	94.7	122	111	104	111	113	111	123	114	104					124	113		98.8		106	106	103	107	106	93.0	102	93.3					105	85.0		115		93.5	94.7	92.6			
Magnesium (total)	mg/L	NG	NG	NG													112	119	111	122				117		101																	94.9	107	118	19.7
Manganese (dissolved)	mg/L	NG	0.05	1.500 [3.20]	0.0039	0.0040	0.0039	0.0050	0.0041	0.0037	0.0040	0.0039	0.0039	0.0054	0.0158	0.0048					0.0046	0.0041		0.00401		0.00808	0.00389	0.0039	0.0042	0.0040	0.0021	0.0127	0.0043					0.0039	0.0015		0.00535		0.00585	0.00658	0.00333			
Manganese (total)	mg/L	NG	0.05	1.500 [3.21]													0.0047	0.0046	0.005	0.0057				0.0110		0.00419																	0.00392	0.0225	0.360	0.0170
Mercury (dissolved)	mg/L	0.001	NG	0.001	<0.00002	<0.00002	<0.00002	<0.00002	0.00033	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000010		<0.000010	<0.000040	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000010		<0.000010	<0.000040	<0.000010			
Mercury (total)	mg/L	0.001	NG	0.001													<0.00002		<0.00002	<0.00002				<0.00002		<0.000010																	<0.000040	<0.000010	<0.000010	<0.000010
Molybdenum (dissolved)	mg/L	NG	NG	0.250	0.0003	0.0004	0.0017	0.0006	0.0004	0.0004	0.0004	0.0002	0.0004	0.0003	0.0004	0.0004					0.0004	0.0004		0.00058		0.00027	0.00036	0.0008	0.0004	0.0006	0.0014	0.0008	0.0010					0.0010	0.0012		0.00031		0.00062	0.00079	0.00077			
Molybdenum (total)	mg/L	NG	NG	0.250													0.0004	0.0004	<0.001	0.0003				0.0003		0.00035																	0.00080	0.00083	0.00107	0.00022
Nickel (dissolved)	mg/L	NG	NG	0.080	0.0011	0.0014	0.0011	<0.0002	0.0014	0.0012	0.0014	0.0015	0.0016	0.0012	0.0021	0.0016					0.0017	0.0022		0.00115		0.00199	0.00201	0.0018	0.0015	0.0012	0.0027	0.0026	0.0019					0.0014	0.0017		0.00179		0.00127	0.00132	0.00116			
Nickel (total)	mg/L	NG	NG	0.080													0.0006	0.0026	<0.002	0.0016				0.0020		0.00204																	0.00118	0.00320	0.00347	0.00109
Selenium (dissolved)	mg/L	0.05	NG	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005					<0.0005	<0.0005		<0.00050		<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	0.0008	0.0007	0.0007					0.0005	0.0007		<0.00050		<0.00050	<0.00050	<0.00050			
Selenium (total)	mg/L	0.05	NG	0.010													<0.0005	<0.0005	<0.005	<0.0005				<0.0005		<0.00050																	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (dissolved, as Si)	mg/L	NG	NG	NG	7.93	8.0	7.3	7.6	7.9	8.0	7.9	8.0	7.4	7.4	8.0	8.4					8.0	8.3		6.4		7.7	7.6	7.2	7.0	6.6	7.4	7.3	7.9					6.8	7.6		7.2		6.8	6.5	7.0			
Silicon (total, as Si)	mg/L	NG	NG	NG													7.9	9.0	8	8.3				7.5		7.6																	7.2			
Silver (dissolved)	mg/L	NG	NG	0.020	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005					<0.00005	<0.00005		<0.000050		<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005					<0.00005	<0.00005		<0.000050		<0.000050	<0.000050	<0.000050			
Silver (total)	mg/L	NG	NG	0.020													0.00005	0.00163	<0.0005	<0.00005				<0.00005		<0.000050																	<0.000050			
Sodium (dissolved)	mg/L	NG	200	200 [3.22]	25.4	25.1	25.3	23.5	29.6	27.4	29.1	30.4	29.7	25.4	28.4	30.1					32.8	29.8		47.5		29.2	28.8	34.2	48.8	51.0	20.2	34.8	31.6					33.4	17.0		27.9		44.6	41.2	40.7			
Sodium (total)	mg/L	NG	200	200 [3.23]													26.9	33.2	29.7	28.7				26.3		26.9																	41.5	46.6	22.3	484
Strontium (dissolved)	mg/L	NG	NG	2.500	1.80	1.69	1.62	1.69	1.72	1.67	1.76	1.74	1.70	1.81	1.76	1.71					1.96	1.79		4.33		1.66	1.76	4.26	5.03	5.11	2.07	4.53	3.80					4.11	2.09		1.59		4.49	4.80	4.10			
Strontium (total)	mg/L	NG	NG	2.500													1.68	1.99	1.74	1.82				1.78		1.85																	4.14	1.19	1.29	1.65
Sulphur (dissolved)	mg/L	NG	NG	NG				55	50	46	46	45	37	52	46	47					52	44		80.3		44.1	41.4	80	95	88	58	87	80					83	48		43.0		85.5	86.6	78.8			
Sulphur (total)	mg/L	NG	NG	NG													46	51	37	45				43		42.6																	81.0			
Tellurium (dissolved)	mg/L	NG	NG	NG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002					<0.0002	<0.0002		<0.00050		<0.00050	<0.00050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002					<0.0002	<0.0002		<0.00050		<0.00050	<0.00050	<0.00050			
Tellurium (total)	mg/L	NG	NG	NG													<0.0002	<0.0002	<0.002	<0.0002				<0.0002		<0.00050																	<0.00050			
Thallium (dissolved)	mg/L	NG	NG	NG	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00004	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000020		<0.000020	<0.000020	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000020		<0.000020	<0.000020	<0.000020			
Thallium (total)	mg/L	NG	NG	NG													<0.00002	<0.00002	<0.002	<0.00002				<0.00002		<0.000020																	<0.000020			
Thorium (dissolved)	mg/L	NG	NG	NG	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010	<0.00010			
Thorium (total)	mg/L	NG	NG	NG													<0.0001	<0.0001	<0.001	<0.0001				<0.0001		<0.00010																	<0.00010			
Tin (dissolved)	mg/L	NG	NG	2.500	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0003					0.0002	<0.0002		<0.00020		<0.00020	<0.00020	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002					<0.0002	<0.0002		<0.00020		<0.00020	<0.00020	<0.00020			
Tin (total)	mg/L	NG	NG	2.500													0.0004	<0.0002	<0.002	<0.0002				<0.0002		<0.00020																	<0.00020			
Titanium (dissolved)	mg/L	NG	NG	NG	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	<0.005		<0.0050		<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005					<0.005	<0.005		<0.0050		<0.0050	<0.0050	<0.0050			
Titanium (total)	mg/L	NG	NG	NG													<0.005	<0.005	<0.05	<0.005				<0.005		<0.0050																	<0.0050			
Tungsten (dissolved)	mg/L	NG	NG	0.003																						<0.0010	<0.0010																<0.0010			
Tungsten (total)	mg/L	NG	NG	0.003																						<0.0010																	<0.0010			
Uranium (dissolved)	mg/L	0.02	NG	0.020	0.00013	0.00011	0.00009	0.00014	0.00007	0.00009	0.00009	0.00007	0.00008	0.00014	0.00014	0.00009					0.00005	0.00007		0.00103		0.000110	0.000071	0.00155	0.00115	0.00100	0.00262	0.00152	0.00175					0.00158	0.00206		0.000121		0.000954	0.00118	0.00134			
Uranium (total)	mg/L	0.02	NG	0.020													0.00011	0.00007	<0.0002	0.00013				0.00020		0.000068																	0.00131	0.00174	0.00277	0.000176
Vanadium (dissolved)	mg/L	NG	NG	0.020	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001					<0.001	<0.001		<0.0010		<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001					<0.001	<0.001		<0.0010		<0.0010	<0.0010	<0.0010			
Vanadium (total)	mg/L	NG	NG	0.020													<0.001	<0.001	<0.01	<0.001				<0.001		<0.0010																	<0.0010			
Zinc (dissolved)	mg/L	NG	5.0	3.000 [3.24]	0.0321	0.005	0.010	0.009	<0.004	0.005	<0.004	<0.004	<0.004	<0.004	<0.004	0.005					<0.004	0.067		0.0380		0.0066	<0.0040	0.029	0.046	0.019	0.045	0.028	0.032					0.015	0.022		0.0061		0.0431	0.0550	0.0189			
Zinc (total)	mg/L	NG	5.0	3.000 [3.25]													<0.004	<0.004	<0.04	<0.004				0.017		0.0084																	0.0192	0.0447	0.0671	1.27
Zirconium (dissolved)	mg/L	NG	NG	NG	0.0015	0.0013	0.0011	0.0011	0.0013	0.0014	0.0011	0.0010	0.0011	0.0012	0.0012	0.0015					0.0019	0.0015		0.00056		0.00155	0.00167	0.0007	0.0007	0.0007	0.0004	0.0006	0.0006					0.0005	0.0003		0.00140		0.00057	0.00047	0.00053			
Zirconium (total)	mg/L	NG	NG	NG													0.0012	0.0019	0.001	0.0014				0.0012		0.00161																	0.00049			
Microbiological																																														
Background Bacteria	CFU/100 mL	NG	NG	NG																																											
E. coli (counts)	CFU/100 mL	0 [1.12]	NG	NG																																								<1	<1	<1
E. coli (MPN)	MPN/100 mL	0 [1.13]	NG	NG																																										
Fecal coliforms (counts)	CFU/100 mL	0 [1.14]	NG	NG																																										
Fecal coliforms (MPN)	MPN/100 mL	0 [1.15]	NG	NG																																										
Total coliforms (counts)	CFU/100 mL	0 [1.16]	NG	NG																																								16	45	3
Total coliforms (MPN)	MPN/100 mL	0 [1.17]	NG	NG																																										
Miscellaneous Organic Substances																																														
Chloroethane	mg/L	NG	NG	NG																				<0.0020				<0.0020											<0.0020				<0.0020			
1,2-Dibromoethane	mg/L	NG	NG	0.0005																				<0.0002				<0.0003											<0.0002				<0.0003			
1,2-Dichloropropane	mg/L	NG	NG	0.0045																				<0.0010				<0.0010											<0.0010				<0.0010			
1,3-Dichloropropene	mg/L	NG	NG	0.0015																				<0.0010				<0.0010											<0.0010				<0.0010			
Methyl tert-butyl ether (MTBE)	mg/L	NG	0.015	0.095 [3.26]																				<0.0010				<0.0010											<0.0010				<0.0010			
VHw6-10	mg/L	NG	NG	15.000 [3.27]																																										
Vinyl chloride	mg/L	0.002 [1.18]	NG	0.002																				<0.0010				<0.0010											<0.0010				<0.0010			
VPHw	mg/L	NG	NG	NG																																										
Monocyclic Aromatic Hydrocarbons (MAHs)																																														
Benzene	mg/L	0.005	NG	0.005																				<0.0005				<0.0005											<0.0005				<0.0005			
Ethylbenzene	mg/L	0.14	0.0016	0.140 [3.28]																				<0.0010				<0.0010											<0.0010				<0.0010			
Styrene	mg/L	NG	NG	0.800																				<0.0010				<0.0010											<0.0010				<0.0010			
Toluene	mg/L	0.06	0.024	0.060 [3.29]																				<0.0010				<0.0010											<0.0010				<0.0010			
Xylenes	mg/L	0.09	0.02	0.090																				<0.0020				<0.0020											<0.0020				<0.0020			
Nutrients																																														
Ammonia (total, as N)	mg/L	NG	NG	NG	0.20	0.26	0.26	0.155	0.263	0.031	0.274	0.274	0.295	0.261	0.280	0.240	0.234	0.210	0.276	0.196	0.251	0.228	0.239	0.758	0.262	0.248	0.249	0.596	0.952	1.07	0.028	0.814	0.341	1.26	0.816	0.283	0.814	0.336	0.036	0.024	0.216	1.06	0.758	0.849	0.416			
Nitrate (as N)	mg/L	10	NG	10 [3.30]	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.199	0.397	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.175	<0.010	<0.010	<0.100	0.181	0.135	<0.010	0.647	0.443	0.602	0.530	0.414	0.725	0.488	0.479	0.511	0.494	0.012	0.138	0.243	0.048	0.402	0.673	<0.010	<0.010
Nitrate + Nitrite (as N)	mg/L	10 [1.19]	NG	10 [3.31]																																											
Nitrate + Nitrite (as N) (calculated)	mg/L	10 [1.20]	NG	10 [3.32]	<0.01	<0.01	<0.01	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.199	0.397	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014	0.175	<0.014	<0.014	<0.141	0.181	0.135	<0.014	0.647	0.443	0.602	0.530	0.414	0.725	0.488	0.479	0.511	0.494	<0.014	0.138	0.243	0.384	0.437	0.673	<0.014	<0.014
Nitrite (as N)	mg/L	1	NG	1	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.336	0.035	<0.010	<0.010	0.011
Total kjeldahl nitrogen	mg/L	NG	NG	NG																																											
Orthophosphate (dissolved, as P)	mg/L	NG	NG	NG													<0.01	<0.01									<0.0050							<0.01	<0.01									<0.0050	<0.0050			
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	NG	NG	NG	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02					<0.02	0.24		<0.050		<0.050	<0.050	<0.02	<0.02	<0.02	<0.02	0.02	<0.02					<0.02	<0.02		<0.050		<0.050	<0.050	<0.050			
Phosphorus (total, by ICPMS/ICPOES)	mg/L	NG	NG	NG													<0.020	0.08	<0.2	<0.02				<0.05		<0.050								<0.020	<0.02	<0.2	<0.02			<0.05		<0.050			<0.050			
Phosphorus (total, APHA 4500-P)	mg/L	NG	NG	NG																																										
Phosphorus (dissolved, APHA 4500-P)	mg/L	NG	NG	NG																																								<0.0020			
Potassium (dissolved)	mg/L	NG	NG	NG	4.72	4.85	4.24	5.17	5.08	4.72	5.11	5.31	4.86	4.76	5.06	4.94					5.62	5.20		8.08		5.15	4.79	7.63	9.49	9.36	3.66	7.73	6.80					7.23	4.01		4.69		8.51	8.04	7.11			
Potassium (total)	mg/L	NG	NG	NG													4.93	5.94	5.1	5.10				4.73		4.63								11.7	9.42	6.2	9.74			4.15		8.59			7.38	8.26	10.6	14.5

Golden Refuse Disposal Site
Water Quality Results

Analyte	Unit	MW09-06D 25-May-09 K9E0816-03	MW09-06D 04-Nov-09 K9K0184-01	MW09-06D 09-Feb-10 K0B0397-02	MW09-06D 15-Jun-10 K0F0788-04	MW09-06D 03-Dec-18 8120636-01 Normal	MW09-6S 25-May-09 K9E0816-02	MW09-6S 04-Nov-09 K9K0184-02	MW09-6S 09-Feb-10 K0B0397-01	MW09-6S 15-Jun-10 K0F0788-03	MW09-6S 16-Nov-10 K0K0729-01	MW09-6S 09-May-11 K1E0403-03	MW09-6S 10-Aug-11 K1H0536-02	MW09-6S 18-Oct-11 K1J0685-01	MW09-6S 24-May-12 2051369-03 Normal	MW09-6S 22-Aug-12 2081484-01 Normal	MW09-6S 20-Nov-12 2111131-01 Normal	MW09-6S 21-May-13 3051354-01 Normal	MW09-6S 20-Aug-13 3081378-01 Normal	MW09-6S 12-Nov-13 3110772-01 Normal	MW09-6S 02-Jun-14 4060249-06 Normal	MW09-6S 18-Aug-14 4081094-06 Normal	MW09-6S 04-Nov-14 4110161-06 Normal	MW09-6S 25-May-15 5051773-06 Normal	MW09-6S 25-Aug-15 5081710-04 Normal	MW09-6S 09-Nov-15 5110693-03 Normal	MW09-6S 03-May-16 6050336-01 Normal	MW09-6S 22-Aug-16 6081698-06 Duplicate	MW09-6S 22-Aug-16 6081698-07 Duplicate	MW09-6S 22-Aug-16 6081698-01 Normal	MW09-6S 14-Nov-16 6111141-03 Normal	MW09-6S 05-Apr-17 7040434-03 Normal	MW09-6S 29-Aug-17 7090074-01 Normal	MW09-6S 20-Nov-17 7111886-01 Normal	MW09-6S 26-Jun-18 8062674-01 Normal	MW09-6S 10-Sep-18 8090975-01 Normal	MW10-08 16-Nov-10 K0K0729-02	MW10-08 09-May-11 K1E0403-01	MW10-08 09-May-11 K1E0403-04	MW10-08 10-Aug-11 K1H0536-01	MW10-08 18-Oct-11 K1J0685-02	MW10-08 24-May-12 2051369-04 Normal	MW10-08 22-Aug-12 2081484-02 Normal	MW10-08 22-Aug-12 2081484-05 Duplicate	MW10-08 20-Nov-12 2111131-02 Normal	MW10-08 21-May-13 3051354-02 Normal	MW10-08 21-May-13 3051354-06 Duplicate	MW10-08 20-Aug-13 3081378-05 Normal
Field Results																																															
Conductivity	µS/cm	6700	4700	4400	4300	3780	4600	4700	4400	4430	6600	4200	3600	4000	4100	4600	480	3300	4900	3700	4240	4030	4610	4710	4550	4530	4700	4520	4520	4520	2270	4150	4120	3630	4260	4160	2100	2800		2700	3100	3200	3500	3500	340	2200	2200	3300
Depth to Water	m	32.972	34	32.69	33.55	33.47	32.619	33	33.49	32.68	32.70	31.618	32.625	32.625	32.590	32.605	32.624	32.629	32.640	32.651	32.60	32.61	32.60	32.67	32.78	32.74	32.76	32.59	32.59	32.59	32.57		32.56	32.68	32.73	32.47	14.14	13.903		13.945	13.780	13.590	13.85	13.85	14.109	14.252	14.252	14.381
Dissolved oxygen	mg/L	0.83	1.92			4.05	2.21	1.07													0.28	1.56	1.07	1.36	1.74	0.95	0.46	0.43	0.43	0.43	1.98		1.17	0.60		3.51												
Dissolved oxygen (percent)	%					35.1															2.8	14.08	10.0	13.6	17.2			4.1	4.1	4.1	18.4		11.6	5.7		32.2												
Field measured depth to bottom	m																																36.11														
Flow rate - container	L/s																																0.033														
Ground Elevation	m						920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	920	921	921	921	921	921	921	921	921	921	921	921
Oxidation reduction potential	mV				73.0	110				73.0	173	175	67	167	135	210	164	231	228	-24	96	116	44	-7	-55	45	151	182	182	182	186	217	158		168	168	-138	2800		83	143	124	52	52	122	254	254	121
pH		6.78	6.86	6.76	7.01	6.81	6.87	6.84	6.79	6.86	6.91	6.75	6.87	6.73	6.86	6.97	6.9	6.87	6.63	6.64	4.8	7.3	6.7	6.5	6.7	6.0	6.7	6.7	6.7	6.7	7.0	7.3	7.0	7.0	7.03	7.02	8.44	7.85		7.51	7.33	7.43	7.54	7.54	7.6	7.40	7.40	7.37
Temperature	°C	10.8	9.4	9.4	11.3	8.9	12.5	10.5	10.9	11.6	10.0	12.2	12.4	11.1	11.2	12.5	12.2	12.4	12.1	12.2	13.0	13.0	12.3	14.1	12.8	12.5	12.5	13.5	13.5	13.5	12.2	11.8	12.6	12.0	13.1	11.6	5.9	8.7		8.1	6.9	7.9	8.4	8.4	7.1	8.9	8.9	8.6
Lab Results																																															
Chlorinated Hydrocarbons																																															
1,2-Dichlorobenzene	mg/L																														<0.0005				<0.0005												
1,3-Dichlorobenzene	mg/L																														<0.0010				<0.0010												
1,4-Dichlorobenzene	mg/L																														<0.0010				<0.0010												
1,1-Dichloroethane	mg/L																														<0.0010				<0.0010												
1,2-Dichloroethane	mg/L																														<0.0010				<0.0010												
1,1-Dichloroethylene	mg/L																														<0.0010				<0.0010												
cis-1,2-Dichloroethylene	mg/L																														<0.0010				<0.0010												
trans-1,2-Dichloroethylene	mg/L																														<0.0010				<0.0010												
Monochlorobenzene	mg/L																														<0.0010				<0.0010												
1,1,2,2-Tetrachloroethane	mg/L																														<0.0005				<0.0005												
Tetrachloroethylene	mg/L																														<0.0010				<0.0010												
1,1,1-Trichloroethane	mg/L																														<0.0010				<0.0010												
1,1,2-Trichloroethane	mg/L																														<0.0010				<0.0010												
Trichloroethylene	mg/L																														<0.0010				<0.0010												
General																																															
Alkalinity (bicarbonate, as CaCO3)	mg/L					939																					857	868	867	878	907	902	878	929	1050	1140												
Alkalinity (carbonate, as CaCO3)	mg/L					<1.0																					<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0												
Alkalinity (hydroxide, as CaCO3)	mg/L					<1.0																					<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0												
Alkalinity (phenolphthalein, as CaCO3)	mg/L					<1.0																					<1	<1	<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0												
Alkalinity (total, as CaCO3)	mg/L	1380	762	768	787	939	1590	780	794	778	757	801	800	784	805	813	790	902	771	798	818	802	832	855	865	897	857	868	867	878	907	902	878	929	1050	1140	425	459	455	462	446	515	768	676	731	619	637	516
Bicarbonate Alkalinity (as HCO3)	mg/L					1150																					1050	1060	1060	1070	1110	1100	1070	1130	1280	1390												
Carbonate Alkalinity (as CO3)	mg/L					<0.600																					<1	<0.6	<0.6	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600												
Hydroxide Alkalinity (as OH)	mg/L					<0.340																					<1	<0.3	<0.3	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340												
Bromide	mg/L					1.88																		0.47	1.09	1.48	0.13	3.02	3.02	2.81	1.14	0.88	2.16	2.84	0.38	<10.0												
Chemical Oxygen Demand	mg/L																																														
Chloride	mg/L	688	574	715	665	358	674	604	713	667	732	556	632	621	599	587	709	669	662	662	650	491	529	594	549	627	605	542	526	529	497	470	480	417	416		523	663	647	844	873	834	888	888	988	762	679	820
Colour	CU																																													
Conductivity	µS/cm	5110	4820	4790	4720	789	5090	4840	4780	4680	4640	4250	4230	4320	4380	4670	5040	5020	5150	5220	4840	4750	4850	4640	4520	4570	4650	4580	4590	4480	4430	4350	4170	4190	4060	4070	2250	2850	2870	3150	3060	3340	3410	3430	3500	3070	3110	3300
Total cyanide	mg/L																																														
Fluoride	mg/L					0.25									0.11	0.31	0.14	0.12	0.14	<0.10	<0.10	0.11	0.25	0.14	0.10	0.23	0.17	0.15	0.17	0.16	0.33	0.14	<0.10	0.51	0.27	0.28							0.12	0.13	0.19	0.12	0.23	0.24	0.24
Hardness, Total (dissolved as CaCO3)	mg/L	1790	1770	1810	1550	1630	1780	1770	1810	1580	1710	1660	1510	1460	1720	1720	1810	1980	2140	2010	1990	1920	1880	1870	1890	1850	1850	1930	1880	1810	1690	1650	1680	1520	1530	1500	582	878	863	850	790	826	798	803	847	839	839	921
Hardness, Total (total as CaCO3)	mg/L																																														
Langelier Index																																															
pH		7.4	7.28	7.32	7.55	7.32	7.4	7.29	7.49	7.57	7.35	7.50	7.39	7.35	7.45	7.35	6.96	7.40	7.46	7.36	7.65	7.39	7.49	7.37	7.34	7.30	7.55	7.40	7.43	7.42	7.68	7.42	7.60	7.51	7.39	7.45	7.97	7.84	7.95	7.76	7.78	7.85	7.74	7.75	6.95	7.78	7.78	7.86
Sulphate	mg/L	788	783	945	873	582	781	824	925	861	781	606	688	701	719	787	893	814	910	884	858	784	879	950	878	905	903	874	848	851	867	799	757	663	628		72.9	44.3	43.5	44.4	55.2	36.5	37.4	37.2	57.6	53.2	53.3	45.1
Temperature of observed pH	°C																																														
Total dissolved solids (computed)	mg/L																																														
Total organic carbon	mg/L																																														
Total suspended solids	mg/L	2640	34	1110	1690	157	2320	1720	751	1090	1020	228	96	127	326	321	42	1080	176	140	19	66	292	22	7	226	<2	2	5	<2	334	5	66.0	437	892	1160	117	2960	2800	7470	116	2870	2600	2200	1640	1020	1220	814
Turbidity	NTU	>4000	9.1	1600	3500	176	2400	2900	830	1500	730	188	79	155	437	267	32.2	448	163	84.6	3.7	47.2	196	6.9	1.6	205	1.6	1.82	1.99	1.89	220	1.03	46.9	387	2210		87	641	535	>4000	71.1	>4000	2350	2340	1910	620	800	664
Halogenated Methanes																																															
Bromodichloromethane	mg/L																														<0.0010				<0.0010												
Bromoform	mg/L																														<0.0010				<0.0010												
Carbon tetrachloride	mg/L																														<0.0005				<0.0005												
Chloroform	mg/L																														<0.0010				<0.0010												
Dibromochloromethane	mg/L																														<0.0010				<0.0010												
Dibromomethane	mg/L																														<0.0010				<0.0010												
Dichloromethane	mg/L																														<0.0030				<0.0030												
Total Trihalomethanes (calculated)	mg/L																														<0.0020				<0.0020												
Trichlorofluoromethane	mg/L																														<0.0010				<0.0010												
Metals																																															
Aluminum (dissolved)	mg/L	0.006	<0.005	0.23	<0.005	0.0101	0.012	<0.005	0.009	0.006	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.024	0.859	<0.005	<0.005	<0.005	<0.005	0.007	0.006	0.0067	<0.0050	0.927	0.0081	0.007	<0.005	0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Aluminum (total)	mg/L																																															
Antimony (dissolved)	mg/L	0.0003	0.0003	0.0005	0.0005	0.00191	0.0006	0.0002	0.0006	0.0004	0.0010	0.0006	0.0004	<0.0020	0.0002	0.0009	0.0009	0.0009	0.0011	0.0010	0.0003	0.0005	0.0003	0.0005	0.0005	0.0004	0.0006	<0.0001	<0.0001	<0.0001	0.0002	0.0001	<0.00020	<0.00020	0.00116	0.00076	0.0008	0.0015	0.0006	0.0010	<0.0020	0.0003	0.0016	0.0015	0.0009	0.0007	0.0004	0.0004
Antimony (total)	mg/L																																														
Arsenic (dissolved)	mg/L	0.0104	0.0029	0.003	0.0048	0.00063	0.0033	0.0028	0.0021	0.0044	0.0057	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0010	0.0034	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.00055	<0.00050	0.00117	0.00067	0.0107	0.0149	0.0147	0.0061	0.0031	0.0028	0.0039	0.0040	0.0024	0.0024	0.0024	0.0029
Arsenic (total)	mg/L																																														
Barium (dissolved)	mg/L	0.101	0.0566	0.0822	0.0620	0.0465	0.087	0.0566	0.0831	0.0676	0.0740	0.0595	0.059	0.051	0.062	0.066	0.067	0.067	0.065	0.061	0.059	0.054	0.058	0.062	0.062	0.071	0.055	0.060	0.059	0.058	0.057	0.057	0.0510	0.0500	0.0748	0.0491	0.125	0.257	0.245	0.246	0.195	0.255	0.271	0.272	0.250	0.227	0.223	0.239
Barium (total)	mg/L																																														
Beryllium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	0.0030	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Beryllium (total)	mg/L																																														
Bismuth (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001
Bismuth (total)	mg/L																																														
Boron (dissolved)	mg/L	1.12	1.05	1.28	1.08	1.95	1.09	0.921	1.24	1.14	1.48	1.31	1.18	1.26	1.23	1.29	1.43	1.47	1.53	1.64	1.67	1.60	1.61	2.04	1.90	1.77	2.12	2.16	2.00	2.08	1.76	2.03	1.86	1.57	1.70	1.60	0.093	0.034	0.034	0.028	0.027	0.031	0.017	0.020	0.024	0.025	0.028	0.051
Boron (total)	mg/L																																														
Cadmium (dissolved)	mg/L	0.00006	0.00001	0.00002	0.00002	<0.000010	0.00005	0.00003	0.00004	0.00002	0.00002	0.00018	0.00001	0.00002	<0.00001	<0.00001	0.00002	0.00002	0.00003	0.00001	<0.00001	<0.00001	0.00001	0.00002	<0.00001	0.00003	<0.00001	0.00002	0.00001	0.00002	0.00003	<0.00001	<0.000010	<0.000010	0.000036	<0.000010	0.00009	0.00002	<0.00001	<0.00001	0.00008	<0.00001	<0.00001	<0.00001	0.00003	0.00004	0.00002	0.00001
Cadmium (total)	mg/L																																														
Calcium (dissolved)	mg/L	235	197	217	186	164	220	192	215	191	212	194	177	177	180	182	193	218	235	231	218	217	209	199	197	208	202	188	181	179	168	163	180	167	186	148	73.8	87.6	90.6	103	100	102	107	105	110	107	107	120
Calcium (total)	mg/L																																														
Chromium (dissolved)	mg/L	0.006	0.0065	0.0342	0.0109	<0.00050	0.004	0.0082	0.0341	0.0117	0.0019	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0006	0.0009	<0.0005	0.0066	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	0.0057	0.0007	0.0007	0.0008	<0.0005	0.0006	0.00063	<0.00050	0.00169	<0.00050	0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chromium (total)	mg/L																																														
Cobalt (dissolved)	mg/L	0.00298	0.00108	0.00151	0.00142	0.00164	0.00415	0.0022	0.00258	0.00228	0.00140	0.00124	0.00116	0.00093	0.00136	0.00114	0.00108	0.00148	0.00128	0.00127	0.00100	0.00118	0.00133	0.00141	0.00149	0.00204	0.00198	0.00164	0.00161	0.00164	0.00183	0.00164	0.00161	0.00164	0.00212	0.00162	0.00537	0.0198	0.0186	0.00674	0.00078	0.00219	0.00342	0.00355	0.00264	0.00126	0.00122	0.00127
Cobalt (total)	mg/L																																														
Copper (dissolved)	mg/L	0.008	0.0055	0.0143	0.0097	0.00328	0.0091	0.0056	0.0157	0.0077	0.0048	0.0019	0.0015	0.0170	0.0009	0.0018	0.0016	0.0014	0.0021	0.0013	0.0169	0.0017	0.0018	0.0028	0.0420	0.200	0.0065	0.0034	0.0033	0.0051	0.217	0.0028	0.00681	0.00211	0.00664	0.00312	0.0031	<0.0002	<0.0002	<0.0002	0.0054	<0.0002	0.0010	0.0010	0.0010	0.0014	0.0013	<0.0002
Copper (total)	mg/L																																														
Iron (dissolved)	mg/L	0.23	0.204	0.402	0.396	<0.010	0.219	0.196	0.195	0.425	0.396	<0.010	<0.01	<0.01	<0.01	0.02	0.01	0.028	<0.010	0.105	<0.010	0.012	0.011	0.011	0.062	1.21	0.609	0.014	0.015	0.021	0.020	<0.010	0.013	<0.010	1.43	0.046	0.347	3.01	2.83	1.87	0.02	0.12	0.15	0.13	0.03	0.011	0.014	0.038
Iron (total)	mg/L																																														
Lead (dissolved)	mg/L	<0.0001	<0.0001	0.0002	<0.0001	0.00048	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	0.0014	0.0039	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	<0.00020	0.00191	<0.00020	0.0002	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0007	<0.0001	<0.0001	<0.0001
Lead (total)	mg/L																																														

Golden Refuse Disposal Site
Water Quality Results

Analyte	Unit	MW09-06D 25-May-09 K9E0816-03	MW09-06D 04-Nov-09 K9K0184-01	MW09-06D 09-Feb-10 K0B0397-02	MW09-06D 15-Jun-10 K0F0788-04	MW09-06D 03-Dec-18 8120636-01 Normal	MW09-6S 25-May-09 K9E0816-02	MW09-6S 04-Nov-09 K9K0184-02	MW09-6S 09-Feb-10 K0B0397-01	MW09-6S 15-Jun-10 K0F0788-03	MW09-6S 16-Nov-10 K0K0729-01	MW09-6S 09-May-11 K1E0403-03	MW09-6S 10-Aug-11 K1H0536-02	MW09-6S 18-Oct-11 K1J0685-01	MW09-6S 24-May-12 2051369-03 Normal	MW09-6S 22-Aug-12 2081484-01 Normal	MW09-6S 20-Nov-12 2111131-01 Normal	MW09-6S 21-May-13 3051354-01 Normal	MW09-6S 20-Aug-13 3081378-01 Normal	MW09-6S 12-Nov-13 3110772-01 Normal	MW09-6S 02-Jun-14 4060249-06 Normal	MW09-6S 18-Aug-14 4081094-06 Normal	MW09-6S 04-Nov-14 4110161-06 Normal	MW09-6S 25-May-15 5051773-06 Normal	MW09-6S 25-Aug-15 5081710-04 Normal	MW09-6S 09-Nov-15 5110693-03 Normal	MW09-6S 03-May-16 6050336-01 Normal	MW09-6S 22-Aug-16 6081698-06 Duplicate	MW09-6S 22-Aug-16 6081698-07 Duplicate	MW09-6S 22-Aug-16 6081698-01 Normal	MW09-6S 14-Nov-16 6111141-03 Normal	MW09-6S 05-Apr-17 7040434-03 Normal	MW09-6S 29-Aug-17 7090074-01 Normal	MW09-6S 20-Nov-17 7111886-01 Normal	MW09-6S 26-Jun-18 8062674-01 Normal	MW09-6S 10-Sep-18 8090975-01 Normal	MW09-08 16-Nov-10 K0K0729-02	MW09-08 09-May-11 K1E0403-01	MW09-08 09-May-11 K1E0403-04	MW09-08 10-Aug-11 K1H0536-01	MW09-08 18-Oct-11 K1J0685-02	MW09-08 24-May-12 2051369-04 Normal	MW09-08 22-Aug-12 2081484-02 Normal	MW09-08 22-Aug-12 2081484-05 Duplicate	MW09-08 20-Nov-12 2111131-02 Normal	MW09-08 21-May-13 3051354-02 Normal	MW09-08 21-May-13 3051354-06 Duplicate	MW09-08 20-Aug-13 3081378-05 Normal
Lithium (dissolved)	mg/L	0.0341	0.0359	0.054	0.0477	0.0443	0.0305	0.0278	0.0574	0.0488	0.0420	0.0377	0.0364	0.0335	0.0361	0.0382	0.0395	0.0450	0.0479	0.0486	0.0520	0.0497	0.0501	0.0483	0.0513	0.0462	0.0519	0.0409	0.0371	0.0396	0.0438	0.0484	0.0452	0.0420	0.0450	0.0403	0.0200	0.0243	0.0248	0.0224	0.0193	0.0182	0.0190	0.0187	0.0190	0.0203	0.0204	0.0220
Lithium (total)	mg/L																																																
Magnesium (dissolved)	mg/L	292	310	308	263	297	299	314	310	269	286	285	259	246	308	308	321	349	378	347	351	335	329	332	339	322	327	353	347	331	309	302	298	267	259	274	96.5	160	155	144	130	139	129	131	139	139	139	151
Magnesium (total)	mg/L																																															
Manganese (dissolved)	mg/L	0.242	0.0862	0.115	0.113	0.00199	0.518	0.212	0.168	0.191	0.108	0.0937	0.0894	0.0932	0.0720	0.0683	0.0882	0.112	0.122	0.119	0.0908	0.121	0.132	0.0747	0.0870	0.157	0.0791	0.0824	0.0819	0.0793	0.0731	0.0597	0.0887	0.0697	0.147	0.0262	0.219	0.492	0.473	0.349	0.0350	0.0785	0.0546	0.0577	0.172	0.0896	0.0897	0.0336
Manganese (total)	mg/L																																															
Mercury (dissolved)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.000040	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00002	<0.00002	0.00005	<0.00002	0.00008	0.00004	0.00002	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.000010	0.000041	<0.000010	<0.000040	<0.00005	<0.00002	0.00002	0.00002	0.00008	0.00003	0.00006	0.00005	0.00003	0.00002	<0.00002	<0.00002
Mercury (total)	mg/L																																															
Molybdenum (dissolved)	mg/L	0.0006	0.0003	0.0003	0.0003	0.00047	0.0023	0.0009	0.0004	0.0006	0.0005	0.0003	0.0003	0.0036	0.0003	0.0018	0.0005	0.0006	0.0003	0.0007	0.0003	0.0003	0.0003	0.0004	0.0004	0.0037	0.0003	0.0003	0.0003	0.0003	0.0012	0.0003	0.00031	0.00032	0.00027	0.00033	0.0149	0.0046	0.0042	0.0019	0.0046	0.0009	0.0024	0.0023	0.0011	0.0007	0.0007	0.0004
Molybdenum (total)	mg/L																																															
Nickel (dissolved)	mg/L	0.0163	0.0085	0.0112	0.0132	0.0120	0.0148	0.0094	0.0115	0.0137	0.0154	0.0070	0.0067	0.0067	0.0073	0.0080	0.0080	0.0155	0.0097	0.0176	0.0078	0.0097	0.0103	0.0093	0.0109	0.0119	0.0139	0.0122	0.0119	0.0114	0.0116	0.0110	0.0113	0.0116	0.0122	0.0123	0.0175	0.0277	0.0259	0.0093	0.0099	0.0060	0.0087	0.0088	0.0077	0.0053	0.0051	0.0048
Nickel (total)	mg/L																																															
Selenium (dissolved)	mg/L	<0.0003	<0.0003	<0.0003	0.0018	<0.00050	<0.0003	<0.0003	<0.0003	0.0006	0.0018	0.0006	0.0006	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.00050	<0.00050	<0.00050	<0.00050	0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium (total)	mg/L																																															
Silicon (dissolved, as Si)	mg/L	10	10.1	22.4	8.42	12.8	9.21	9.1	17.6	10.8	8.95	12.4	11.5	10.2	12.2	11.4	11.9	11.9	12.5	11.1	12.0	12.3	13.7	12.7	12.7	12.9	13.3	12.1	12.0	11.2	12.1	12.6	11.6	11.2	13.8	11.3	4.21	10.1	9.77	9.0	8.1	10.3	9.6	9.4	9.7	9.4	9.4	9.6
Silicon (total, as Si)	mg/L																																															
Silver (dissolved)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	0.00005	<0.00005	<0.00005	0.00006	0.00014	<0.00005	0.00012	0.00009	<0.00005	<0.00005	0.00011	0.00010	<0.00005	0.00008	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.00005	0.00007	<0.00005	0.00016	0.00006	<0.00005	<0.00005	<0.00005	0.00008	<0.00005	<0.00005	<0.00005
Silver (total)	mg/L																																															
Sodium (dissolved)	mg/L	348	379	384	314	323	351	378	380	323	344	322	298	290	346	362	375	409	444	407	372	385	428	385	394	375	359	386	379	366	347	343	334	285	261	297	178	312	302	341	305	436	450	444	390	359	358	386
Sodium (total)	mg/L																																														
Strontium (dissolved)	mg/L	2.53	2.21	2.04	2.04	1.75	2.42	2.09	2.07	2.12	2.25	1.95	1.88	1.74	1.91	2.00	2.11	2.18	2.28	2.10	2.15	2.06	2.04	1.92	2.05	1.90	1.95	1.95	1.93	1.84	1.76	1.74	1.62	1.73	1.65	1.65	1.03	1.66	1.62	1.60	1.49	1.53	1.60	1.60	1.64	1.52	1.51	1.61
Strontium (total)	mg/L																																															
Sulphur (dissolved)	mg/L					292									266	298	339	359	405	366	337	340	398	343	362	342	281	348	350	336	312	284	268	273	266	257						19	17	20	23	21	22	20
Sulphur (total)	mg/L																																														
Tellurium (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.00050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00050	<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tellurium (total)	mg/L																																														
Thallium (dissolved)	mg/L	0.00009	0.00006	0.00006	0.00007	0.000048	0.00008	0.00006	0.00007	0.00007	0.00007	0.00006	0.00005	0.00006	0.00005	0.00005	0.00022	0.00005	0.00009	0.00007	0.00005	0.00007	0.00007	0.00007	0.00006	0.00007	0.00006	0.00007	0.00006	0.00006	0.00006	0.00006	<0.000020	0.000058	0.000060	0.000057	<0.00002	<0.00002	<0.00002	<0.00002	0.00011	<0.00002	<0.00002	<0.00002	0.00003	0.00007	0.00006	<0.00002
Thallium (total)	mg/L																																														
Thorium (dissolved)	mg/L		<0.0001	<0.0001	<0.0001	<0.00010		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	0.00067	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Thorium (total)	mg/L																																														
Tin (dissolved)	mg/L	0.0002	0.0002	0.0002	0.0002	0.00151	0.0003	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0005	0.0013	<0.0002	0.0003	0.0003	0.0003	0.0003	<0.0002	0.00026	0.00023	0.00031	<0.00020	0.0010	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Tin (total)	mg/L																																														
Titanium (dissolved)	mg/L	<0.005	0.006	0.017	0.008	<0.0050	<0.005	0.005	0.005	0.008	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.038	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	0.0525	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Titanium (total)	mg/L																																														
Tungsten (dissolved)	mg/L					<0.0010																												<0.0010	<0.0010	<0.0010												
Tungsten (total)	mg/L																																														
Uranium (dissolved)	mg/L	0.00761	0.00751	0.00639	0.00741	0.00793	0.00886	0.00757	0.007	0.00757	0.00790	0.00607	0.00602	0.00607	0.00580	0.00698	0.00686	0.00779	0.00823	0.00765	0.00721	0.00777	0.00802	0.00729	0.00779	0.00804	0.00863	0.00802	0.00765	0.00753	0.00717	0.00734	0.00769	0.00796	0.00707	0.00763	0.00216	0.00164	0.00166	0.00196	0.00205	0.00173	0.00206	0.00200	0.00206	0.00213	0.00214	0.00218
Uranium (total)	mg/L																																														
Vanadium (dissolved)	mg/L	0.0019	0.002	0.016	0.0062	<0.0010	0.0014	0.0026	0.0134	0.0090	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.0013	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium (total)	mg/L																																														
Zinc (dissolved)	mg/L	0.0063	0.0036	0.0086	0.0047	0.0057	0.0063	0.0029	0.0103	0.0050	0.0044	0.0040	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.009	0.005	0.005	0.006	0.027	0.067	0.009	0.030	0.029	0.035	0.199	0.005	0.0340	<0.0040	0.0229	0.0044	0.0037	<0.0040	<0.0040	<0.004	0.007	0.008	0.008	0.012	<0.004	0.011	0.011	<0.004
Zinc (total)	mg/L																																														
Zirconium (dissolved)	mg/L	0.0008	0.0002	0.0004	0.0002	0.00021	0.001	0.0005	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001	0.0003	0.0001	0.0002	0.0002	0.0001	0.0001	0.0004	0.0004	0.0002	0.0001	0.0008	0.0002	0.0002	0.0002	0.0001	0.0001	0.0002	0.00014	0.00012	0.00083	0.00019	0.0003	0.0002	0.0002	0.0001	0.0002	0.0001	0.0002	0.0002	<0.0001	<0.0001	<0.0001	0.0001
Zirconium (total)	mg/L																																														
Microbiological																																																
Background Bacteria	CFU/100 mL																																															
E. coli (counts)	CFU/100 mL																																															
E. coli (MPN)	MPN/100 mL																																															
Fecal coliforms (counts)	CFU/100 mL																																															
Fecal coliforms (MPN)	MPN/100 mL																																															
Total coliforms (counts)	CFU/100 mL																																															
Total coliforms (MPN)	MPN/100 mL																																															
Miscellaneous Organic Substances																																																
Chloroethane	mg/L																														<0.0020					<0.0020												
1,2-Dibromoethane	mg/L																														<0.0002					<0.0003												
1,2-Dichloropropane	mg/L																														<0.0010					<0.0010												
1,3-Dichloropropene	mg/L																														<0.0010					<0.0010												
Methyl tert-butyl ether (MTBE)	mg/L																														<0.0010					<0.0010												
VHw6-10	mg/L																																															
Vinyl chloride	mg/L																														<0.0010					<0.0010												
VPHw	mg/L																																															
Monocyclic Aromatic Hydrocarbons (MAHs)																																															
Benzene	mg/L																														<0.0005					<0.0005												
Ethylbenzene	mg/L																														<0.0010					<0.0010												
Styrene	mg/L																														<0.0010					<0.0010												
Toluene	mg/L																														0.0066					<0.0010												
Xylenes	mg/L																														<0.0020					<0.0020												
Nutrients																																																
Ammonia (total, as N)	mg/L	0.29	0.08	0.3	0.09	0.790	0.54	0.26	0.44	0.26	0.13	0.20	0.18	0.16	0.133	0.274	0.406	0.432	0.462	0.518	0.390	0.588	0.408	0.644	0.614	0.899	1.40	1.12	1.16	1.21	0.940	1.19	0.935	1.17	1.26	1.12	0.05	0.04	<0.02	0.04	0.05	<0.020	0.100	0.091	0.026	0.034	0.060	0.020
Nitrate (as N)	mg/L	62.6	56.4	67.7	61.4	27.2	62	60	66.9	62.3	55.0	53.2	66.5	56.3		54.6	59.1	62.3	54.5	54.7	52.1	41.8	48.9	38.0	34.1	33.3	44.1	37.9	38.1	37.7	40.1	42.3	35.3	32.6	31.3		0.22	<0.010	<0.010	0.341	0.580	0.590	0.141	0.128	0.339	0.566	0.544	0.929
Nitrate + Nitrite (as N)	mg/L																																														
Nitrate + Nitrite (as N) (calculated)	mg/L	62.6	56.4	67.7	61.4	27.2	62	60	66.9	62.3	55.0	53.2	66.5	56.3		54.6	59.1	62.3	54.5	54.7	52.1	41.8	48.9	38.0	34.1	33.3	44.1	37.9	38.1	37.7	40.1	48.0	35.3	32.6	31.3		0.22	<0.01	<0.01	0.341	0.580	0.590	0.141	0.128	0.339	0.566	0.544	0.929
Nitrite (as N)	mg/L	<0.01	<0.01	<0.01	0.03	<0.010	<0.01	<0.01	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.016	5.70	<0.010	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total kjeldahl nitrogen	mg/L																																														
Orthophosphate (dissolved, as P)	mg/L					0.0179																		<0.01	<0.01											<0.0050												
Phosphorus (dissolved, by ICPMS/ICPOE	mg/L	0.039	<0.020	0.03	<0.020	<0.050	0.043	0.02	0.031	0.024	<0.020	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.05	<0.050	<0.050	0.053	<0.050	<0.020	<0.020	<0.020	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus (total, by ICPMS/ICPOES)	mg/L																																													
Phosphorus (total, APHA 4500-P)	mg/L																																														
Phosphorus (dissolved, APHA 4500-P)	mg/L					0.163																																								
Potassium (dissolved)	mg/L	131	149	153	147	186	109	133	153	146	157	167	160	148	170	161	178	202	228	210	222	232	246	215	217	199	209	224	223	213	211	209	200	184	189	180	8.58	6.79	6.60	6.33	6.51	7.89	7.23	7.29	6.55	6.53	6.53	6.90
Potassium (total)	mg/L																																													

Golden Refuse Disposal Site

Water Quality Results

Analyte	Unit	MW10-08 12-Nov-13 3110772-05 Normal	MW10-08 02-Jun-14 4060249-05 Normal	MW10-08 18-Aug-14 4081094-05 Normal	MW10-08 04-Nov-14 4110161-05 Normal	MW10-08 25-May-15 5051773-05 Normal	MW10-08 11-Sep-18 8090975-03 Normal	MW10-08 03-Dec-18 8120636-03 Normal	MW15-01 09-Nov-15 5110701-01 Normal	MW15-01 02-May-16 6050110-01	MW15-01 22-Aug-16 6081657-01 Normal	MW15-01 14-Nov-16 6111045-01 Normal	MW15-01 05-Apr-17 7040391-01 Normal	MW15-01 29-Aug-17 7082760-01 Normal	MW15-01 20-Nov-17 7112039-01 Normal	MW15-01 26-Jan-18 8062805-01 Normal	MW15-01 11-Sep-18 8090971-01 Normal	MW15-01 04-Dec-18 8120631-01 Normal	MW18-10 27-Jun-18 8062805-02 Normal	MW18-10 10-Sep-18 8090975-02 Normal	MW18-10 03-Dec-18 8120636-02 Normal	MW18-11 375 ft 04-Dec-18 8120636-08 Normal	MW18-11 475 ft 06-Dec-18 8120644-01 Normal	Town Well #4 03-Jun-02	Town Well #4 12-May-03	Town Well #4 17-May-04	Town Well #4 22-May-07 K705752-02	Town Well #4 05-Nov-07 K7K0165-01	Town Well #4 28-Apr-08 K8E0035-01	Town Well #4 14-Oct-08 K8J0452-01	Town Well #4 25-May-09 K9E0816-01	Town Well #4 04-Nov-09 K9K0184-03	Town Well #4 09-Feb-10 K0B0397-03	Town Well #4 15-Jun-10 K0F0788-02	Town Well #4 16-Nov-10 K0K0729-03	Town Well #4 09-May-11 K1E0403-02	Town Well #4 10-Aug-11 K1H0536-04	Town Well #4 18-Oct-11 K1J0685-04	Town Well #4 24-May-12 2051369-02 Normal	Town Well #4 22-Aug-12 2081484-04 Normal	Town Well #4 20-Nov-12 2111131-04 Normal	Town Well #4 21-May-13 3051354-04 Normal	Town Well #4 12-Nov-13 3110772-02 Normal	Town Well #4 02-Jun-14 4060249-02 Normal	Town Well #4 18-Aug-14 4081094-01 Normal	Town Well #4 04-Nov-14 4110161-01 Normal	Town Well #4 25-May-15 5051773-02 Normal	Town Well #4 03-May-16 6050336-05 Normal
Field Results																																																		
Conductivity	µS/cm	2700	2740	2770	3150	2960	2910	2700	1056	1062	1033	1031	1047	1122	1107	1050	1111	973	2480	2730	2380	558	1036									900	890	870	970	890		690	930	740	860	800	640	710	799	805	756	813	1013
Depth to Water	m	16.281	15.19	13.84	14.99	15.37	15.91	14.72	11.04		11.475		10.955	10.425	11.24	9.54	10.81	11.29		28.31	28.24			8																											
Dissolved oxygen	mg/L		7.43	7.85	8.3	7.05	10.98	9.05	1.42	0.30	0.62	0.35		0.89	1.28		1.84	1.02		2.91	1.08										2.01	3.7												4.5	3.93	4.38	4.85	4.24
Dissolved oxygen (percent)	%		67.1	71.7	71.0	62.5	93.1	74.1			5.4	3.1		7.9	11.2		15.9	8.8		28.2	10.2																								38.2	33.8	37.6	43	
Field measured depth to bottom	m																																															
Flow rate - container	L/s																																															
Ground Elevation	m	921	921	921	921	921	921	921																790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790	790
Oxidation reduction potential	mV	47	87	132	24	23	100	158	50	-6	177	162	229	101		198	41	30	222	126	128														49.0	159		62	119	111	221	188	258	74	165	201	47	68	156
pH		7.23	3.1	7.3	7.4	7.3	7.57	7.23	6.5	7.1	7.1	7.3	7.6	7.2	7.1	7.39	7.73	7.08	7.62	7.35	6.92	8.30									6.85	7.48	7.2	7.41	7.49		7.35	7.39	7.43	7.59	7.6	7.36	7.20	7.5	7.5	7.2	7.2	7.4
Temperature	°C	7.5	8.1	9.5	7.5	9.7	8.3	6.8	9.3	9.2	9.8	8.8	8.7	9.5	8.7	9.3	9.2	8.8	13.8	13.9	12.4	9.8			10	12	7.5	5.0			8.4	8.4	7.4	12.2	8.2		9.4	7.6	8.2	8.8	8.1	8.4	8.1	7.9	8.5	8.4	12.9	8.31
Lab Results																																																
Chlorinated Hydrocarbons																																																
1,2-Dichlorobenzene	mg/L						<0.0005			<0.0005			<0.0005				<0.0005			<0.0005	<0.0005																												
1,3-Dichlorobenzene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,4-Dichlorobenzene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,1-Dichloroethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0014	0.0010																												
1,2-Dichloroethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,1-Dichloroethylene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
cis-1,2-Dichloroethylene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
trans-1,2-Dichloroethylene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Monochlorobenzene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,1,2,2-Tetrachloroethane	mg/L						<0.0005			<0.0010			<0.0005				<0.0005			<0.0005	<0.0005																												
Tetrachloroethylene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,1,1-Trichloroethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
1,1,2-Trichloroethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Trichloroethylene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
General																																																
Alkalinity (bicarbonate, as CaCO3)	mg/L						797	1100		332	335	335	364	356	126	330	372	363	667	992	876	494	8900																											336
Alkalinity (carbonate, as CaCO3)	mg/L						<1.0	<1.0		<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0																											<1
Alkalinity (hydroxide, as CaCO3)	mg/L						<1.0	<1.0		<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0																											<1
Alkalinity (phenolphthalein, as CaCO3)	mg/L						<1.0	<1.0		<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0																											<1
Alkalinity (total, as CaCO3)	mg/L	598	514	476	592	492	797	1100	350	332	335	335	364	356	126	330	372	363	667	992	876	494	8900	287	290	324	310	340	333	345	337	330	325	328	313	331	332	327	304	313	332	326	314	319	320	319	328	336
Bicarbonate Alkalinity (as HCO3)	mg/L						972	1340		404	408	409	444	434	154	402	453	443	813	1210	1070	603	10900																											410
Carbonate Alkalinity (as CO3)	mg/L						<0.600	<0.600		<1	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600	<0.600																											<1
Hydroxide Alkalinity (as OH)	mg/L						<0.340	<0.340		<1	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340	<0.340																											<1
Bromide	mg/L					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	0.11	<0.10	<0.10	<0.10	<0.10	<1.00	0.64	<0.10	<1.00																										<0.10	<0.10
Chemical Oxygen Demand	mg/L																							<5	5	10	<5	<5																					
Chloride	mg/L	815	672	672	700	666	509	580	125	117	107	94.5	125	125	116	105	114	113	314	313	343	26.6	23.2	62.5	73.8	65	60.2	76.7	69.4	86.9	74	57.6	91.1	76.7	75.7	79.2	72.9	77.2	63.0	67.2	65.6	69.1	68.5	67.0	69.7	70.2	81.2	97.3
Colour	CU																																																
Conductivity	µS/cm	3380	2940	3180	3310	2890	2770	2.2	1020	993	974	1030	1080	1110	327	999	1050	1080	2390	2590	2500	193	1190	845	866	791	822	881	842	884	899	902	905	874	854	869	835	873	825	836	838	833	859	857	880	900	911	966
Total cyanide	mg/L																																																
Fluoride	mg/L	0.25	0.27	0.13	0.26	0.26	0.28	0.22	<0.10	<0.10	<0.10	<0.10	0.16	0.14	<0.10	<0.10	0.12	<0.10	0.32	0.29	0.20	0.90	1.42															<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Hardness, Total (dissolved as CaCO3)	mg/L	958	800	833	826	734	704	761	443	408		402	431			417	389	427	911	1020	1060	278	176				369	390	394	377	353	364	382	342	370	388	360	360	347	357	356	366	383	397	392	378		436
Hardness, Total (total as CaCO3)	mg/L								532																																						393	
Langelier Index																																																
pH		7.86	7.94	7.74	7.82	7.81	7.83	7.81	7.65	7.86						7.74	7.88	7.74	7.81	7.70	7.62	8.07	7.93	7.1	7.2	7.3	7.1	7.4	7.4	6.9	7.7	7.76	7.81	7.93	7.79	7.85	7.81	7.82	7.87	7.80	6.94	7.86	7.82	7.92	7.65	7.85	7.83	7.53
Sulphate	mg/L	56.2	38.1	44.7	47.5	39.4	48.6	51.8	45.8	43.2	45.1	42.3	46.5	46.6	47.3	43.5	46.0	44.6	89.5	89.0	76.5	39.0	156	44.5	43	40	37.5	38.0	38.6	40.6	38.8	39.8	42.9	41.2	36.1	37.6	35.8	40.0	37.2	36.6	40.4	36.6	38.8	37.6	39.7	40.7	40.0	40.3
Temperature of observed pH	°C																																															
Total dissolved solids (computed)	mg/L																																															
Total organic carbon	mg/L								1.0	<0.5	0.7	0.8	1.0	0.83	<0.50	0.71	<0.50	<0.50																															
Total suspended solids	mg/L	1230	300	284	1240	214	1460	3520								3.4	<2.0	4.0	264	1190	520	2980	171000						<1	<1	<1	<1	4	<1	<1	<1	<1	<1	<1	6	2	<1	2	<1	<1	<1	<2	<2
Turbidity	NTU	1220	292	186	1180	122		3750	37.8	2.5	12.1	7.28	1.60	1.30	2.48	1.41		3.69	267		661	>=4000	>=4000	0.4	2.5	0.6			0.2	0.1	<0.1	0.3	0.2	<0.1	0.1	<0.1	0.11	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Halogenated Methanes																																																
Bromodichloromethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Bromoform	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Carbon tetrachloride	mg/L						<0.0005			<0.0010			<0.0005				<0.0005			<0.0005	<0.0005																												
Chloroform	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Dibromochloromethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Dibromomethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Dichloromethane	mg/L						<0.0030			<0.0030			<0.0030				<0.0030			<0.0030	<0.0030																												
Total Trihalomethanes (calculated)	mg/L						<0.0020			<0.0020			<0.0020				<0.0020			<0.0020	<0.0020																												
Trichlorofluoromethane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010			<0.0010	<0.0010																												
Metals																																																
Aluminum (dissolved)	mg/L	<0.005	<0.005	0.006	0.010	<0.005	<0.0050	<0.0050	0.008	<0.005		0.007	<0.005			0.0154	<0.0050	0.0081	0.0126	0.0124	<0.0050	0.0134	0.0320	<0.2	<0.2	<0.2	<0.050		<0.050	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	<0.005	<0.005	<0.005	<0.005	0.021	<0.005		
Aluminum (total)	mg/L								0.455	0.069		0.122	0.047				0.0181	0.0297									<0.10																			<0.005	<0.005
Antimony (dissolved)	mg/L	0.0007	0.0003	0.0003	0.0013	0.0019	0.00028	0.00029	<0.0001	0.0004		0.0001	<0.0001			<0.00020	<0.00020	<0.00020	0.00070	0.00072	0.00036	0.00072	0.00576	<0.2	<0.2	<0.2	<0.0050		<0.0030	<0.0006	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	0.0001	<0.0020	<0.0001	0.0007	0.0003	0.0003	0.0007	0.0004	0.0005	0.0002		
Antimony (total)	mg/L								<0.0001	0.0004		0.0001	<0.0001				<0.00020	<0.00020									<0.006																			<0.0001	<0.0001
Arsenic (dissolved)	mg/L	0.0018	0.0024	0.0042	0.0016	0.0039	0.00200	0.00204	<0.0005	<0.0005		<0.0005	<0.0005			<0.00050	<0.00050	<0.00050	0.00269	0.00212	0.00161	<0.00050	0.0352	<0.2	<0.2	<0.2	<0.0050		<0.0050	<0.0010	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Arsenic (total)	mg/L								<0.0005	<0.0005		<0.0005	<0.0005				<0.00050	<0.00050									<0.010																			<0.0005	<0.0005
Barium (dissolved)	mg/L	0.257	0.192	0.235	0.242	0.212	0.174	0.199	0.154	0.156		0.157	0.165			0.152	0.159	0.161	0.140	0.167	0.227	0.0369	0.0180	0.2	0.2	0.21	0.191		0.191	0.211	0.227	0.173	0.244	0.216	0.217	0.189	0.195	0.184	0.189	0.193	0.191	0.195	0.200	0.192	0.195	0.210		
Barium (total)	mg/L								0.184	0.165		0.171	0.178				0.169	0.165									0.190																			0.193	0.227
Beryllium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.0001	<0.0001		<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010				<0.0010		<0.0020	<0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Beryllium (total)	mg/L								0.0001	<0.0001		0.0002	<0.0001				<0.00010	<0.00010									<0.005																			<0.0001	<0.0001
Bismuth (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.0001	<0.0001		<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010				<0.0010		<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Bismuth (total)	mg/L								<0.0001	<0.0001		<0.0001	<0.0001				<0.00010	<0.00010									<0.001																			<0.0001	<0.0001
Boron (dissolved)	mg/L	0.041	0.031	0.035	0.024	0.020	0.0602	0.0413	0.029	0.033		0.031	0.036			0.0432	0.0222	0.0291	0.187	0.465	0.452	0.0339	0.418	<0.1	<0.1	<0.1	<0.020		<0.020	0.013	0.015	0.02	0.02	0.015	0.042	0.016	0.018	0.017	0.018	0.012	0.018	0.018	0.032	0.021	0.024	0.014		
Boron (total)	mg/L								0.028	0.034		0.033	0.040				0.0322	0.0230									<0.020																			0.015	0.021
Cadmium (dissolved)	mg/L	0.00002	0.00002	0.00003	0.00001	0.00004	<0.000010	<0.000010	<0.00001	<0.00001		0.00001	<0.00001			<0.000010	<0.000010	<0.000010	0.000032	0.000010	0.000045	0.000015	0.000016	<0.01	<0.01	<0.01	<0.00010		<0.00010	<0.00002	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00005	0.00009	<0.00001	0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	0.00003	0.00002		
Cadmium (total)	mg/L								<0.00001	<0.00001		<0.00001	<0.00001				<0.000010	<0.000010									<0.00010																			<0.00001	<0.00001
Calcium (dissolved)	mg/L	128	103	116	116	101	84.0	93.3	97.5	88.1		86.4	92.0			91.9	78.3	88.0	136	97.8	86.3	14.9	23.7	90	104	88	84.6	88.4	91.2	87	83.8	80	87.4	79.1	81.3	90.0	83.8	84.7	74.7	80.7	82.0	82.5	88.6	90.2	92.1	88.7		
Calcium (total)	mg/L								118	89.6		92.2	102				91.8	89.2									85.1																			91.7	99.5
Chromium (dissolved)	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.00050	<0.00050	<0.0005	0.0018		<0.0005	<0.0005			<0.00050	<0.00050	0.00194	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.01	<0.01	<0.01	<0.0050		0.006	0.006	0.0033	0.0028	0.0116	0.0022	0.0007	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Chromium (total)	mg/L								0.0018	<0.0005		<0.0005	<0.0005				<0.00050	<0.00050									<0.010																			<0.0005	<0.0005
Cobalt (dissolved)	mg/L	0.00151	0.00111	0.00024	0.00096	0.00012	<0.00010	<0.00010	0.00007	0.00019		0.00006	<0.00005			<0.00010	<0.00010	<0.00010	0.00273	0.00322	0.00402	0.00046	0.00162				<0.0010		<0.0005	<0.0001	0.00009	0.00006	0.00007	0.00010	0.00013	<0.00005	0.00018	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00007	0.00006		
Cobalt (total)	mg/L								0.00062	0.00022		0.00016	0.00006				<0.00010	<0.00010									<0.0010																			<0.00005	<0.00005
Copper (dissolved)	mg/L	0.0012	0.0011	0.0040	0.0008	0.0051	0.00086	<0.00040	0.0019	0.0008		0.0030	<0.0002			0.00052	<0.00040	<0.00040	0.00242	0.00263	0.00297	0.00271	<0.00040	<0.01	<0.01	<0.01	<0.0050		<0.0030	0.0046	0.0038	0.0016	0.0045	0.0025	0.0025	0.0008	0.0038	0.0016	0.0007	0.0013	0.0010	0.0008	0.0006	0.0009	0.0014	0.0014		
Copper (total)	mg/L								0.0281	0.0024		0.0181	0.0004				0.00092	<0.00040									<0.010																			0.0039	0.0009
Iron (dissolved)	mg/L	0.012	0.111	0.015	0.049	0.015	<0.010	<0.010	0.019	0.279		<0.010	<0.010			0.034	<0.010	0.013	0.038	0.011	<0.010	0.017	0.018	<0.03	<0.03	<0.03	0.267		0.386	0.079	0.082	0.07	0.063	0.147	0.166	<0.010	0.02	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	0.031	<0.010		
Iron (total)	mg/L								1.07	0.36		0.27	0.06				0.039	0.047									<0.30																			<0.01	<0.01
Lead (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00020	0.00056	<0.0001	<0.0001		<0.0001	<0.0001			<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00040	0.00031	<0.00020	<0.01	<0.05	<0.05	<0.0020		<0.0010	0.0002	0.0001	<0.0001	0.0002	0.0002	0.0002	0.0001	0.0005	0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001		
Lead (total)	mg/L								0.0008	<0.0001		0.0002	<0.0001				<0.00020	0.00048									<0.0020																			0.0001	0.0004

Analyte	Unit	MW10-08 12-Nov-13 3110772-05 Normal	MW10-08 02-Jun-14 4060249-05 Normal	MW10-08 18-Aug-14 4081094-05 Normal	MW10-08 04-Nov-14 4110161-05 Normal	MW10-08 25-May-15 5051773-05 Normal	MW10-08 11-Sep-18 8090975-03 Normal	MW10-08 03-Dec-18 8120636-03 Normal	MW15-01 09-Nov-15 5110701-01 Normal	MW15-01 02-May-16 6050110-01	MW15-01 22-Aug-16 6081657-01 Normal	MW15-01 14-Nov-16 6111045-01 Normal	MW15-01 05-Apr-17 7040391-01 Normal	MW15-01 29-Aug-17 7082760-01 Normal	MW15-01 20-Nov-17 7112039-01 Normal	MW15-01 26-Jun-18 8062805-01 Normal	MW15-01 11-Sep-18 8090971-01 Normal	MW15-01 04-Dec-18 8120631-01 Normal
Lithium (dissolved)	mg/L	0.0233	0.0223	0.0219	0.0212	0.0188	0.0198	0.0218	0.0049	0.0058		0.0047	0.0054			0.00523	0.00539	0.00563
Lithium (total)	mg/L								0.0061	0.0059		0.0050	0.0052				0.00573	0.00578
Magnesium (dissolved)	mg/L	155	132	132	130	117	120	128	48.5	45.6		45.3	48.7			45.6	46.8	50.1
Magnesium (total)	mg/L								57.5	46.4		47.1	49.0				46.8	51.1
Manganese (dissolved)	mg/L	0.0871	0.0380	0.0049	0.0270	0.0031	0.00139	0.00063	0.0043	0.0012		0.0013	0.0003			0.00291	<0.00020	0.00593
Manganese (total)	mg/L								0.0238	0.0024		0.0046	0.0013				0.00170	0.00142
Mercury (dissolved)	mg/L	<0.00002	<0.00002	0.00002	0.00002	<0.00002	<0.000040	<0.000040	<0.00002	<0.00002		<0.00002	<0.00002			<0.000010	<0.000040	<0.000010
Mercury (total)	mg/L								<0.00002	<0.00002		<0.00002	<0.00002				<0.000010	<0.000040
Molybdenum (dissolved)	mg/L	0.0007	0.0006	0.0004	0.0007	0.0006	0.00072	0.00061	0.0003	0.0003		0.0003	0.0002			0.00032	0.00023	0.00024
Molybdenum (total)	mg/L								0.0008	0.0003		0.0004	0.0002				0.00022	0.00023
Nickel (dissolved)	mg/L	0.0060	0.0045	0.0032	0.0039	0.0007	0.00298	0.00318	0.0006	0.0017		0.0005	0.0003			<0.00040	<0.00040	0.00054
Nickel (total)	mg/L								0.0003	0.0024		0.0005	0.0004				<0.00040	<0.00040
Selenium (dissolved)	mg/L	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.00050	<0.00050	<0.0005	<0.0005		<0.0005	<0.0005			<0.00050	<0.00050	<0.00050
Selenium (total)	mg/L								<0.0005	<0.0005		<0.0005	<0.0005				<0.00050	<0.00050
Silicon (dissolved, as Si)	mg/L	9.1	9.2	9.9	10.4	10.4	8.8	9.8	4.8	5.3		4.0	4.9			4.5	4.6	5.0
Silicon (total, as Si)	mg/L								6.3	5.4		5.2	5.0				4.9	5.1
Silver (dissolved)	mg/L	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.000050	<0.000050	<0.00005	<0.00005		<0.00005	<0.00005			<0.000050	<0.000050	<0.000050
Silver (total)	mg/L								0.00005	<0.00005		<0.00005	<0.00005				<0.000050	<0.000050
Sodium (dissolved)	mg/L	392	356	399	436	365	316	370	61.0	64.0		55.4	61.1			56.5	58.0	63.0
Sodium (total)	mg/L								72.3	58.8		57.5	66.0				58.1	64.7
Strontium (dissolved)	mg/L	1.64	1.43	1.52	1.56	1.35	1.30	1.44	0.542	0.592		0.548	0.561			0.532	0.555	0.562
Strontium (total)	mg/L								0.634	0.609		0.571	0.597				0.583	0.570
Sulphur (dissolved)	mg/L	18	18	17	20	16	17.2	20.2	17	17		14	14			16.4	15.6	16.6
Sulphur (total)	mg/L								21	16		14	14				16.0	15.7
Tellurium (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00050	<0.00050	<0.0002	<0.0002		<0.0002	<0.0002			<0.00050	<0.00050	<0.00050
Tellurium (total)	mg/L								<0.0002	<0.0002		<0.0002	<0.0002				<0.00050	<0.00050
Thallium (dissolved)	mg/L	0.00008	<0.00002	0.00004	<0.00002	0.00002	0.000074	0.000062	<0.00002	<0.00002		<0.00002	<0.00002			<0.000020	<0.000020	<0.000020
Thallium (total)	mg/L								<0.00002	<0.00002		<0.00002	<0.00002				<0.000020	<0.000020
Thorium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.0001	<0.0001		<0.0001	<0.0001			<0.00010	<0.00010	<0.00010
Thorium (total)	mg/L								0.0001	<0.0001		<0.0001	<0.0001				<0.00010	<0.00010
Tin (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.0002	<0.0002		<0.0002	<0.0002			<0.00020	<0.00020	0.00033
Tin (total)	mg/L								0.0004	<0.0002		<0.0002	0.0004				<0.00020	<0.00020
Titanium (dissolved)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005		<0.005	<0.005			<0.0050	<0.0050	<0.0050
Titanium (total)	mg/L								0.005	<0.005		<0.005	<0.005				<0.0050	<0.0050
Tungsten (dissolved)	mg/L						0.0060	0.0064								<0.0010	<0.0010	<0.0010
Tungsten (total)	mg/L																<0.0010	<0.0010
Uranium (dissolved)	mg/L	0.00223	0.00205	0.00210	0.00227	0.00193	0.00231	0.00238	0.00104	0.00115		0.00102	0.00110			0.00105	0.00106	0.00114
Uranium (total)	mg/L								0.00120	0.00114		0.00111	0.00108				0.00107	0.00111
Vanadium (dissolved)	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	<0.001	<0.001		<0.001	<0.001			<0.0010	<0.0010	<0.0010
Vanadium (total)	mg/L								<0.001	<0.001		<0.001	<0.001				<0.0010	<0.0010
Zinc (dissolved)	mg/L	<0.004	<0.004	0.005	0.012	0.008	<0.0040	<0.0040	0.004	<0.004		0.007	<0.004			<0.0040	<0.0040	0.0174
Zinc (total)	mg/L								0.012	<0.004		0.011	<0.004				<0.0040	0.0056
Zirconium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	0.0025	<0.0001	<0.00010	<0.00010	<0.0001	<0.0001		<0.0001	<0.0001			<0.00010	<0.00010	<0.00010
Zirconium (total)	mg/L								0.0003	<0.0001		<0.0001	<0.0001				<0.00010	<0.00010
Microbiological																		
Background Bacteria	CFU/100 ml																>200	
E. coli (counts)	CFU/100 ml												<1	<1	<1		<1	
E. coli (MPN)	MPN/100 ml								<3.0	<3.0	<3.0	<3.0				<3.0		
Fecal coliforms (counts)	CFU/100 ml												<1	<1	<1		<1	
Fecal coliforms (MPN)	MPN/100 ml								<3.0	<3.0	<3.0	<3.0				<3.0		
Total coliforms (counts)	CFU/100 ml												<1	<1	<1		<1	
Total coliforms (MPN)	MPN/100 ml								<3.0	<3.0	<3.0	<3.0				<3.0		
Miscellaneous Organic Substances																		
Chloroethane	mg/L						<0.0020			<0.0020			<0.0020				<0.0020	
1,2-Dibromoethane	mg/L						<0.0003			<0.0003			<0.0002				<0.0003	
1,2-Dichloropropane	mg/L						<0.0010			<0.0010			<0.0010				<0.0010	
1,3-Dichloropropene	mg/L						<0.0010			<0.0010			<0.0010				<0.0010	
Methyl tert-butyl ether (MTBE)	mg/L						<0.0010		<0.0010	<0.0010		<0.0010	<0.0010				<0.0010	
VHw6-10	mg/L								<0.100	<0.100		<0.100	<0.100				<0.100	
Vinyl chloride	mg/L						<0.0010			<0.0020			<0.0010				<0.0010	
VPHw	mg/L								<0.100	<0.100		<0.100	<0.100				<0.100	
Monocyclic Aromatic Hydrocarbons (MAHs)																		
Benzene	mg/L						<0.0005		<0.0005	<0.0005		<0.0005	<0.0005				<0.0005	
Ethylbenzene	mg/L						<0.0010		<0.0010	<0.0010		<0.0010	<0.0010				<0.0010	
Styrene	mg/L						<0.0010		<0.0010	<0.0010		<0.0010	<0.0010				<0.0010	
Toluene	mg/L						0.0602		0.0050	<0.0010		0.0076	<0.0010				0.0023	
Xylenes	mg/L						<0.0020		<0.0020	<0.0020		<0.0020	<0.0020				<0.0020	
Nutrients																		
Ammonia (total, as N)	mg/L	1.24	0.118	0.023	0.030	<0.020	0.052	0.061								<0.020	0.026	<0.020
Nitrate (as N)	mg/L	<0.010	0.206	1.11	0.723	0.695	0.940	0.778	1.19	1.19	1.05	0.803	0.807	1.18	1.15	0.892	0.954	0.855
Nitrate + Nitrite (as N)	mg/L																	
Nitrate + Nitrite (as N) (calculated)	mg/L	<0.014	0.206	1.11	0.723	0.695	0.940	0.778	1.19	1.19	1.05	0.803	0.807	1.18	1.15	0.892	0.954	0.855
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total kjeldahl nitrogen	mg/L																	
Orthophosphate (dissolved, as P)	mg/L					<0.01	<0.0050	<0.0050			<0.01	<0.01	<0.010	<0.010	<0.010	<0.0050		<0.0050
Phosphorus (dissolved, by ICPMS/ICPOE	mg/L	<0.02	<0.02	0.02	<0.02	<0.02	<0.050	<0.050	<0.02	<0.02		<0.02	<0.05			<0.050	<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L								<0.02	<0.02		0.04	<0.05				<0.050	<0.050
Phosphorus (total, APHA 4500-P)	mg/L								0.017	0.007								
Phosphorus (dissolved, APHA 4500-P)	mg/L							<0.0020										
Potassium (dissolved)	mg/L	6.64	6.05	6.82	6.66	6.34	5.61	5.93	2.42	2.33		2.35	2.32			2.21	2.10	2.14
Potassium (total)	mg/L								2.67	2.23		2.31	2.31				2.11	2.15

Analyte	Unit	MW18-10 27-Jun-18 8062805-02 Normal	MW18-10 10-Sep-18 8090975-02 Normal	MW18-10 03-Dec-18 8120636-02 Normal	MW18-11 375 ft 04-Dec-18 8120636-08 Normal	MW18-11 475 ft 06-Dec-18 8120644-01 Normal	Town Well #4 03-Jun-02	Town Well #4 12-May-03	Town Well #4 17-May-04	Town Well #4 22-May-07 K705752-02	Town Well #4 05-Nov-07 K7K0165-01	Town Well #4 28-Apr-08 K8E0035-01	Town Well #4 14-Oct-08 K8J0452-01	Town Well #4 25-May-09 K9E0816-01	Town Well #4 04-Nov-09 K9K0184-03	Town Well #4 09-Feb-10 K0B0397-03
Lithium (dissolved)	mg/L	0.0294	0.0260	0.0232	0.0314	0.0871				0.0018		0.0020	0.0015	0.0021	0.0013	0.0017
Lithium (total)	mg/L									<0.0050						
Magnesium (dissolved)	mg/L	138	188	204	58.4	28.5	37	43.7	38.1	38.4	41.1	40.2	38.9	34.9	39.8	39.7
Magnesium (total)	mg/L									37.9						
Manganese (dissolved)	mg/L	0.168	0.126	0.202	0.294	0.0149	<0.005	<0.005	<0.005	<0.0100		<0.0050	<0.0010	<0.0002	<0.0002	<0.0002
Manganese (total)	mg/L									<0.010						
Mercury (dissolved)	mg/L	<0.000010	<0.000040	<0.000040	<0.000040	<0.000040				<0.00050		<0.00030	<0.00006	<0.00005	<0.00005	<0.00005
Mercury (total)	mg/L									<0.00050						
Molybdenum (dissolved)	mg/L	0.00287	0.00257	0.00190	0.00620	0.0364	<0.03	<0.03	<0.03	<0.0020		<0.0010	0.0002	0.0002	0.0002	0.0002
Molybdenum (total)	mg/L									<0.0050						
Nickel (dissolved)	mg/L	0.0355	0.0388	0.0438	0.00553	0.00589	<0.05	<0.05	<0.05	<0.010		<0.005	0.001	0.0014	0.001	0.0012
Nickel (total)	mg/L									<0.020						
Selenium (dissolved)	mg/L	0.00109	<0.00050	<0.00050	<0.00050	<0.00050	<0.2	<0.2	<0.2	<0.0100		<0.0050	<0.0010	<0.0003	<0.0003	<0.0003
Selenium (total)	mg/L									<0.010						
Silicon (dissolved, as Si)	mg/L	8.5	10.2	10.9	1.1	4.3				3.88		5.01	5.35	4.1	3.53	7.83
Silicon (total, as Si)	mg/L									2.6						
Silver (dissolved)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050				<0.0004		<0.00040	<0.00008	<0.00005	<0.00005	<0.00005
Silver (total)	mg/L									<0.00050						
Sodium (dissolved)	mg/L	168	185	190	30.7	270	34	37	37	36.8		43.1	42.1	36.7	44.4	45.6
Sodium (total)	mg/L									34.8						
Strontium (dissolved)	mg/L	0.842	1.18	1.43	0.0865	0.246				0.414		0.434	0.442	0.481	0.409	0.409
Strontium (total)	mg/L									0.405						
Sulphur (dissolved)	mg/L	37.5	31.3	30.9	16.1	62.1										
Sulphur (total)	mg/L															
Tellurium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050				<0.0050		<0.0030	<0.0006	<0.0002	<0.0002	<0.0002
Tellurium (total)	mg/L									<0.005						
Thallium (dissolved)	mg/L	0.000088	0.000085	0.000071	<0.000020	0.000141				<0.0010		<0.0005	<0.0001	<0.00002	<0.00002	<0.00002
Thallium (total)	mg/L									<0.0010						
Thorium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010				<0.0050		<0.0030	<0.0006		<0.0001	<0.0001
Thorium (total)	mg/L									<0.005						
Tin (dissolved)	mg/L	0.00077	<0.00020	<0.00020	<0.00020	0.00064				<0.0020		<0.0020	<0.0004	<0.0002	<0.0002	<0.0002
Tin (total)	mg/L									<0.001						
Titanium (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050				<0.0200		<0.100	<0.020	<0.005	<0.005	<0.005
Titanium (total)	mg/L									<0.050						
Tungsten (dissolved)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010										
Tungsten (total)	mg/L															
Uranium (dissolved)	mg/L	0.00902	0.00845	0.00597	0.000448	0.00256				0.0011		0.0012	0.0014	0.00124	0.00114	0.00102
Uranium (total)	mg/L									0.0012						
Vanadium (dissolved)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010				<0.0050		<0.010	<0.002	<0.0010	<0.0010	0.0046
Vanadium (total)	mg/L									<0.010						
Zinc (dissolved)	mg/L	0.0065	<0.0040	0.0060	0.0092	<0.0040	0.01	0.021	0.039	<0.040		<0.030	0.008	0.0088	0.0021	0.0051
Zinc (total)	mg/L									<0.050						
Zirconium (dissolved)	mg/L	0.00060	0.00060	0.00044	<0.00010	0.00068				<0.010		<0.005	<0.001	<0.0001	<0.0001	<0.0001
Zirconium (total)	mg/L									<0.010						
Microbiological																
Background Bacteria	CFU/100 ml															
E. coli (counts)	CFU/100 ml															
E. coli (MPN)	MPN/100 ml															
Fecal coliforms (counts)	CFU/100 ml															
Fecal coliforms (MPN)	MPN/100 ml															
Total coliforms (counts)	CFU/100 ml															
Total coliforms (MPN)	MPN/100 ml															
Miscellaneous Organic Substances																
Chloroethane	mg/L		<0.0020	<0.0020												
1,2-Dibromoethane	mg/L		<0.0003	<0.0003												
1,2-Dichloropropane	mg/L		<0.0010	<0.0010												
1,3-Dichloropropene	mg/L		<0.0010	<0.0010												
Methyl tert-butyl ether (MTBE)	mg/L		<0.0010	<0.0010												
VHw6-10	mg/L															
Vinyl chloride	mg/L		<0.0010	<0.0010												
VPHw	mg/L															
Monocyclic Aromatic Hydrocarbons (MAHs)																
Benzene	mg/L		<0.0005	<0.0005												
Ethylbenzene	mg/L		<0.0010	<0.0010												
Styrene	mg/L		<0.0010	<0.0010												
Toluene	mg/L		0.0108	0.0162												
Xylenes	mg/L		<0.0020	<0.0020												
Nutrients																
Ammonia (total, as N)	mg/L	1.80	2.14	2.40	0.449	1.36				<0.02	<0.02	0.04	0.06	<0.02	<0.02	<0.02
Nitrate (as N)	mg/L	12.9	21.7	15.7	1.03	0.043	1.4	1.35	1.63	1.35	1.09	0.982	1.17	1.12	1.21	1.3
Nitrate + Nitrite (as N)	mg/L									1.35	1.09					
Nitrate + Nitrite (as N) (calculated)	mg/L	12.9	21.8	15.7	1.10	0.318				1.35	1.09	0.982	1.17	1.12	1.21	1.3
Nitrite (as N)	mg/L	<0.010	0.134	0.020	0.068	0.275	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.01	<0.01	<0.01	<0.01
Total kjeldahl nitrogen	mg/L						0.05	<0.05	0.08	0.10	0.06					
Orthophosphate (dissolved, as P)	mg/L		<0.0050	<0.0050	0.0054	0.0141										
Phosphorus (dissolved, by ICPMS/ICPOE	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.3	<0.3	<0.3	<0.500		<0.200	<0.040	<0.020	<0.020	<0.020
Phosphorus (total, by ICPMS/ICPOES)	mg/L									<0.50						
Phosphorus (total, APHA 4500-P)	mg/L															
Phosphorus (dissolved, APHA 4500-P)	mg/L			0.0130	0.0053	0.0103										
Potassium (dissolved)	mg/L	13.7	20.0	19.9	5.73	38.1	<2	<2	<2	1.66		2.17	1.82	2.08	1.48	1.93
Potassium (total)	mg/L									1.53						

Analyte	Unit	Town Well #4 15-Jun-10 K0F0788-02	Town Well #4 16-Nov-10 K0K0729-03	Town Well #4 09-May-11 K1E0403-02	Town Well #4 10-Aug-11 K1H0536-04	Town Well #4 18-Oct-11 K1J0685-04	Town Well #4 24-May-12 2051369-02 Normal	Town Well #4 22-Aug-12 2081484-04 Normal	Town Well #4 20-Nov-12 2111131-04 Normal	Town Well #4 21-May-13 3051354-04 Normal	Town Well #4 12-Nov-13 3110772-02 Normal	Town Well #4 02-Jun-14 4060249-02 Normal	Town Well #4 18-Aug-14 4081094-01 Normal	Town Well #4 04-Nov-14 4110161-01 Normal	Town Well #4 25-May-15 5051773-02 Normal	Town Well #4 03-May-16 6050336-05 Normal
Lithium (dissolved)	mg/L	0.0021	0.0040	0.0020	0.0017	0.0018	0.0017	0.0016	0.0018	0.0018	0.0018	0.0020	0.0022	0.0020		
Lithium (total)	mg/L														0.0020	0.0022
Magnesium (dissolved)	mg/L	35.0	40.5	39.7	37.3	34.9	39.1	37.7	36.8	38.9	39.3	41.8	39.4	38.0		
Magnesium (total)	mg/L														39.8	45.4
Manganese (dissolved)	mg/L	<0.0002	<0.0002	0.0006	0.0008	<0.0002	0.0007	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0068	0.0012		
Manganese (total)	mg/L														<0.0002	<0.0002
Mercury (dissolved)	mg/L	<0.00005	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	0.00005	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		
Mercury (total)	mg/L														<0.00002	<0.00002
Molybdenum (dissolved)	mg/L	0.0002	0.0003	0.0002	0.0003	0.0012	0.0003	0.0005	0.0003	0.0002	0.0003	0.0003	0.0003	0.0002		
Molybdenum (total)	mg/L														0.0003	0.0003
Nickel (dissolved)	mg/L	0.0016	0.0037	0.0002	0.0011	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	0.0002	<0.0002	0.0015	0.0004		
Nickel (total)	mg/L														<0.0002	0.0002
Selenium (dissolved)	mg/L	<0.0003	<0.0003	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		
Selenium (total)	mg/L														<0.0005	<0.0005
Silicon (dissolved, as Si)	mg/L	4.00	2.33	4.89	4.8	4.4	4.8	4.6	4.9	4.6	4.2	4.5	4.6	4.9		
Silicon (total, as Si)	mg/L														4.8	5.3
Silver (dissolved)	mg/L	<0.00005	<0.00005	<0.00005	0.00007	<0.00005	<0.00005	<0.00005	0.00006	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005		
Silver (total)	mg/L														<0.00005	<0.00005
Sodium (dissolved)	mg/L	37.8	37.8	44.0	39.9	38.2	40.8	39.4	38.7	41.7	42.4	42.5	44.5	48.5		
Sodium (total)	mg/L														46.9	56.5
Strontium (dissolved)	mg/L	0.451	0.628	0.423	0.436	0.370	0.441	0.405	0.399	0.432	0.400	0.421	0.457	0.438		
Strontium (total)	mg/L														0.425	0.490
Sulphur (dissolved)	mg/L						16	17	15	13	9	16	12	13		
Sulphur (total)	mg/L														14	16
Tellurium (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tellurium (total)	mg/L														<0.0002	<0.0002
Thallium (dissolved)	mg/L	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		
Thallium (total)	mg/L														<0.00002	<0.00002
Thorium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Thorium (total)	mg/L														<0.0001	<0.0001
Tin (dissolved)	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
Tin (total)	mg/L														<0.0002	<0.0002
Titanium (dissolved)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Titanium (total)	mg/L														<0.005	<0.005
Tungsten (dissolved)	mg/L															
Tungsten (total)	mg/L															
Uranium (dissolved)	mg/L	0.00115	0.00127	0.00113	0.00107	0.00104	0.00103	0.00109	0.00103	0.00112	0.00105	0.00114	0.00143	0.00123		
Uranium (total)	mg/L														0.00115	0.00134
Vanadium (dissolved)	mg/L	0.0018	<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		
Vanadium (total)	mg/L														<0.001	<0.001
Zinc (dissolved)	mg/L	0.0058	0.0032	<0.0040	0.016	<0.004	<0.004	0.006	<0.004	<0.004	<0.004	<0.004	<0.004	0.005		
Zinc (total)	mg/L														<0.004	<0.004
Zirconium (dissolved)	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		
Zirconium (total)	mg/L														<0.0001	0.0002
Microbiological																
Background Bacteria	CFU/100 ml															
E. coli (counts)	CFU/100 ml															
E. coli (MPN)	MPN/100 ml															
Fecal coliforms (counts)	CFU/100 ml															
Fecal coliforms (MPN)	MPN/100 ml															
Total coliforms (counts)	CFU/100 ml															
Total coliforms (MPN)	MPN/100 ml															
Miscellaneous Organic Substances																
Chloroethane	mg/L															
1,2-Dibromoethane	mg/L															
1,2-Dichloropropane	mg/L															
1,3-Dichloropropene	mg/L															
Methyl tert-butyl ether (MTBE)	mg/L															
VHw6-10	mg/L															
Vinyl chloride	mg/L															
VPHw	mg/L															
Monocyclic Aromatic Hydrocarbons (MAHs)																
Benzene	mg/L															
Ethylbenzene	mg/L															
Styrene	mg/L															
Toluene	mg/L															
Xylenes	mg/L															
Nutrients																
Ammonia (total, as N)	mg/L	<0.02	<0.02	<0.02	0.03	0.02	<0.020	0.030	0.025	0.024	0.029	<0.020	<0.020	<0.020	0.038	<0.020
Nitrate (as N)	mg/L	1.17	1.14	0.895	1.26	1.21	1.19	1.20	0.755	1.36	1.33	1.26	1.55	1.57	1.53	1.72
Nitrate + Nitrite (as N)	mg/L															
Nitrate + Nitrite (as N) (calculated)	mg/L	1.17	1.14	0.895	1.26	1.21	1.19	1.20	0.755	1.36	1.33	1.26	1.55	1.57	1.53	1.72
Nitrite (as N)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total kjeldahl nitrogen	mg/L															
Orthophosphate (dissolved, as P)	mg/L														<0.01	0.04
Phosphorus (dissolved, by ICPMS/ICPOE	mg/L	<0.020	<0.020	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.11	<0.02		
Phosphorus (total, by ICPMS/ICPOES)	mg/L														<0.020	<0.02
Phosphorus (total, APHA 4500-P)	mg/L															
Phosphorus (dissolved, APHA 4500-P)	mg/L															
Potassium (dissolved)	mg/L	2.33	1.95	1.74	1.75	1.50	2.04	1.62	1.61	1.69	1.67	1.70	1.84	1.90		
Potassium (total)	mg/L														1.86	2.05

Analyte	Unit	Town Well #4 22-Aug-16 6081698-04 Normal	Town Well #4 14-Nov-16 6111141-02 Normal	Town Well #4 05-Apr-17 7040434-04 Normal	Town Well #4 20-Nov-17 7111886-03 Normal	Town Well #4 26-Jun-18 8062674-04 Normal	Town Well #4 11-Sep-18 8090975-06 Normal	Town Well #4 03-Dec-18 8120636-05 Normal	Town Well #6 20-Aug-13 3081378-02 Normal	Town Well #6 02-Jun-14 4060249-01 Normal	Town Well #6 18-Aug-14 4081094-02 Normal	Town Well #6 04-Nov-14 4110161-02 Normal	Town Well #6 25-May-15 5051773-01 Normal	Town Well #6 25-Aug-15 5081710-01 Normal	Town Well #6 09-Nov-15 5110693-04 Normal	Town Well #6 03-May-16 6050336-04 Normal	Town Well #6 22-Aug-16 6081698-05 Normal	Town Well #6 14-Nov-16 6111141-01 Normal	Town Well #6 05-Apr-17 7040434-05 Normal	Town Well #6 29-Aug-17 7090074-02 Normal	Town Well #6 20-Nov-17 7111886-02 Normal	Town Well #6 26-Jun-18 8062674-05 Normal	Well ID 22653 04-Dec-18 8120636-07 Normal
Field Results																							
Conductivity	µS/cm	986	932	63	1050	1055	1043	904	650	577	577	677	587	401	670	693	695	723	635	680	726	727	352
Depth to Water	m																						5.82
Dissolved oxygen	mg/L	4.67					5.59	5.67		8.14	7.68	7.38	6.40	7.04	6.51	5.61	6.13	5.71		9.27	9.21		2.87
Dissolved oxygen (percent)	%	39.8					47.6	48.3		68.1	65.3	64.0	57	63.6			52.5	49.8		83.1	78.7		25.2
Field measured depth to bottom	m																						
Flow rate - container	L/s																						
Ground Elevation	m	790	790	790	790	790	790	790															
Oxidation reduction potential	mV	240	293	261		218	123	102	246	183	172	66	211	46	74	122	234	163	265	31		204	
pH		7.3	7.5	7.5	7.2	7.46	7.52	7.26	7.15	7.3	7.9	7.4	7.4	7.4	6.6	7.3	7.2	7.3	7.3		7.5	7.45	8.65
Temperature	°C	8.6	8.3	8	8.2	8.3	8.4	8.3	7.9	7.7	8.1	8.1	7.8	10.2	8.2	8.2	8.4	8.0	7.9	9.5	7.9	8.1	7.8
Lab Results																							
Chlorinated Hydrocarbons																							
1,2-Dichlorobenzene	mg/L			<0.0005			<0.0005												<0.0005				
1,3-Dichlorobenzene	mg/L			<0.0010			<0.0010												<0.0010				
1,4-Dichlorobenzene	mg/L			<0.0010			<0.0010												<0.0010				
1,1-Dichloroethane	mg/L			<0.0010			<0.0010												<0.0010				
1,2-Dichloroethane	mg/L			<0.0010			<0.0010												<0.0010				
1,1-Dichloroethylene	mg/L			<0.0010			<0.0010												<0.0010				
cis-1,2-Dichloroethylene	mg/L			<0.0010			<0.0010												<0.0010				
trans-1,2-Dichloroethylene	mg/L			<0.0010			<0.0010												<0.0010				
Monochlorobenzene	mg/L			<0.0010			<0.0010												<0.0010				
1,1,2,2-Tetrachloroethane	mg/L			<0.0005			<0.0005												<0.0005				
Tetrachloroethylene	mg/L			<0.0010			<0.0010												<0.0010				
1,1,1-Trichloroethane	mg/L			<0.0010			<0.0010												<0.0010				
1,1,2-Trichloroethane	mg/L			<0.0010			<0.0010												<0.0010				
Trichloroethylene	mg/L			<0.0010			<0.0010												<0.0010				
General																							
Alkalinity (bicarbonate, as CaCO3)	mg/L	338	336	343	361	336	378	355								292	296	308	314	288	304	288	142
Alkalinity (carbonate, as CaCO3)	mg/L	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0								<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (hydroxide, as CaCO3)	mg/L	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0								<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (phenolphthalein, as CaCO3)	mg/L	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0								<1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity (total, as CaCO3)	mg/L	338	336	343	361	336	378	355	268	276	277	291	303	288	295	292	296	308	314	288	304	288	142
Bicarbonate Alkalinity (as HCO3)	mg/L	412	410	418	441	410	461	433								356	361	375	383	352	371	351	173
Carbonate Alkalinity (as CO3)	mg/L	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600								<1	<0.6	<0.6	<0.600	<0.600	<0.600	<0.600	<0.600
Hydroxide Alkalinity (as OH)	mg/L	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340								<1	<0.3	<0.3	<0.340	<0.340	<0.340	<0.340	<0.340
Bromide	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10					<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chemical Oxygen Demand	mg/L																						
Chloride	mg/L	88.5	88.6	90.4	105	103	87.4	97.0	22.9	23.7	26.2	34.5	28.7	24.8	28.6	24.4	29.2	30.5	31.0	34.4	36.2	39.7	29.4
Colour	CU																						
Conductivity	µS/cm	948	966	959	1050	1010	1020	1000	620	621	634	679	672	618	661	658	666	712	692	655	704	702	387
Total cyanide	mg/L																						
Fluoride	mg/L	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.11	0.18	<0.10	0.13
Hardness, Total (dissolved as CaCO3)	mg/L	453	386	398		408	399	397	319	324	325	322				398	380	333	334	327		328	159
Hardness, Total (total as CaCO3)	mg/L				389								346	332	328						308		
Langelier Index																							
pH		7.77	7.97	7.85	7.91	7.88	7.83	7.92	7.94	7.87	7.70	7.86	7.81	7.79	7.72	7.74	7.76	7.89	7.89	8.03	8.00	7.93	8.00
Sulphate	mg/L	41.5	40.2	42.8	43.8	38.8	42.3	42.9	20.4	23.5	24.1	24.3	24.3	23.8	24.8	25.2	27.1	24.9	27.6	24.4	23.0	25.2	23.5
Temperature of observed pH	°C																						
Total dissolved solids (computed)	mg/L																						
Total organic carbon	mg/L																						
Total suspended solids	mg/L	<2	<2	<2	<2.0	<2.0	<2.0	<2.0	<1	<1	<1	<1	<2	<2	<3	<2	<2	<2	<2	<2.0	8.6	<2.0	71.0
Turbidity	NTU	<0.10	<0.10	<0.10	0.26	<0.10		<0.10	0.6	<0.1	<0.1	0.1	<0.1	0.2	0.1	<0.1	0.11	0.13	0.16	0.12	0.10	<0.10	142
Halogenated Methanes																							
Bromodichloromethane	mg/L			<0.0010			<0.0010												<0.0010				
Bromoform	mg/L			<0.0010			<0.0010												<0.0010				
Carbon tetrachloride	mg/L			<0.0005			<0.0005												<0.0005				
Chloroform	mg/L			<0.0010			<0.0010												<0.0010				
Dibromochloromethane	mg/L			<0.0010			<0.0010												<0.0010				
Dibromomethane	mg/L			<0.0010			<0.0010												<0.0010				
Dichloromethane	mg/L			<0.0030			<0.0030												<0.0030				
Total Trihalomethanes (calculated)	mg/L			<0.0020			<0.0020												<0.0020				
Trichlorofluoromethane	mg/L			<0.0010			<0.0010												<0.0010				
Metals																							
Aluminum (dissolved)	mg/L	<0.005	<0.005			0.0057	<0.0050	<0.0050	<0.005	<0.005	0.011	<0.005					<0.005	<0.005		<0.0050		0.0069	0.0068
Aluminum (total)	mg/L			<0.005	<0.0050								<0.005	<0.005	<0.05	<0.005			<0.005		<0.0050		
Antimony (dissolved)	mg/L	<0.0001	<0.0001			<0.00020	<0.00020	<0.00020	0.0005	0.0005	0.0003	0.0002					<0.0001	<0.0001		<0.00020		<0.00020	<0.00020
Antimony (total)	mg/L			<0.0001	<0.00020								0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00020		
Arsenic (dissolved)	mg/L	<0.0005	<0.0005			<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005					<0.0005	<0.0005		<0.00050		<0.00050	<0.00050
Arsenic (total)	mg/L			<0.0005	<0.00050								<0.0005	<0.0005	<0.005	<0.0005			<0.0005		<0.00050		
Barium (dissolved)	mg/L	0.247	0.219			0.196	0.219	0.214	0.133	0.126	0.136	0.146					0.169	0.155		0.133		0.133	0.0224
Barium (total)	mg/L			0.214	0.228								0.142	0.146	0.14	0.162			0.150		0.146		
Beryllium (dissolved)	mg/L	<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010
Beryllium (total)	mg/L			<0.0001	<0.00010								<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010		
Bismuth (dissolved)	mg/L	<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010
Bismuth (total)	mg/L			<0.0001	<0.00010								<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010		
Boron (dissolved)	mg/L	0.031	0.014			0.0335	0.0357	0.0293	0.050	0.015	0.012	0.006					0.014	0.007		0.143		0.0170	0.0156
Boron (total)	mg/L			0.025	0.0140								0.006	0.007	<0.04	0.012			0.016		0.0068		
Cadmium (dissolved)	mg/L	0.00002	<0.00001			<0.000010	<0.000010	<0.000010	0.00002	<0.00001	0.00002	<0.00001					0.00002	<0.00001		<0.000010		<0.000010	<0.000010
Cadmium (total)	mg/L			<0.00001	<0.000010								<0.00001	<0.00001	<0.0001	<0.00001			<0.00001		<0.000010		
Calcium (dissolved)	mg/L	100	86.1			93.1	90.1	86.2	81.5	82.8	82.7	84.3					96.8	85.7		84.4		85.5	20.4
Calcium (total)	mg/L			93.7	91.1								90.4	87.9	87.0	105			89.6		83.6		
Chromium (dissolved)	mg/L	<0.0005	<0.0005			<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005					<0.0005	<0.0005		<0.00050		<0.00050	<0.00050
Chromium (total)	mg/L			0.0005	0.00052								<0.0005	<0.0005	<0.005	<0.0005			0.0006		0.00062		
Cobalt (dissolved)	mg/L	0.00006	<0.00005			<0.00010	<0.00010	<0.00010	<0.00005	<0.00005	0.00007	0.00006					0.00007	<0.00005		<0.00010		<0.00010	<0.00010
Cobalt (total)	mg/L			<0.00005	<0.00010								<0.00005	<0.00005	<0.0005	<0.00005			<0.00005		<0.00010		
Copper (dissolved)	mg/L	0.0016	0.0012			0.00099	0.00182	0.00065	0.0008	0.0013	0.0028	0.0024					0.0014	0.0008		0.00143		0.00106	<0.00040
Copper (total)	mg/L			0.0015	0.00073								0.0010	0.0016	<0.002	0.0008			0.0013		0.00153		
Iron (dissolved)	mg/L	<0.010	<0.010			<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.013					0.012	<0.010		0.019		0.018	1.93
Iron (total)	mg/L			<0.01	<0.010								0.01	0.01	<0.10	<0.01			<0.01		<0.010		
Lead (dissolved)	mg/L	<0.0001	0.0001			<0.00020	<0.00020	0.00025	<0.0001	<0.0001	0.0002	<0.0001					<0.0001	<0.0001		<0.00020		<0.00020	<0.00020
Lead (total)	mg/L			0.0001	<0.00020								0.0001	0.0001	<0.001	0.0001			<0.0001		<0.00020		

Analyte	Unit	Town Well #4 22-Aug-16 6081698-04 Normal	Town Well #4 14-Nov-16 6111141-02 Normal	Town Well #4 05-Apr-17 7040434-04 Normal	Town Well #4 20-Nov-17 7111886-03 Normal	Town Well #4 26-Jun-18 8062674-04 Normal	Town Well #4 11-Sep-18 8090975-06 Normal	Town Well #4 03-Dec-18 8120636-05 Normal	Town Well #6 20-Aug-13 3081378-02 Normal	Town Well #6 02-Jun-14 4060249-01 Normal	Town Well #6 18-Aug-14 4081094-02 Normal	Town Well #6 04-Nov-14 4110161-02 Normal	Town Well #6 25-May-15 5051773-01 Normal	Town Well #6 25-Aug-15 5081710-01 Normal	Town Well #6 09-Nov-15 5110693-04 Normal	Town Well #6 03-May-16 6050336-04 Normal	Town Well #6 22-Aug-16 6081698-05 Normal	Town Well #6 14-Nov-16 6111141-01 Normal	Town Well #6 05-Apr-17 7040434-05 Normal	Town Well #6 29-Aug-17 7090074-02 Normal	Town Well #6 20-Nov-17 7111886-02 Normal	Town Well #6 26-Jun-18 8062674-05 Normal	Well ID 22653 04-Dec-18 8120636-07 Normal
Lithium (dissolved)	mg/L	0.0019	0.0019			0.00226	0.00212	0.00231	0.0013	0.0013	0.0014	0.0013					0.0012	0.0012		0.00140		0.00132	0.00204
Lithium (total)	mg/L			0.0020	0.00199								0.0014	0.0012	0.001	0.0017			0.0013		0.00115		
Magnesium (dissolved)	mg/L	49.3	41.5			42.6	42.3	44.1	28.1	28.5	28.7	27.1					33.6	28.8		28.2		27.7	26.2
Magnesium (total)	mg/L			39.6	39.2								29.2	27.1	26.8	33.0			26.8		24.0		
Manganese (dissolved)	mg/L	0.0003	<0.0002			0.00162	<0.00020	0.00517	0.0009	0.0013	0.0082	0.0014					0.0011	0.0008		0.00294		0.00229	0.0986
Manganese (total)	mg/L			<0.0002	<0.00020								0.0011	0.0010	<0.002	0.0007			0.0007		0.00077		
Mercury (dissolved)	mg/L	<0.00002	<0.00002			<0.000010	<0.000040	<0.000010	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000010		<0.000040	<0.000010
Mercury (total)	mg/L			<0.00002	<0.000010								<0.00002		<0.00002	<0.00002			<0.00002		<0.000010		
Molybdenum (dissolved)	mg/L	0.0002	0.0002			0.00018	0.00021	0.00023	0.0003	0.0004	0.0004	0.0004					0.0003	0.0002		0.00030		0.00044	0.00025
Molybdenum (total)	mg/L			0.0002	0.00019								0.0005	0.0003	<0.001	0.0003			0.0003		0.00026		
Nickel (dissolved)	mg/L	<0.0002	<0.0002			<0.00040	<0.00040	<0.00040	0.0003	<0.0002	0.0012	0.0004					0.0002	0.0003		<0.00040		<0.00040	<0.00040
Nickel (total)	mg/L			<0.0002	<0.00040								<0.0002	0.0006	<0.002	0.0002			0.0002		<0.00040		
Selenium (dissolved)	mg/L	<0.0005	<0.0005			<0.00050	<0.00050	<0.00050	<0.0005	<0.0005	<0.0005	<0.0005					<0.0005	<0.0005		<0.00050		<0.00050	<0.00050
Selenium (total)	mg/L			<0.0005	<0.00050								<0.0005	<0.0005	<0.005	<0.0005			<0.0005		<0.00050		
Silicon (dissolved, as Si)	mg/L	4.5	4.9			4.9	4.6	4.9	4.1	4.0	4.4	4.5					4.2	4.5		4.0		4.3	<1.0
Silicon (total, as Si)	mg/L			4.7	4.4								4.7	4.3	<5	5.2			4.3		3.7		
Silver (dissolved)	mg/L	<0.00005	<0.00005			<0.000050	<0.000050	<0.000050	<0.00005	<0.00005	<0.00005	<0.00005					<0.00005	<0.00005		<0.000050		<0.000050	<0.000050
Silver (total)	mg/L			<0.00005	<0.000050								<0.00005	0.00154	<0.0005	<0.00005			<0.00005		<0.000050		
Sodium (dissolved)	mg/L	58.2	50.0			57.8	56.9	58.5	15.2	13.9	15.4	17.9					17.9	16.7		17.0		20.3	14.7
Sodium (total)	mg/L			52.7	52.1								18.9	15.1	15.9	17.9			17.1		15.7		
Strontium (dissolved)	mg/L	0.527	0.462			0.492	0.460	0.471	0.282	0.269	0.301	0.290					0.344	0.312		0.258		0.281	0.115
Strontium (total)	mg/L			0.446	0.486								0.296	0.298	0.27	0.325			0.294		0.285		
Sulphur (dissolved)	mg/L	18	15			16.1	14.3	15.0	8	10	8	7					13	9		7.8		9.8	7.1
Sulphur (total)	mg/L			12	14.0								9	8	<10	11			6		7.9		
Tellurium (dissolved)	mg/L	<0.0002	<0.0002			<0.00050	<0.00050	<0.00050	<0.0002	<0.0002	<0.0002	<0.0002					<0.0002	<0.0002		<0.00050		<0.00050	<0.00050
Tellurium (total)	mg/L			<0.0002	<0.00050								<0.0002	<0.0002	<0.002	<0.0002			<0.0002		<0.00050		
Thallium (dissolved)	mg/L	<0.00002	<0.00002			<0.000020	<0.000020	<0.000020	<0.00002	<0.00002	<0.00002	<0.00002					<0.00002	<0.00002		<0.000020		<0.000020	<0.000020
Thallium (total)	mg/L			<0.00002	<0.000020								<0.00002	<0.00002	<0.0002	<0.00002			<0.00002		<0.000020		
Thorium (dissolved)	mg/L	<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010
Thorium (total)	mg/L			<0.0001	<0.00010								<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010		
Tin (dissolved)	mg/L	<0.0002	<0.0002			<0.00020	<0.00020	0.00022	<0.0002	<0.0002	<0.0002	<0.0002					<0.0002	<0.0002		<0.00020		<0.00020	0.00077
Tin (total)	mg/L			<0.0002	<0.00020								<0.0002	<0.0002	<0.002	<0.0002			<0.0002		<0.00020		
Titanium (dissolved)	mg/L	<0.005	<0.005			<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005					<0.005	<0.005		<0.0050		<0.0050	<0.0050
Titanium (total)	mg/L			<0.005	<0.0050								<0.005	<0.005	<0.05	<0.005			<0.005		<0.0050		
Tungsten (dissolved)	mg/L					<0.0010	<0.0010	<0.0010														<0.0010	<0.0010
Tungsten (total)	mg/L				<0.0010																<0.0010		
Uranium (dissolved)	mg/L	0.00130	0.00115			0.00117	0.00132	0.00133	0.00105	0.00103	0.00114	0.00114					0.00117	0.00106		0.00109		0.00100	<0.000020
Uranium (total)	mg/L			0.00124	0.00127								0.00112	0.00111	0.0011	0.00133			0.00109		0.00107		
Vanadium (dissolved)	mg/L	<0.001	<0.001			<0.0010	<0.0010	<0.0010	<0.001	<0.001	<0.001	<0.001					<0.001	<0.001		<0.0010		<0.0010	<0.0010
Vanadium (total)	mg/L			<0.001	<0.0010								<0.001	<0.001	<0.01	<0.001			<0.001		<0.0010		
Zinc (dissolved)	mg/L	<0.004	<0.004			0.0062	<0.0040	0.0063	<0.004	<0.004	0.010	0.005					<0.004	<0.004		0.0100		0.0052	0.0043
Zinc (total)	mg/L			<0.004	<0.0040								<0.004	0.016	<0.04	<0.004			0.004		<0.0040		
Zirconium (dissolved)	mg/L	<0.0001	<0.0001			<0.00010	<0.00010	<0.00010	<0.0001	<0.0001	<0.0001	<0.0001					<0.0001	<0.0001		<0.00010		<0.00010	<0.00010
Zirconium (total)	mg/L			<0.0001	<0.00010								<0.0001	<0.0001	<0.001	<0.0001			<0.0001		<0.00010		
Microbiological																							
Background Bacteria	CFU/100																						
E. coli (counts)	CFU/100																						
E. coli (MPN)	MPN/100																						
Fecal coliforms (counts)	CFU/100																						
Fecal coliforms (MPN)	MPN/100																						
Total coliforms (counts)	CFU/100																						
Total coliforms (MPN)	MPN/100																						
Miscellaneous Organic Substances																							
Chloroethane	mg/L			<0.0020			<0.0020												<0.0020				
1,2-Dibromoethane	mg/L			<0.0002			<0.0003												<0.0002				
1,2-Dichloropropane	mg/L			<0.0010			<0.0010												<0.0010				
1,3-Dichloropropene	mg/L			<0.0010			<0.0010												<0.0010				
Methyl tert-butyl ether (MTBE)	mg/L			<0.0010			<0.0010												<0.0010				
VHw6-10	mg/L																						
Vinyl chloride	mg/L			<0.0010			<0.0010												<0.0010				
VPHw	mg/L																						
Monocyclic Aromatic Hydrocarbons (MAHs)																							
Benzene	mg/L			<0.0005			<0.0005												<0.0005				
Ethylbenzene	mg/L			<0.0010			<0.0010												<0.0010				
Styrene	mg/L			<0.0010			<0.0010												<0.0010				
Toluene	mg/L			<0.0010			<0.0010												<0.0010				
Xylenes	mg/L			<0.0020			<0.0020												<0.0020				
Nutrients																							
Ammonia (total, as N)	mg/L	0.031	<0.020	0.026	0.024	<0.020	0.020	<0.020	<0.020	0.024	<0.020	<0.020	<0.020	<0.020	0.020	<0.020	0.020	0.037	0.030	0.021	0.028	<0.020	0.326
Nitrate (as N)	mg/L	1.48	1.19	1.39	1.61	1.26	1.76	1.60	0.781	0.839	0.993	1.23	0.890	1.01	0.925	0.978	1.03	0.976	1.09	1.11	1.30	0.933	<0.010
Nitrate + Nitrite (as N)	mg/L																						
Nitrate + Nitrite (as N) (calculated)	mg/L	1.48	1.19	1.39	1.61	1.26	1.76	1.60	0.781	0.839	0.993	1.23	0.890	1.01	0.925	0.978	1.03	0.976	1.09	1.11	1.30	0.933	<0.014
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total kjeldahl nitrogen	mg/L																						
Orthophosphate (dissolved, as P)	mg/L	<0.01	<0.01	<0.010	<0.010		<0.0050	<0.0050					<0.01	<0.01									<0.0050
Phosphorus (dissolved, by ICPMS/ICPOE	mg/L	<0.02	<0.02			<0.050	<0.050	<0.050	<0.02	<0.02	0.07	<0.02					<0.02	<0.02		<0.050		<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L			<0.05	<0.050								<0.020	0.03	<0.2	<0.02			<0.05		<0.050		
Phosphorus (total, APHA 4500-P)	mg/L																						
Phosphorus (dissolved, APHA 4500-P)	mg/L							<0.0020															<0.0020
Potassium (dissolved)	mg/L	2.20	1.93			1.95	1.77	2.12	1.00	0.89	0.95	0.94					1.10	0.99		0.89		1.01	0.95
Potassium (total)	mg/L			1.85	1.89								1.03	0.99	0.8	1.06			0.93		0.91		

Guideline Notes for Reports for CSRD Refuse Disposal Sites Water Quality Results

1. Notes for Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations (GCDWQ MAC)

Note 1.1 for Total cyanide:

The MAC for free cyanide is 0.2 mg/L. A maximum of 0.2 mg/L was used, in this report, to identify exceedances for total cyanide as a means for determining the potential for exceeding the free cyanide guideline.

Note 1.2 for Turbidity:

Waterworks systems that use a surface water source or a groundwater source under the direct influence of surface water should filter the source water to meet health-based turbidity limits, as defined for specific treatment technologies. Where possible, filtration systems should be designed and operated to reduce turbidity levels as low as possible, with a treated water turbidity target of less than 0.1 NTU at all times. Where this is not achievable, the treated water turbidity levels from individual filters should meet the requirements described in GCDWQ.

For systems that use groundwater that is not under the direct influence of surface water, which are considered less vulnerable to faecal contamination, turbidity should generally be below 1.0 NTU.

For effective operation of the distribution system, it is good practice to ensure that water entering the distribution system has turbidity levels below 1.0 NTU.

Note 1.3 for Bromodichloromethane:

The maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water is 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. Trihalomethanes refers to the total of chloroform, bromodichloromethane, dibromochloromethane and bromoform compounds.

Note 1.4 for Bromoform:

The maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water is 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. Trihalomethanes refers to the total of chloroform, bromodichloromethane, dibromochloromethane and bromoform compounds.

Note 1.5 for Chloroform:

The maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water is 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. Trihalomethanes refers to the total of chloroform, bromodichloromethane, dibromochloromethane and bromoform compounds.

Note 1.6 for Dibromochloromethane:

The maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water is 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. Trihalomethanes refers to the total of chloroform, bromodichloromethane, dibromochloromethane and bromoform compounds.

Note 1.7 for Total Trihalomethanes (calculated):

Trihalomethanes refers to the total of chloroform, bromodichloromethane, dibromochloromethane and bromoform compounds. The maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water is 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. Utilities should make every effort to maintain concentrations as low as reasonably achievable without compromising the effectiveness of disinfection.

Note 1.8 for Arsenic (dissolved):

Every effort should be made to maintain arsenic levels in drinking water as low as reasonably achievable.

Note 1.9 for Arsenic (total):

Every effort should be made to maintain arsenic levels in drinking water as low as reasonably achievable.

Note 1.10 for Lead (dissolved):

The maximum acceptable concentration (MAC) for total lead in drinking water is 0.005 mg/L (5 µg/L), based on a sample of water taken at the tap and using the appropriate protocol for the type of building being sampled. Every effort should be made to maintain lead levels in drinking water as low as reasonably achievable (or ALARA). (GCDWQ: Guideline Technical Document: March, 2019)

Note 1.11 for Lead (total):

The maximum acceptable concentration (MAC) for total lead in drinking water is 0.005 mg/L (5 µg/L), based on a sample of water taken at the tap and using the appropriate protocol for the type of building being sampled. Every effort should be made to maintain lead levels in drinking water as low as reasonably achievable (or ALARA). (GCDWQ: Guideline Technical Document: March, 2019)

Note 1.12 for E. coli (counts):

MAC is none detectable per 100 mL

Note 1.13 for E. coli (MPN):

MAC is none detectable per 100 mL

Note 1.14 for Fecal coliforms (counts):

The GCDWQ does not have a guideline for fecal coliforms. The GCDWQ were revised in 2006 when the guideline for fecal coliforms was deleted, and a guideline for E. coli was added. However the GCDWQ has a guideline for total coliforms that includes the following statement: “The MAC of total coliforms in water leaving a treatment plant in a public system and throughout semi-public and private supply systems is none detectable per 100 mL.” Therefore a guideline of none detectable per 100 mL was used for fecal coliforms for this report.
Note that the Drinking Water Protection Regulation (2003), under the BC Drinking Water Protection Act, has a water quality standard for potable water for fecal coliforms of “No detectable fecal coliform bacteria per 100 ml”

Note 1.15 for Fecal coliforms (MPN):

The GCDWQ does not have a guideline for fecal coliforms. The GCDWQ were revised in 2006 when the guideline for fecal coliforms was deleted, and a guideline for E. coli was added. However the GCDWQ has a guideline for total coliforms that includes the following statement: “The MAC of total coliforms in water leaving a treatment plant in a public system and throughout semi-public and private supply systems is none detectable per 100 mL.” Therefore a guideline of none detectable per 100 mL was used for fecal coliforms for this report.
Note that the Drinking Water Protection Regulation (2003), under the BC Drinking Water Protection Act, has a water quality standard for potable water for fecal coliforms of “No detectable fecal coliform bacteria per 100 ml”

Note 1.16 for Total coliforms (counts):

The maximum acceptable concentration (MAC) of total coliforms in water leaving a treatment plant and in non-disinfected groundwater leaving the well is none detectable per 100 mL.
Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality. Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.

Note 1.17 for Total coliforms (MPN):

The maximum acceptable concentration (MAC) of total coliforms in water leaving a treatment plant and in non-disinfected groundwater leaving the well is none detectable per 100 mL.
Total coliforms should be monitored in the distribution system because they are used to indicate changes in water quality. Detection of total coliforms from consecutive samples from the same site or from more than 10% of the samples collected in a given sampling period should be investigated.

Note 1.18 for Vinyl chloride:

Every effort should be made to maintain vinyl chloride levels in drinking water as low as reasonably achievable.

Note 1.19 for Nitrate + Nitrite (as N):

The MAC for Nitrate (as N) is 10 mg/L

Note 1.20 for Nitrate + Nitrite (as N) (calculated):

The MAC for Nitrate (as N) is 10 mg/L

2. Notes for Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives (GCDWQ AO)

Note 2.1 for pH:

The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.

Note 2.2 for pH:

The operational guideline for pH is a range of 7.0 to 10.5 in finished drinking water.

Note 2.3 for Sulphate:

There may be a laxative effect in some individuals when sulphate levels exceed 500 mg/L. Health authorities should be notified of drinking water sources containing above 500 mg/L.

Note 2.4 for Aluminum (dissolved):

This is an operational guidance value, designed to apply only to drinking water treatment plants using aluminum-based coagulants. The operational guidance value of 0.1 mg/L applies to conventional treatment plants, and 0.2 mg/L applies to other types of treatment systems.

Note 2.5 for Aluminum (total):

This is an operational guidance value, designed to apply only to drinking water treatment plants using aluminum-based coagulants. The operational guidance value of 0.1 mg/L applies to conventional treatment plants, and 0.2 mg/L applies to other types of treatment systems.

3. Notes for BC CSR, Schedule 3.2, Generic Numerical Water Standards for Drinking Water (2017 and updates) (BC CSR DW)

General Notes:

Drinking water standards are for unfiltered samples obtained at the point of consumption. Heavy metals, metalloids and inorganic ions are expressed as total substance concentrations unless otherwise indicated.

Note 3.1 for 1,2-Dichlorobenzene:

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.2 for 1,4-Dichlorobenzene:

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.3 for Monochlorobenzene:

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.4 for Chloride:

Standard to protect against taste and odour concerns.

Note 3.5 for Total cyanide:

To demonstrate compliance with the drinking water (DW) standard, samples for cyanide in water must be analyzed using the appropriate “Cyanide Strong Acid Dissociable (SAD)” analytical method for water specified in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time.

Note 3.6 for Sulphate:

Standard to protect against taste and odour concerns.

Note 3.7 for Bromodichloromethane:

Standard is specific for total trihalomethanes. Sum of the concentrations of bromodichloromethane (BDCM), dibromochloromethane (DBCM), bromoform (tribromomethane) and chloroform (trichloromethane) must not exceed the standard specified.

Note 3.8 for Bromoform:

Standard is specific for total trihalomethanes. Sum of the concentrations of bromodichloromethane (BDCM), dibromochloromethane (DBCM), bromoform (tribromomethane) and chloroform (trichloromethane) must not exceed the standard specified.

Note 3.9 for Chloroform:

Standard is specific for total trihalomethanes. Sum of the concentrations of bromodichloromethane (BDCM), dibromochloromethane (DBCM), bromoform (tribromomethane) and chloroform (trichloromethane) must not exceed the standard specified.

Note 3.10 for Dibromochloromethane:

Standard is specific for total trihalomethanes. Sum of the concentrations of bromodichloromethane (BDCM), dibromochloromethane (DBCM), bromoform (tribromomethane) and chloroform (trichloromethane) must not exceed the standard specified.

Note 3.11 for Total Trihalomethanes (calculated):

Standard is specific for total trihalomethanes. Sum of the concentrations of bromodichloromethane (BDCM), dibromochloromethane (DBCM), tribromomethane (bromoform) and trichloromethane (chloroform) must not exceed the standard specified.

Note 3.12 for Aluminum (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.13 for Aluminum (total):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.14 for Chromium (dissolved):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.

Standard is 50 µg/L for chromium, hexavalent. Standard is 6000 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 3.15 for Chromium (total):

Analytical results for chromium (all species) in water may be used to demonstrate compliance with the standards. Where the standards cannot be met based on analytical results for chromium (all species), chromium speciation may be necessary.

Standard is 50 µg/L for chromium, hexavalent. Standard is 6000 µg/L for chromium, trivalent. The standard of 50 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.

Note 3.16 for Copper (dissolved):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.17 for Copper (total):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.18 for Iron (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups. Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.19 for Iron (total):
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item A6, A7, A8 or A11
(b) item C1, C2, C3, C4 or C6,
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.20 for Manganese (dissolved):
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.21 for Manganese (total):
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as
(a) item B1
(b) item C1, C3 or C4
(c) item D2, D3, D5, or D6
(d) item E4, or
(e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.22 for Sodium (dissolved):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 3.23 for Sodium (total):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 3.24 for Zinc (dissolved):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 3.25 for Zinc (total):
Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

Note 3.26 for Methyl tert-butyl ether (MTBE):

Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.
Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.27 for VHw6-10:

VHw6-10 - Volatile Hydrocarbons (nC6-nC10) in water as defined in the 2015 British Columbia Environmental Laboratory Manual, as updated from time to time. Standard is applicable at all sites, irrespective of water use.

Note 3.28 for Ethylbenzene:

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.29 for Toluene:

Standard may not address aesthetic (organoleptic) concerns related to drinking water quality. Water treatment may be required.

Note 3.30 for Nitrate (as N):

Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 3.31 for Nitrate + Nitrite (as N):

Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Note 3.32 for Nitrate + Nitrite (as N) (calculated):

Where nitrate and nitrite are present, total nitrate plus nitrite-nitrogen should not exceed this value.

Legend for Reports for CSRD Refuse Disposal Sites Water Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
BCAWQG AL	BC Approved Water Quality Guidelines for freshwater aquatic life
BCAWQG ALA	BC Approved Water Quality Guidelines for freshwater aquatic life (30-day average)
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
BCAWQG AL	Highlighted value exceeds BCAWQG AL
BCAWQG ALA	Highlighted value exceeds BCAWQG ALA
SL Criteria Override	Highlighted value exceeds sampling location criteria override

			Sampling Location	Hospital Creek	Kicking Horse
			Date Sampled	04-Dec-18	27-Jun-18
			Lab Sample ID	8120636-06	8062805-03
			Sample Type	Normal	Normal
Analyte	**Unit**	**Guideline**			
		BCAWQG AL	BCAWQG ALA		
Field Results					
Conductivity	µS/cm	NG	NG	360	220
Dissolved oxygen	mg/L	min 5 [1.1]	min 8 [2.1]	13.48	
Dissolved oxygen (percent)	%	NG	NG	92	
Oxidation reduction potential	mV	NG	NG		138
pH		N [1.2]	N [2.2]	7.49	8.48
Temperature	°C	19 [1.3]	19 [2.3]	0.1	10.1
Lab Results					
General					
Alkalinity (bicarbonate, as CaCO3)	mg/L	NG	NG	189	
Alkalinity (carbonate, as CaCO3)	mg/L	NG	NG	<1.0	
Alkalinity (hydroxide, as CaCO3)	mg/L	NG	NG	<1.0	
Alkalinity (phenolphthalein, as CaCO3)	mg/L	NG	NG	<1.0	
Alkalinity (total, as CaCO3)	mg/L	NG	NG	189	
Bicarbonate Alkalinity (as HCO3)	mg/L	NG	NG	230	
Carbonate Alkalinity (as CO3)	mg/L	NG	NG	<0.600	
Hydroxide Alkalinity (as OH)	mg/L	NG	NG	<0.340	
Bromide	mg/L	NG	NG	<0.10	
Chloride	mg/L	600 [1.4]	150 [2.4]	0.97	4.04
Conductivity	µS/cm	NG	NG	382	
Fluoride	mg/L	Calc [1.5]	Calc [2.5]	<0.10	
Hardness, Total (dissolved as CaCO3)	mg/L	NG	NG	205	
pH		N [1.6]	N [2.6]	8.21	
Sulphate	mg/L	Calc [1.7]	Calc [2.7]	28.9	
Total suspended solids	mg/L	N [1.8]	N [2.8]	<5.0	
Turbidity	NTU	N [1.9]	N [2.9]	0.83	
Metals					
Aluminum (dissolved)	mg/L	Calc [1.10]	Calc [2.10]	<0.0050	
Aluminum (total)	mg/L	NG	NG	0.0088	
Antimony (dissolved)	mg/L	NG	NG	<0.00020	
Antimony (total)	mg/L	NG	NG	<0.00020	
Arsenic (dissolved)	mg/L	0.005 [1.11]	0.005 [2.11]	<0.00050	
Arsenic (total)	mg/L	0.005	0.005	<0.00050	
Barium (dissolved)	mg/L	NG	NG	0.0555	
Barium (total)	mg/L	NG	NG	0.0589	
Beryllium (dissolved)	mg/L	NG	NG	<0.00010	
Beryllium (total)	mg/L	NG	NG	<0.00010	
Bismuth (dissolved)	mg/L	NG	NG	<0.00010	
Bismuth (total)	mg/L	NG	NG	<0.00010	
Boron (dissolved)	mg/L	1.2 [1.12]	1.2 [2.12]	0.0091	
Boron (total)	mg/L	1.2	1.2	0.0093	
Cadmium (dissolved)	mg/L	Calc [1.13]	Calc [2.13]	<0.000010	
Cadmium (total)	mg/L	NG	NG	<0.000010	
Calcium (dissolved)	mg/L	NG	NG	53.2	
Calcium (total)	mg/L	NG	NG	52.4	
Chromium (dissolved)	mg/L	NG	NG	<0.00050	
Chromium (total)	mg/L	NG	NG	<0.00050	
Cobalt (dissolved)	mg/L	0.110 [1.14]	0.004 [2.14]	<0.00010	
Cobalt (total)	mg/L	0.110 [1.15]	0.004 [2.15]	<0.00010	
Copper (dissolved)	mg/L	Calc [1.16]	Calc [2.16]	<0.00040	
Copper (total)	mg/L	Calc [1.17]	Calc [2.17]	0.00323	
Iron (dissolved)	mg/L	0.35	0.35	<0.010	
Iron (total)	mg/L	1.0	1.0	<0.010	
Lead (dissolved)	mg/L	Calc [1.18]	Calc [2.18]	<0.00020	
Lead (total)	mg/L	Calc [1.19]	Calc [2.19]	0.00096	
Lithium (dissolved)	mg/L	NG	NG	0.00102	
Lithium (total)	mg/L	NG	NG	0.00107	
Magnesium (dissolved)	mg/L	NG	NG	17.5	
Magnesium (total)	mg/L	NG	NG	18.1	
Manganese (dissolved)	mg/L	Calc [1.20]	Calc [2.20]	<0.00020	
Manganese (total)	mg/L	Calc [1.21]	Calc [2.21]	0.00048	
Mercury (dissolved)	mg/L	0.000020 [1.22]	0.000020 [2.22]	<0.000040	
Mercury (total)	mg/L	0.000020 [1.23]	0.000020 [2.23]	<0.000010	
Molybdenum (dissolved)	mg/L	2 [1.24]	1 [2.24]	0.00036	
Molybdenum (total)	mg/L	2 [1.25]	1 [2.25]	0.0004	
Nickel (dissolved)	mg/L	NG	NG	<0.00040	
Nickel (total)	mg/L	NG	NG	<0.00040	
Selenium (dissolved)	mg/L	0.002 [1.26]	0.002 [2.26]	<0.00050	
Selenium (total)	mg/L	0.002 [1.27]	0.002 [2.27]	<0.00050	
Silicon (dissolved, as Si)	mg/L	NG	NG	3.3	
Silicon (total, as Si)	mg/L	NG	NG	3.3	
Silver (dissolved)	mg/L	Calc [1.28]	Calc [2.28]	<0.000050	
Silver (total)	mg/L	Calc [1.29]	Calc [2.29]	<0.000050	
Sodium (dissolved)	mg/L	NG	NG	1.89	
Sodium (total)	mg/L	NG	NG	1.86	
Strontium (dissolved)	mg/L	NG	NG	0.174	
Strontium (total)	mg/L	NG	NG	0.173	
Sulphur (dissolved)	mg/L	NG	NG	10.8	
Sulphur (total)	mg/L	NG	NG	10.1	
Tellurium (dissolved)	mg/L	NG	NG	<0.00050	
Tellurium (total)	mg/L	NG	NG	<0.00050	
Thallium (dissolved)	mg/L	NG	NG	<0.000020	
Thallium (total)	mg/L	NG	NG	<0.000020	
Thorium (dissolved)	mg/L	NG	NG	<0.00010	
Thorium (total)	mg/L	NG	NG	<0.00010	
Tin (dissolved)	mg/L	NG	NG	<0.00020	
Tin (total)	mg/L	NG	NG	<0.00020	
Titanium (dissolved)	mg/L	NG	NG	<0.0050	
Titanium (total)	mg/L	NG	NG	<0.0050	
Tungsten (dissolved)	mg/L	NG	NG	<0.0010	
Tungsten (total)	mg/L	NG	NG	<0.0010	
Uranium (dissolved)	mg/L	NG	NG	0.000797	
Uranium (total)	mg/L	NG	NG	0.000856	
Vanadium (dissolved)	mg/L	NG	NG	<0.0010	
Vanadium (total)	mg/L	NG	NG	<0.0010	
Zinc (dissolved)	mg/L	Calc [1.30]	Calc [2.30]	<0.0040	
Zinc (total)	mg/L	Calc [1.31]	Calc [2.31]	0.0065	
Zirconium (dissolved)	mg/L	NG	NG	<0.00010	
Zirconium (total)	mg/L	NG	NG	<0.00010	
Nutrients					
Ammonia (total, as N)	mg/L	Calc [1.32]	Calc [2.32]	<0.020	
Nitrate (as N)	mg/L	32.8 [1.33]	3.0 [2.33]	0.052	0.096
Nitrate + Nitrite (as N) (calculated)	mg/L	32.8 [1.34]	3.0 [2.34]	0.052	
Nitrite (as N)	mg/L	Calc [1.35]	Calc [2.35]	<0.010	
Orthophosphate (dissolved, as P)	mg/L	NG	NG	<0.0050	
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	N [1.36]	N [2.36]	<0.050	
Phosphorus (total, by ICPMS/ICPOES)	mg/L	N [1.37]	N [2.37]	<0.050	
Phosphorus (dissolved, APHA 4500-P)	mg/L	N [1.38]	N [2.38]	<0.0020	
Potassium (dissolved)	mg/L	NG	NG	0.47	
Potassium (total)	mg/L	NG	NG	0.45	

Guideline Notes for Reports for CSRD Refuse Disposal Sites Water Quality Results

1. Notes for BC Approved Water Quality Guidelines for freshwater aquatic life (BCAWQG AL)
General Notes:
The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was used. / For some parameters, guidelines are specified as two values: the maximum value or the acute criterion, and the 30-day average value or the chronic criterion. The maximum value was used in this report for parameters that have both guideline values.

Note 1.1 for Dissolved oxygen:
The instantaneous minimum guideline for dissolved oxygen is 5 mg/L for all life stages other than buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in the water column is 9 mg/L for buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in interstitial water is 6 mg/L for buried embryo/alevin.
The 30-day mean guideline (minimum) for dissolved oxygen is 8 mg/L for all life stages other than buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in the water column is 11 mg/L for buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in interstitial water is 8 mg/L for buried embryo/alevin.

Note 1.2 for pH:
pH less than 6.5: No statistically significant decrease in pH from background.
pH from 6.5 to 9.0: Unrestricted change permitted within this range.
pH over 9.0: No statistically significant increase in pH from background.
See BC MOE Overview Report for additional details.

Note 1.3 for Temperature:
The maximum daily temperature of 19 degrees Celsius is for streams with unknown fish distribution. See BC MOE Overview Report for additional details for streams with unknown fish distribution, and specific guidelines for streams with known fish distribution, and guideline for lakes and impoundments.

Note 1.4 for Chloride:
To protect freshwater aquatic life from acute and lethal effects, the maximum concentration of chloride (mg/L as NaCl) at any time should not exceed 600 mg/L.
To protect freshwater aquatic life from chronic effects, the average (arithmetic mean computed from five weekly samples collected over a 30-day period) concentration of chloride (mg/L as NaCl) should not exceed 150 mg/L.

Note 1.5 for Fluoride:
Correction by BC MOE Sept. 2011: The criteria for Fluoride (total) in mg/L is 0.4 as a maximum where the water hardness (as CaCO3) is less than or equal to 10 mg/L. Otherwise use the equation:
LC50 fluoride = -51.73 + 92.57 log10 (Hardness) and multiply by 0.01.
Hardness is as CaCO3 in units mg/L.

Note 1.6 for pH:
pH less than 6.5: No statistically significant decrease in pH from background.
pH from 6.5 to 9.0: Unrestricted change permitted within this range.
pH over 9.0: No statistically significant increase in pH from background.
See BC MOE Overview Report for additional details.

Note 1.7 for Sulphate:
The approved 30-day average (minimum of 5 evenly-spaced samples collected in 30 days) water quality guidelines to protect aquatic life in BC for sulphate are:
128 mg/L at hardness of 0 to 30 mg/L as CaCO3
218 mg/L at hardness of 31 to 75 mg/L as CaCO3
309 mg/L at hardness of 76 to 180mg/L as CaCO3
429 mg/L at hardness 181 to 250 mg/L as CaCO3
Need to determine guideline based on site water for hardness greater than 250 mg/L as CaCO3.
For screening purposes in this report, exceedance were flagged for sulphate greater than 429 mg/L at hardness greater than 250 mg/L as CaCO3.

Note 1.8 for Total suspended solids:
Maximum Induced Suspended Sediments - mg/L or % of background:
- 25 mg/L in 24 hours when background is less than or equal to 25;
- Mean of 5 mg/L in 30 days when background is less than or equal to 25;
- 25 mg/L when background is between 25 and 250;
- 10% when background is greater than or equal to 250. / There are two refuse disposal sites (Revelstoke and Skimikin) where up gradient and down gradient samples have been collected in one water body; therefore, this guideline applies to Revelstoke and Skimikin only.

Note 1.9 for Turbidity:

When background is less than or equal to 8 NTU:
- Maximum Induced Turbidity of 8 NTU in 24 hours.
- For sediment inputs that last between 24 hours and 30 days (daily sampling preferred) the mean turbidity should not exceed background by more than 2 NTU.
Maximum Induced Turbidity of 5 NTU when background is between 8 and 50 NTU.
Maximum Induced Turbidity of 10% when background is greater than 50 NTU. / There are two refuse disposal sites (Revelstoke and Skimikin) where up gradient and down gradient samples have been collected in one water body; therefore, this guideline applies to Revelstoke and Skimikin only.

Note 1.10 for Aluminum (dissolved):
The maximum concentration of dissolved aluminum at any time should not exceed:
1. 0.10 mg/L when the pH is greater than or equal to 6.5
2. The value (in mg/L) determined by the following relationship if pH less than 6.5
Dissolved Aluminum = e (1.209-2.426 (pH) + 0.286 (pH)^2)
The 30-day average concentration of dissolved aluminum (based on a minimum of 5 approximately weekly samples) should not exceed:
1. 0.05 mg/L when the median pH over 30 days is greater than or equal to 6.5
2. the value determined by the following relationship at median pH less than 6.5
Dissolved Aluminum = e (1.6-3.327 (median pH) + 0.402 (median pH)^2)

Note 1.11 for Arsenic (dissolved):
The recommended guideline is for total arsenic.

Note 1.12 for Boron (dissolved):
The recommended guideline is for total boron.

Note 1.13 for Cadmium (dissolved):
The guideline for cadmium is determined on a site-specific basis according to the local water hardness. The guideline for cadmium (dissolved) in µg/L is determined by the following equations for short term exposure:
1. If hardness (as CaCO3) is less than 7 mg/L then maximum is 0.0380 µg/L
2. If hardness (as CaCO3) is from 7 to 45 mg/L then maximum is based on equation:
e to the power of {1.03[ln(hardness)] - 5.274}
3. If hardness (as CaCO3) is greater than 455 mg/L then maximum is 2.8 µg/L.
When water hardness is greater than the upper bound (i.e., highest water hardness tested), a site-specific assessment may be required.

Note 1.14 for Cobalt (dissolved):
The interim maximum concentration for total cobalt is 110 µg/L to protect aquatic life in the freshwater environment from acute effects of cobalt.
The interim 30-day average concentration for total cobalt (based on five weekly samples) is 4 µg/L to protect aquatic life from chronic effects of cobalt.

Note 1.15 for Cobalt (total):
The interim maximum concentration for total cobalt is 110 µg/L to protect aquatic life in the freshwater environment from acute effects of cobalt.
The interim 30-day average concentration for total cobalt (based on five weekly samples) is 4 µg/L to protect aquatic life from chronic effects of cobalt.

Note 1.16 for Copper (dissolved):
The maximum concentration of total copper should not exceed at any time the numerical value (in µg/L) given by the formula "0.094(hardness)+2", where water hardness is reported as mg/L CaCO3.
The 30-day average concentration of total copper (based on a minimum of 5 approximately weekly samples) should not exceed 2 µg/L when average water hardness over the same period (expressed as mg/L CaCO3) is less than 50 mg/L.
When average water hardness is greater than 50 mg/L the 30-day average concentration should not exceed the numerical value (in µg/L) given by the formula "0.04(average hardness)", where water hardness is reported as mg/L CaCO3.

Note 1.17 for Copper (total):
The maximum concentration of total copper should not exceed at any time the numerical value (in µg/L) given by the formula "0.094(hardness)+2", where water hardness is reported as mg/L CaCO3.
The 30-day average concentration of total copper (based on a minimum of 5 approximately weekly samples) should not exceed 2 µg/L when average water hardness over the same period (expressed as mg/L CaCO3) is less than 50 mg/L.
When average water hardness is greater than 50 mg/L the 30-day average concentration should not exceed the numerical value (in µg/L) given by the formula "0.04(average hardness)", where water hardness is reported as mg/L CaCO3.

Note 1.18 for Lead (dissolved):
The maximum guideline for total lead in water, at a water hardness less than or equal to 8 mg/L as CaCO3 is set at 3.0 µg/L. When water hardness exceeds 8.0 mg/L CaCO3 the maximum guideline for lead at any time is given by the following equation:
Maximum Criteria (µg/L) = exp (1.273 ln(hardness) - 1.460).
The 30-day average guideline for total lead in water, when water hardness exceeds 8 mg/L as CaCO3, is as follows:
30-Day Average (µg/L) is less than or equal to 3.31 + exp (1.273 ln (mean hardness) - 4.704).
For hardness less than or equal to 8.0 mg/L there is no 30-day average guideline; hence the maximum concentration of 3.0 ug/L is used.

Note 1.19 for Lead (total):

The maximum guideline for total lead in water, at a water hardness less than or equal to 8 mg/L as CaCO3 is set at 3.0 µg/L. When water hardness exceeds 8.0 mg/L CaCO3 the maximum guideline for lead at any time is given by the following equation:
Maximum Criteria (µg/L) = exp (1.273 ln(hardness) - 1.460).
The 30-day average guideline for total lead in water, when water hardness exceeds 8 mg/L as CaCO3, is as follows:
30-Day Average (µg/L) is less than or equal to 3.31 + exp (1.273 ln (mean hardness) - 4.704).
For hardness less than or equal to 8.0 mg/L there is no 30-day average guideline; hence the maximum concentration of 3.0 µg/L is used.

Note 1.20 for Manganese (dissolved):
The maximum concentration of total manganese in mg/L at any time should not exceed the value as determined by the following relationship:
0.01102 hardness + 0.54
where water hardness is reported as mg/L of CaCO3.
The 30-day mean concentration of total manganese in mg/L should be less than or equal to the value as determined by the following relationship:
0.0044 hardness + 0.605
where water hardness is reported as mg/L of CaCO3

Note 1.21 for Manganese (total):
The maximum concentration of total manganese in mg/L at any time should not exceed the value as determined by the following relationship:
0.01102 hardness + 0.54
where water hardness is reported as mg/L of CaCO3.
The 30-day mean concentration of total manganese in mg/L should be less than or equal to the value as determined by the following relationship:
0.0044 hardness + 0.605
where water hardness is reported as mg/L of CaCO3

Note 1.22 for Mercury (dissolved):
The average concentration of total mercury in water as measured over a 30-day period (based on five weekly samples) should not exceed 0.02 µg/L when the methyl mercury (MeHg) constitutes less than or equal to 0.5% of the total mercury concentration. When the proportion of MeHg is greater than 0.5%, the guideline should be adjusted as indicated in the Table 1 and Table 4 of the BC MOE Overview Report - First Update, February 2001.
There is no guideline maximum for total mercury in water, for freshwater aquatic life.

Note 1.23 for Mercury (total):
The average concentration of total mercury in water as measured over a 30-day period (based on five weekly samples) should not exceed 0.02 µg/L when the methyl mercury (MeHg) constitutes less than or equal to 0.5% of the total mercury concentration. When the proportion of MeHg is greater than 0.5%, the guideline should be adjusted as indicated in the Table 1 and Table 4 of the BC MOE Overview Report - First Update, February 2001.
There is no guideline maximum for total mercury in water, for freshwater aquatic life.

Note 1.24 for Molybdenum (dissolved):
The maximum concentration for total molybdenum is 2 mg/L.
The 30-day average concentration for total molybdenum (based on at least five weekly samples in a period of 30 days) is less than or equal to 1 mg/L.

Note 1.25 for Molybdenum (total):
The maximum concentration for total molybdenum is 2 mg/L.
The 30-day average concentration for total molybdenum (based on at least five weekly samples in a period of 30 days) is less than or equal to 1 mg/L.

Note 1.26 for Selenium (dissolved):
The 30-day average water quality guideline for protection of aquatic life is 2 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.
The 30-day average alert concentration for the protection of aquatic life in sensitive ecosystems is 1 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.

Note 1.27 for Selenium (total):
The 30-day average water quality guideline for protection of aquatic life is 2 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.
The 30-day average alert concentration for the protection of aquatic life in sensitive ecosystems is 1 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.

Note 1.28 for Silver (dissolved):
The guideline maximum for total silver is:
0.1 µg/L maximum if hardness less than or equal to 100 mg/L
3.0 µg/L maximum if hardness greater than 100 mg/L.
The guideline 30-day average for total silver is:
0.05 µg/L as 30-day mean if hardness less than or equal to 100 mg/L
1.5 µg/L as 30-day mean if hardness greater than 100 mg/L.

Note 1.29 for Silver (total):

The guideline maximum for total silver is:
0.1 µg/L maximum if hardness less than or equal to 100 mg/L
3.0 µg/L maximum if hardness greater than 100 mg/L.
The guideline 30-day average for total silver is:
0.05 µg/L as 30-day mean if hardness less than or equal to 100 mg/L
1.5 µg/L as 30-day mean if hardness greater than 100 mg/L

Note 1.30 for Zinc (dissolved):

The Short-term Maximum concentration of total zinc (µg/L) at any time should not exceed 33 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the Short-term Maximum guideline in µg/L for total zinc is the value determined by the following relationship:
33 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
Short-term maximum WQG formula applies to water hardness between 90 – 500 mg/L CaCO3.
The Long-term Average concentration of total zinc (µg/L) at any time should not exceed 7.5 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the Long-term Average guideline in µg/L for total zinc is the value determined by the following relationship:
7.5 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
Long-term average WQG formula applies to water hardness between 90 – 330 mg/L CaCO3

Note 1.31 for Zinc (total):

The maximum concentration of total zinc (µg/L) at any time should not exceed 33 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the guideline maximum in µg/L for total zinc is the value determined by the following relationship:
33 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
The 30-day average concentration of total zinc (µg/L) at any time should not exceed 7.5 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the guideline maximum in µg/L for total zinc is the value determined by the following relationship:
7.5 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.

Note 1.32 for Ammonia (total, as N):

The maximum guideline for ammonia varies as a function of pH and temperature. See Table 3 in Overview Report Update September 2009.
The 30-day average guideline for ammonia varies as a function of pH and temperature. See Table 4 in Overview Report Update September 2009. / The lab pH and field temperature results were used for determining the maximum ammonia for this report. If a lab pH result was not available then the field pH result was used.

Note 1.33 for Nitrate (as N):

The guideline maximum for nitrate (as N) is 32.8 mg/l.
The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.
Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values.

Note 1.34 for Nitrate + Nitrite (as N) (calculated):

The guideline maximum for nitrate (as N) is 32.8 mg/l.
The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.
Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values.

Note 1.35 for Nitrite (as N):

The guideline maximum for nitrite as N is:
0.06 mg/L if chloride less than 2 mg/L
0.12 mg/L if chloride is 2 to 4 mg/L
0.18 mg/L if chloride is 4 to 6 mg/L
0.24 mg/L if chloride is 6 to 8 mg/L
0.30 mg/L if chloride is 8 to 10 mg/L
0.60 mg/L if chloride is greater than 10 mg/L.
The guideline 30-day average for nitrite as N is:
0.02 mg/L if chloride less than 2 mg/L
0.04 mg/L if chloride is 2 to 4 mg/L
0.06 mg/L if chloride is 4 to 6 mg/L
0.08 mg/L if chloride is 6 to 8 mg/L
0.10 mg/L if chloride is 8 to 10 mg/L
0.20 mg/L if chloride is greater than 10 mg/L

Note 1.36 for Phosphorus (dissolved, by ICPMS/ICPOES):

Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

Note 1.37 for Phosphorus (total, by ICPMS/ICPOES):

Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

Note 1.38 for Phosphorus (dissolved, APHA 4500-P):

Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

2. Notes for BC Approved Water Quality Guidelines for freshwater aquatic life (30-day average) (BCAWQG ALA)

General Notes:

The Water Quality Guidelines (Criteria) Reports by BC Ministry of Environment were used as references for the guidelines. (Internet address: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html). Overview Reports (BC MOE) were used as the references for the guidelines unless the note for specific analyte indicates that the Technical Appendix (BC MOE) was used. / For some parameters, guidelines are specified as two values: the maximum value or the acute criterion, and the 30-day average value or the chronic criterion. The 30-day average value was used in this report for parameters that have both guideline values.

Note 2.1 for Dissolved oxygen:

The instantaneous minimum guideline for dissolved oxygen is 5 mg/L for all life stages other than buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in the water column is 9 mg/L for buried embryo/alevin. The instantaneous minimum guideline for dissolved oxygen in interstitial water is 6 mg/L for buried embryo/alevin.
The 30-day mean guideline (minimum) for dissolved oxygen is 8 mg/L for all life stages other than buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in the water column is 11 mg/L for buried embryo/alevin. The 30-day mean guideline (minimum) for dissolved oxygen in interstitial water is 8 mg/L for buried embryo/alevin.

Note 2.2 for pH:

pH less than 6.5: No statistically significant decrease in pH from background.
pH from 6.5 to 9.0: Unrestricted change permitted within this range.
pH over 9.0: No statistically significant increase in pH from background.
See BC MOE Overview Report for additional details.

Note 2.3 for Temperature:

The maximum daily temperature of 19 degrees Celsius is for streams with unknown fish distribution. See BC MOE Overview Report for additional details for streams with unknown fish distribution, and specific guidelines for streams with known fish distribution, and guideline for lakes and impoundments.

Note 2.4 for Chloride:

To protect freshwater aquatic life from acute and lethal effects, the maximum concentration of chloride (mg/L as NaCl) at any time should not exceed 600 mg/L.
To protect freshwater aquatic life from chronic effects, the average (arithmetic mean computed from five weekly samples collected over a 30-day period) concentration of chloride (mg/L as NaCl) should not exceed 150 mg/L.

Note 2.5 for Fluoride:

Correction by BC MOE Sept. 2011: The criteria for Fluoride (total) in mg/L is 0.4 as a maximum where the water hardness (as $CaCO_3$) is less than or equal to 10 mg/L. Otherwise use the equation:
LC50 fluoride = -51.73 + 92.57 log10 (Hardness) and multiply by 0.01.
Hardness is as $CaCO_3$ in units mg/L.

Note 2.6 for pH:

pH less than 6.5: No statistically significant decrease in pH from background.
pH from 6.5 to 9.0: Unrestricted change permitted within this range.
pH over 9.0: No statistically significant increase in pH from background.
See BC MOE Overview Report for additional details.

Note 2.7 for Sulphate:

The approved 30-day average (minimum of 5 evenly-spaced samples collected in 30 days) water quality guidelines to protect aquatic life in BC for sulphate are:
128 mg/L at hardness of 0 to 30 mg/L as $CaCO_3$
218 mg/L at hardness of 31 to 75 mg/L as $CaCO_3$
309 mg/L at hardness of 76 to 180mg/L as $CaCO_3$
429 mg/L at hardness 181 to 250 mg/L as $CaCO_3$
Need to determine guideline based on site water for hardness greater than 250 mg/L as $CaCO_3$.
For screening purposes in this report, exceedance were flagged for sulphate greater than 429 mg/L at hardness greater than 250 mg/L as $CaCO_3$.

Note 2.8 for Total suspended solids:

Maximum Induced Suspended Sediments - mg/L or % of background:
- 25 mg/L in 24 hours when background is less than or equal to 25;
- Mean of 5 mg/L in 30 days when background is less than or equal to 25;
- 25 mg/L when background is between 25 and 250;
- 10% when background is greater than or equal to 250.

Note 2.9 for Turbidity:

When background is less than or equal to 8 NTU:
- Maximum Induced Turbidity of 8 NTU in 24 hours.
- For sediment inputs that last between 24 hours and 30 days (daily sampling preferred) the mean turbidity should not exceed background by more than 2 NTU.

Maximum Induced Turbidity of 5 NTU when background is between 8 and 50 NTU.
Maximum Induced Turbidity of 10% when background is greater than 50 NTU.

Note 2.10 for Aluminum (dissolved):

The maximum concentration of dissolved aluminum at any time should not exceed:
1. 0.10 mg/L when the pH is greater than or equal to 6.5
2. The value (in mg/L) determined by the following relationship if pH less than 6.5

Dissolved Aluminum = e (1.209-2.426 (pH) + 0.286 (pH)²)

The 30-day average concentration of dissolved aluminum (based on a minimum of 5 approximately weekly samples) should not exceed:
1. 0.05 mg/L when the median pH over 30 days is greater than or equal to 6.5
2. the value determined by the following relationship at median pH less than 6.5

Dissolved Aluminum = e (1.6-3.327 (median pH) + 0.402 (median pH)²) / The lab pH results were used for determining the maximum aluminum (dissolved) concentration for this report. If a lab pH result was not available then the field pH result was used.

Note 2.11 for Arsenic (dissolved):

The recommended guideline is for total arsenic.

Note 2.12 for Boron (dissolved):

The recommended guideline is for total boron.

Note 2.13 for Cadmium (dissolved):

The guideline for cadmium is determined on a site-specific basis according to the local water hardness. The guideline for cadmium (dissolved) in µg/L is determined by the following equations for long term exposure:
1. If hardness (as CaCO3) is less than 3.4 mg/L then maximum is 0.0176 µg/L
2. If hardness (as CaCO3) is from 3.4 to 285 mg/L then maximum is based on equation:

e raised to the power of {0.736[ln(hardness)] - 4.943}

3. If hardness (as CaCO3) is greater than 285 mg/L then maximum is 0.457 µg/L.

When water hardness is greater than the upper bound (i.e., highest water hardness tested), a site-specific assessment may be required.

Note 2.14 for Cobalt (dissolved):

The interim maximum concentration for total cobalt is 110 µg/L to protect aquatic life in the freshwater environment from acute effects of cobalt.
The interim 30-day average concentration for total cobalt (based on five weekly samples) is 4 µg/L to protect aquatic life from chronic effects of cobalt.

Note 2.15 for Cobalt (total):

The interim maximum concentration for total cobalt is 110 µg/L to protect aquatic life in the freshwater environment from acute effects of cobalt.
The interim 30-day average concentration for total cobalt (based on five weekly samples) is 4 µg/L to protect aquatic life from chronic effects of cobalt.

Note 2.16 for Copper (dissolved):

The maximum concentration of total copper should not exceed at any time the numerical value (in µg/L) given by the formula "0.094(hardness)+2", where water hardness is reported as mg/L CaCO3.
The 30-day average concentration of total copper (based on a minimum of 5 approximately weekly samples) should not exceed 2 µg/L when average water hardness over the same period (expressed as mg/L CaCO3) is less than 50 mg/L.
When average water hardness is greater than 50 mg/L the 30-day average concentration should not exceed the numerical value (in µg/L) given by the formula "0.04(average hardness)", where water hardness is reported as mg/L CaCO3.

Note 2.17 for Copper (total):

The maximum concentration of total copper should not exceed at any time the numerical value (in µg/L) given by the formula "0.094(hardness)+2", where water hardness is reported as mg/L CaCO3.
The 30-day average concentration of total copper (based on a minimum of 5 approximately weekly samples) should not exceed 2 µg/L when average water hardness over the same period (expressed as mg/L CaCO3) is less than 50 mg/L.
When average water hardness is greater than 50 mg/L the 30-day average concentration should not exceed the numerical value (in µg/L) given by the formula "0.04(average hardness)", where water hardness is reported as mg/L CaCO3.

Note 2.18 for Lead (dissolved):

The maximum guideline for total lead in water, at a water hardness less than or equal to 8 mg/L as CaCO3 is set at 3.0 µg/L. When water hardness exceeds 8.0 mg/L CaCO3 the maximum guideline for lead at any time is given by the following equation:
Maximum Criteria (µg/L) = exp (1.273 ln(hardness) - 1.460).
The 30-day average guideline for total lead in water, when water hardness exceeds 8 mg/L as CaCO3, is as follows:
30-Day Average (µg/L) is less than or equal to 3.31 + exp (1.273 ln (mean hardness) - 4.704).
For hardness less than or equal to 8.0 mg/L there is no 30-day average guideline; hence the maximum concentration of 3.0 µg/L is used.

Note 2.19 for Lead (total):

The maximum guideline for total lead in water, at a water hardness less than or equal to 8 mg/L as CaCO3 is set at 3.0 µg/L. When water hardness exceeds 8.0 mg/L CaCO3 the maximum guideline for lead at any time is given by the following equation:
Maximum Criteria (µg/L) = exp (1.273 ln(hardness) - 1.460).
The 30-day average guideline for total lead in water, when water hardness exceeds 8 mg/L as CaCO3, is as follows:
30-Day Average (µg/L) is less than or equal to 3.31 + exp (1.273 ln (mean hardness) - 4.704).
For hardness less than or equal to 8.0 mg/L there is no 30-day average guideline; hence the maximum concentration of 3.0 µg/L is used.

Note 2.20 for Manganese (dissolved):

The maximum concentration of total manganese in mg/L at any time should not exceed the value as determined by the following relationship:
0.01102 hardness + 0.54
where water hardness is reported as mg/L of CaCO3.
The 30-day mean concentration of total manganese in mg/L should be less than or equal to the value as determined by the following relationship:
0.0044 hardness + 0.605
where water hardness is reported as mg/L of CaCO3.

Note 2.21 for Manganese (total):

The maximum concentration of total manganese in mg/L at any time should not exceed the value as determined by the following relationship:
0.01102 hardness + 0.54
where water hardness is reported as mg/L of CaCO3.
The 30-day mean concentration of total manganese in mg/L should be less than or equal to the value as determined by the following relationship:
0.0044 hardness + 0.605
where water hardness is reported as mg/L of CaCO3.

Note 2.22 for Mercury (dissolved):

The average concentration of total mercury in water as measured over a 30-day period (based on five weekly samples) should not exceed 0.02 µg/L when the methyl mercury (MeHg) constitutes less than or equal to 0.5% of the total mercury concentration. When the proportion of MeHg is greater than 0.5%, the guideline should be adjusted as indicated in the Table 1 and Table 4 of the BC MOE Overview Report - First Update, February 2001.
There is no guideline maximum for total mercury in water, for freshwater aquatic life.

Note 2.23 for Mercury (total):

The average concentration of total mercury in water as measured over a 30-day period (based on five weekly samples) should not exceed 0.02 µg/L when the methyl mercury (MeHg) constitutes less than or equal to 0.5% of the total mercury concentration. When the proportion of MeHg is greater than 0.5%, the guideline should be adjusted as indicated in the Table 1 and Table 4 of the BC MOE Overview Report - First Update, February 2001.
There is no guideline maximum for total mercury in water, for freshwater aquatic life.

Note 2.24 for Molybdenum (dissolved):

The maximum concentration for total molybdenum is 2 mg/L.
The 30-day average concentration for total molybdenum (based on at least five weekly samples in a period of 30 days) is less than or equal to 1 mg/L.

Note 2.25 for Molybdenum (total):

The maximum concentration for total molybdenum is 2 mg/L.
The 30-day average concentration for total molybdenum (based on at least five weekly samples in a period of 30 days) is less than or equal to 1 mg/L.

Note 2.26 for Selenium (dissolved):

The 30-day average water quality guideline for protection of aquatic life is 2 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.
The 30-day average alert concentration for the protection of aquatic life in sensitive ecosystems is 1 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.

Note 2.27 for Selenium (total):

The 30-day average water quality guideline for protection of aquatic life is 2 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.
The 30-day average alert concentration for the protection of aquatic life in sensitive ecosystems is 1 µg/L determined as the mean concentration of 5 evenly spaced samples collected over 30 days, and measured as total selenium.

Note 2.28 for Silver (dissolved):

The guideline maximum for total silver is:
0.1 µg/L maximum if hardness less than or equal to 100 mg/L
3.0 µg/L maximum if hardness greater than 100 mg/L.
The guideline 30-day average for total silver is:
0.05 µg/L as 30-day mean if hardness less than or equal to 100 mg/L
1.5 µg/L as 30-day mean if hardness greater than 100 mg/L

Note 2.29 for Silver (total):

The guideline maximum for total silver is:
0.1 µg/L maximum if hardness less than or equal to 100 mg/L
3.0 µg/L maximum if hardness greater than 100 mg/L.
The guideline 30-day average for total silver is:
0.05 µg/L as 30-day mean if hardness less than or equal to 100 mg/L
1.5 µg/L as 30-day mean if hardness greater than 100 mg/L

Note 2.30 for Zinc (dissolved):

The Short-term Maximum concentration of total zinc (µg/L) at any time should not exceed 33 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the Short-term Maximum guideline in µg/L for total zinc is the value determined by the following relationship:
33 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
Short-term maximum WQG formula applies to water hardness between 90 – 500 mg/L CaCO3.
The Long-term Average concentration of total zinc (µg/L) at any time should not exceed 7.5 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the Long-term Average guideline in µg/L for total zinc is the value determined by the following relationship:
7.5 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
Long-term average WQG formula applies to water hardness between 90 – 330 mg/L CaCO3

Note 2.31 for Zinc (total):

The maximum concentration of total zinc (µg/L) at any time should not exceed 33 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the guideline maximum in µg/L for total zinc is the value determined by the following relationship:
33 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.
The 30-day average concentration of total zinc (µg/L) at any time should not exceed 7.5 µg/L when water hardness is less than or equal to 90 mg/L as CaCO3.
When water hardness exceeds 90 mg/L CaCO3, the guideline maximum in µg/L for total zinc is the value determined by the following relationship:
7.5 + 0.75 * (hardness - 90)
where water hardness is reported as mg/L of CaCO3.

Note 2.32 for Ammonia (total, as N):

The maximum guideline for ammonia varies as a function of pH and temperature. See Table 3 in Overview Report Update September 2009.
The 30-day average guideline for ammonia varies as a function of pH and temperature. See Table 4 in Overview Report Update September 2009. / The lab pH and field temperature results were used for determining the maximum ammonia concentration for this report. If a lab pH result was not available then the field pH result was used.

Note 2.33 for Nitrate (as N):

The guideline maximum for nitrate (as N) is 32.8 mg/l.
The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.
Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values.

Note 2.34 for Nitrate + Nitrite (as N) (calculated):

The guideline maximum for nitrate (as N) is 32.8 mg/l.
The 30-day average guideline for nitrate (as N) is 3.0 mg /L. The 30-day average (chronic) concentration is based on 5 weekly samples collected within a 30-day period.
Where nitrate and nitrite are present, the total nitrate+nitrite nitrogen should not exceed these values.

Note 2.35 for Nitrite (as N):

The guideline maximum for nitrite as N is:
0.06 mg/L if chloride less than 2 mg/L
0.12 mg/L if chloride is 2 to 4 mg/L
0.18 mg/L if chloride is 4 to 6 mg/L
0.24 mg/L if chloride is 6 to 8 mg/L
0.30 mg/L if chloride is 8 to 10 mg/L
0.60 mg/L if chloride is greater than 10 mg/L.
The guideline 30-day average for nitrite as N is:
0.02 mg/L if chloride less than 2 mg/L
0.04 mg/L if chloride is 2 to 4 mg/L
0.06 mg/L if chloride is 4 to 6 mg/L
0.08 mg/L if chloride is 6 to 8 mg/L
0.10 mg/L if chloride is 8 to 10 mg/L
0.20 mg/L if chloride is greater than 10 mg/L

Note 2.36 for Phosphorus (dissolved, by ICPMS/ICPOES):
Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

Note 2.37 for Phosphorus (total, by ICPMS/ICPOES):
Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

Note 2.38 for Phosphorus (dissolved, APHA 4500-P):
Streams: None proposed for streams.
Lakes: It is not possible to specify a single phosphorous concentration to achieve protection of aquatic life in lakes. A range of total phosphorous concentrations (5-15 µg/L) is suggested as the criterion which can be used as the basis for site specific water quality objectives.

Revelstoke Refuse Disposal Site

Replicate Water Samples Report

Sampling Location		MW94-10	MW94-10		MW94-07	MW94-07		MW94-08	MW94-08	MW94-08		MW94-08	MW94-08	MW94-08	
Date Sampled		24-Aug-12	24-Aug-12		13-Nov-13	13-Nov-13		23-Aug-16	23-Aug-16	23-Aug-16		14-Nov-18	14-Nov-18	14-Nov-18	
Lab Sample ID		2081482-08	2081482-19		3110766-05	3110766-10		6081808-06	6081808-07	6081808-08		8111319-01	8111319-02	8111319-03	
Sample Type		Normal	Duplicate		Normal	Duplicate		Normal	Duplicate	Duplicate		Normal	Duplicate	Duplicate	
Analyte	**Unit**			**RPD**			**RPD**				**RPD/RSD**				**RPD/RSD**
Field Results															
Casing Height Above Ground	m	0.66	0.66	0.0%	0.79	0.79	0.0%	0.73	0.73	0.73	0.0%	0.73	0.73	0.73	0.0%
Conductivity	µS/cm	490	490	0.0%	59	59	0.0%	824	824	824	0.0%	499	499	499	0.0%
Depth to Water	m	14.725	14.725	0.0%	1.235	1.235	0.0%	8.955	8.955	8.955	0.0%	7.96	7.69	7.69	2.0%
Dissolved oxygen	mg/L							3.8	3.8	3.8	0.0%	2.94	2.94	2.94	0.0%
Dissolved oxygen (percent)	%							37	37	37	0.0%	24.1	24.1	24.1	0.0%
Elevation of Piezometric Surface	m	449	449	0.0%	460.5	460.5	0.0%	461.73	461.73	461.73	0.0%	462.72	462.99	462.99	0.0%
Elevation of Top of Casing	m	464	464	0.0%	461.73	461.73	0.0%	470.68	470.68	470.68	0.0%	470.68	470.68	470.68	0.0%
Ground Elevation	m	463.34	463.34	0.0%	460.94	460.94	0.0%	469.95	469.95	469.95	0.0%	469.95	469.95	469.95	0.0%
Oxidation reduction potential	mV	59	59	0.0%	180	180	0.0%	78	78	78	0.0%	-115	-115	-115	0.0%
pH		7.59	7.59	0.0%	6.83	6.83	0.0%	6.7	6.7	6.7	0.0%	6.14	6.14	6.14	0.0%
Temperature	°C	10	10	0.0%	8.2	8.2	0.0%	17.6	17.6	17.6	0.0%	7.2	7.2	7.2	0.0%
Lab Results															
General															
Alkalinity (bicarbonate, as CaCO3)	mg/L							296	332	338	7.1%	162	170	171	2.9%
Alkalinity (carbonate, as CaCO3)	mg/L							<1	<1	<1		<1.0	<1.0	<1.0	
Alkalinity (hydroxide, as CaCO3)	mg/L							<1	<1	<1		<1.0	<1.0	<1.0	
Alkalinity (phenolphthalein, as CaCO3)	mg/L							<1	<1	<1		<1.0	<1.0	<1.0	
Alkalinity (total, as CaCO3)	mg/L	283	372	27.2%	64	64	0.0%	296	332	338	7.1%	162	170	171	2.9%
Bicarbonate Alkalinity (as HCO3)	mg/L							361	405	412	7.0%	198	208	209	3.0%
Carbonate Alkalinity (as CO3)	mg/L							<0.6	<0.6	<0.6		<0.600	<0.600	<0.600	
Hydroxide Alkalinity (as OH)	mg/L							<0.3	<0.3	<0.3		<0.340	<0.340	<0.340	
Bromide	mg/L							<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	
Chloride	mg/L	12.1	11.2	7.7%	<0.10	<0.10		10.8	10.8	9.76	5.7%	3.96	3.94	3.98	0.5%
Conductivity	µS/cm	550	576	4.6%	146	146	0.0%	802	834	848	2.8%	477	473	472	0.6%
Fluoride	mg/L							0.12	0.12	<0.10	0.0%	<0.10	<0.10	<0.10	
Hardness, Total (dissolved as CaCO3)	mg/L	187	195	4.2%	57.4	58.1	1.2%	441	451	447	1.1%	194	190	194	1.2%
pH		7.92	7.86	0.8%	7.4	7.45	0.7%	7.36	7.48	7.59	1.5%	7.09	7	6.94	1.1%
Sulphate	mg/L	8.3	14.7	55.7%	8.5	8.4	1.2%	123	116	114	4.0%	91.9	84.9	85.7	4.4%
Total organic carbon	mg/L	8.4	8.3	1.2%	2.1	1.8	15.4%	6.1	6	7.3	11.2%	2.73	2.66	3.1	8.4%
Total suspended solids	mg/L	22900	142000	144.5%	14	9	43.5%	66	15	12	97.9%	<16.7	4.6	4.5	2.2%
Metals															
Aluminum (dissolved)	mg/L	0.018	0.006	100.0%	<0.005	<0.005		<0.005	<0.005	<0.005		0.0054	0.008	<0.0050	38.8%
Antimony (dissolved)	mg/L	0.0004	0.0007	54.5%	0.0003	0.0001	100.0%	0.0002	<0.0001	<0.0001		<0.00020	<0.00020	<0.00020	
Arsenic (dissolved)	mg/L	0.0098	0.0122	21.8%	<0.0005	<0.0005		0.0122	0.0047	0.0039	66.0%	0.00162	0.00159	0.00158	1.3%
Barium (dissolved)	mg/L	0.136	0.151	10.5%	0.027	0.027	0.0%	0.033	0.175	0.167	63.8%	0.0469	0.0464	0.048	1.7%
Beryllium (dissolved)	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.00010	<0.00010	<0.00010	
Bismuth (dissolved)	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.00010	<0.00010	<0.00010	
Boron (dissolved)	mg/L	<0.004	<0.004		0.023	0.022	4.4%	0.232	0.232	0.229	0.7%	0.156	0.148	0.152	2.6%
Cadmium (dissolved)	mg/L	<0.00001	<0.00001		0.00005	0.00005	0.0%	<0.00001	<0.00001	<0.00001		<0.000010	<0.000010	<0.000010	
Calcium (dissolved)	mg/L	57.1	59.5	4.1%	19.7	19.9	1.0%	150	154	152	1.3%	67.8	66.4	67.9	1.2%
Chromium (dissolved)	mg/L	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005		<0.00050	<0.00050	<0.00050	
Cobalt (dissolved)	mg/L	0.00034	0.00033	3.0%	0.00086	0.00083	3.6%	0.00665	0.00488	0.00409	25.2%	0.0132	0.0129	0.0133	1.6%
Copper (dissolved)	mg/L	0.0006	<0.0002		0.0009	0.0008	11.8%	0.0003	0.0005	0.0002	45.8%	0.00053	<0.00040	<0.00040	
Iron (dissolved)	mg/L	0.12	0.07	52.6%	0.142	0.138	2.9%	2.42	3.04	0.578	63.6%	1.42	1.35	1.37	2.6%
Lead (dissolved)	mg/L	0.0001	0.0001	0.0%	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.00020	<0.00020	<0.00020	
Lithium (dissolved)	mg/L	0.0056	0.0063	11.8%	0.0002	0.0002	0.0%	0.0135	0.0114	0.0105	13.0%	0.00276	0.00267	0.00272	1.7%
Magnesium (dissolved)	mg/L	10.7	11.4	6.3%	2.01	2.03	1.0%	16.3	15.9	16.1	1.2%	5.88	5.79	5.97	1.5%
Manganese (dissolved)	mg/L	0.111	0.106	4.6%	3.29	3.28	0.3%	3.74	4.96	4.99	15.6%	5.72	5.58	5.77	1.7%
Mercury (dissolved)	mg/L	0.00016	0.00036	76.9%	<0.00002	<0.00002		<0.00002	<0.00002	<0.00002		<0.000010	<0.000010	<0.000010	
Molybdenum (dissolved)	mg/L	0.0021	0.0032	41.5%	0.0007	0.0008	13.3%	0.002	0.0013	0.001	35.8%	0.00012	<0.00010	<0.00010	
Nickel (dissolved)	mg/L	0.0019	0.0027	34.8%	0.0017	0.0018	5.7%	0.0137	0.0107	0.0096	18.7%	0.0278	0.0276	0.0284	1.5%
Selenium (dissolved)	mg/L	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	<0.0005	<0.0005		<0.00050	<0.00050	<0.00050	
Silicon (dissolved, as Si)	mg/L	4.7	5	6.2%	4.5	4.5	0.0%	19.5	17.3	15.8	10.6%	7.8	7.6	7.8	1.5%
Silver (dissolved)	mg/L	<0.00005	<0.00005		<0.00005	<0.00005		<0.00005	<0.00005	<0.00005		<0.000050	<0.000050	<0.000050	

Revelstoke Refuse Disposal Site

Replicate Water Samples Report

Sampling Location	MW94-10	MW94-10		MW94-07	MW94-07		MW94-08	MW94-08	MW94-08		MW94-08	MW94-08	MW94-08	
Date Sampled	24-Aug-12	24-Aug-12		13-Nov-13	13-Nov-13		23-Aug-16	23-Aug-16	23-Aug-16		14-Nov-18	14-Nov-18	14-Nov-18	
Lab Sample ID	2081482-08	2081482-19		3110766-05	3110766-10		6081808-06	6081808-07	6081808-08		8111319-01	8111319-02	8111319-03	
Sample Type	Normal	Duplicate		Normal	Duplicate		Normal	Duplicate	Duplicate		Normal	Duplicate	Duplicate	
Analyte	**Unit**			**RPD**			**RPD**			**RPD/RSD**				**RPD/RSD**
Sodium (dissolved)	mg/L	53.8	57.5	6.6%	1.68	1.7	1.2%	14.9	15.3	16	3.6%	6.63	6.53	6.65	1.0%
Strontium (dissolved)	mg/L	0.214	0.226	5.5%	0.082	0.082	0.0%	0.822	0.872	0.855	3.0%	0.315	0.31	0.319	1.4%
Sulphur (dissolved)	mg/L	4	5	22.2%	<1	<1		51	48	48	3.5%	31	30.6	31.9	2.1%
Tellurium (dissolved)	mg/L	<0.0002	<0.0002		<0.0002	<0.0002		<0.0002	<0.0002	<0.0002		<0.00050	<0.00050	<0.00050	
Thallium (dissolved)	mg/L	<0.00002	<0.00002		<0.00002	<0.00002		<0.00002	<0.00002	<0.00002		<0.000020	<0.000020	<0.000020	
Thorium (dissolved)	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.00010	<0.00010	<0.00010	
Tin (dissolved)	mg/L	<0.0002	<0.0002		<0.0002	<0.0002		<0.0002	<0.0002	<0.0002		0.00025	0.00035	0.00028	17.5%
Titanium (dissolved)	mg/L	<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005		<0.0050	<0.0050	<0.0050	
Tungsten (dissolved)	mg/L											<0.0010	<0.0010	<0.0010	
Uranium (dissolved)	mg/L	0.00275	0.00512	60.2%	0.00037	0.0004	7.8%	0.00272	0.00443	0.00535	32.0%	0.000292	0.000282	0.00029	1.8%
Vanadium (dissolved)	mg/L	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001		<0.0010	<0.0010	<0.0010	
Zinc (dissolved)	mg/L	<0.004	<0.004		<0.004	0.007		<0.004	<0.004	0.005		0.006	0.0059	0.0058	1.7%
Zirconium (dissolved)	mg/L	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001		<0.00010	<0.00010	<0.00010	
Nutrients															
Ammonia (total, as N)	mg/L	0.153	0.129	17.0%	0.254	0.202	22.8%	1.32	1.41	1.4	3.6%	0.077	0.067	0.099	20.2%
Nitrate (as N)	mg/L	0.05	0.014	112.5%	0.096	0.1	4.1%	0.04	<0.010	<0.010		<0.010	<0.010	<0.010	
Nitrate + Nitrite (as N) (calculated)	mg/L	0.05	<0.014		0.127	0.141	10.4%	0.04	<0.014	<0.014		<0.014	<0.014	<0.014	
Nitrite (as N)	mg/L	<0.010	<0.010		0.031	0.041	27.8%	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	
Total kjeldahl nitrogen	mg/L	6	24.5	121.3%	0.59	1.13	62.8%								
Orthophosphate (dissolved, as P)	mg/L											<0.0050	<0.0050	<0.0050	
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	<0.02	<0.02		<0.02	<0.02		1.64	<0.02	<0.02		<0.050	<0.050	<0.050	
Phosphorus (dissolved, APHA 4500-P)	mg/L											<0.0020	0.0133	0.0025	136.7%
Potassium (dissolved)	mg/L	6.58	7.37	11.3%	3.36	3.41	1.5%	11.5	10.3	9.87	8.0%	9.37	9.2	9.41	1.2%

Appendix D

2018 Water Quality Reports

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8062674
PO NUMBER		**RECEIVED / TEMP**	2018-06-27 08:00 / 4°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12
PROJECT INFO	14-024-01	**COC NUMBER**	B48804

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at jnobrega@caro.ca

Authorized By:

Jessica Nobrega, B.Sc.
Client Service Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (8062674-01) | Matrix: Wastewater | Sampled: 2018-06-26 11:00					
Anions					
Bromide	**0.38**	0.10	mg/L	2018-06-29	
Chloride	**416**	0.10	mg/L	2018-06-29	
Fluoride	**0.27**	0.10	mg/L	2018-06-29	
Nitrate (as N)	**31.3**	0.010	mg/L	2018-06-29	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-29	
Sulfate	**628**	1.0	mg/L	2018-06-29	
General Parameters					
Alkalinity, Total (as CaCO3)	**1050**	1.0	mg/L	2018-06-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Bicarbonate (as CaCO3)	**1050**	1.0	mg/L	2018-06-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Bicarbonate (HCO3)	**1280**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**1.26**	0.020	mg/L	2018-06-28	
Conductivity (EC)	**4060**	2.0	µS/cm	2018-06-28	
pH	**7.39**	0.10	pH units	2018-06-28	HT2
Solids, Total Suspended	**892**	2.0	mg/L	2018-06-28	
Turbidity	**2210**	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1530**	0.824	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.927**	0.0050	mg/L	2018-07-06	
Antimony, dissolved	**0.00116**	0.00020	mg/L	2018-07-06	
Arsenic, dissolved	**0.00117**	0.00050	mg/L	2018-07-06	
Barium, dissolved	**0.0748**	0.0050	mg/L	2018-07-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Boron, dissolved	**1.70**	0.0050	mg/L	2018-07-06	
Cadmium, dissolved	**0.000036**	0.000010	mg/L	2018-07-06	
Calcium, dissolved	**186**	0.20	mg/L	2018-07-06	
Chromium, dissolved	**0.00169**	0.00050	mg/L	2018-07-06	
Cobalt, dissolved	**0.00212**	0.00010	mg/L	2018-07-06	
Copper, dissolved	**0.00664**	0.00040	mg/L	2018-07-06	
Iron, dissolved	**1.43**	0.010	mg/L	2018-07-06	
Lead, dissolved	**0.00191**	0.00020	mg/L	2018-07-06	
Lithium, dissolved	**0.0450**	0.00010	mg/L	2018-07-06	
Magnesium, dissolved	**259**	0.010	mg/L	2018-07-03	
Manganese, dissolved	**0.147**	0.00020	mg/L	2018-07-06	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6S (8062674-01) | Matrix: Wastewater | Sampled: 2018-06-26 11:00, Continued					
Dissolved Metals, Continued					
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-03	
Molybdenum, dissolved	**0.00027**	0.00010	mg/L	2018-07-06	
Nickel, dissolved	**0.0122**	0.00040	mg/L	2018-07-06	
Phosphorus, dissolved	**0.053**	0.050	mg/L	2018-07-06	
Potassium, dissolved	**189**	0.10	mg/L	2018-07-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Silicon, dissolved	**13.8**	1.0	mg/L	2018-07-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-06	
Sodium, dissolved	**261**	0.10	mg/L	2018-07-03	
Strontium, dissolved	**1.65**	0.0010	mg/L	2018-07-06	
Sulfur, dissolved	**266**	3.0	mg/L	2018-07-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Thallium, dissolved	**0.000060**	0.000020	mg/L	2018-07-06	
Thorium, dissolved	**0.00067**	0.00010	mg/L	2018-07-06	
Tin, dissolved	**0.00031**	0.00020	mg/L	2018-07-06	
Titanium, dissolved	**0.0525**	0.0050	mg/L	2018-07-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Uranium, dissolved	**0.00707**	0.000020	mg/L	2018-07-06	
Vanadium, dissolved	**0.0013**	0.0010	mg/L	2018-07-06	
Zinc, dissolved	**0.0229**	0.0040	mg/L	2018-07-06	
Zirconium, dissolved	**0.00083**	0.00010	mg/L	2018-07-06	
DMW - 1b (8062674-02) | Matrix: Water | Sampled: 2018-06-26 12:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-29	
Chloride	**92.2**	0.10	mg/L	2018-06-29	
Fluoride	**1.35**	0.10	mg/L	2018-06-29	
Nitrate (as N)	< 0.010	0.010	mg/L	2018-06-29	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-29	
Sulfate	**117**	1.0	mg/L	2018-06-29	
General Parameters					
Alkalinity, Total (as CaCO3)	**477**	1.0	mg/L	2018-06-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Bicarbonate (as CaCO3)	**477**	1.0	mg/L	2018-06-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Bicarbonate (HCO3)	**582**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.248**	0.020	mg/L	2018-06-28	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW - 1b (8062674-02) | Matrix: Water | Sampled: 2018-06-26 12:30, Continued					
General Parameters, Continued					
Conductivity (EC)	**1150**	2.0	µS/cm	2018-06-28	
pH	**7.80**	0.10	pH units	2018-06-28	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-06-28	
Turbidity	**4.61**	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**613**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0202**	0.0050	mg/L	2018-07-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Arsenic, dissolved	**0.0434**	0.00050	mg/L	2018-07-06	
Barium, dissolved	**0.0225**	0.0050	mg/L	2018-07-06	
Beryllium, dissolved	**0.00011**	0.00010	mg/L	2018-07-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Boron, dissolved	**0.156**	0.0050	mg/L	2018-07-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-07-06	
Calcium, dissolved	**71.2**	0.20	mg/L	2018-07-06	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Cobalt, dissolved	**0.00011**	0.00010	mg/L	2018-07-06	
Copper, dissolved	**0.00069**	0.00040	mg/L	2018-07-06	
Iron, dissolved	**0.381**	0.010	mg/L	2018-07-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Lithium, dissolved	**0.0240**	0.00010	mg/L	2018-07-06	
Magnesium, dissolved	**106**	0.010	mg/L	2018-07-06	
Manganese, dissolved	**0.00808**	0.00020	mg/L	2018-07-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-03	
Molybdenum, dissolved	**0.00027**	0.00010	mg/L	2018-07-06	
Nickel, dissolved	**0.00199**	0.00040	mg/L	2018-07-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-06	
Potassium, dissolved	**5.15**	0.10	mg/L	2018-07-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Silicon, dissolved	**7.7**	1.0	mg/L	2018-07-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-06	
Sodium, dissolved	**29.2**	0.10	mg/L	2018-07-06	
Strontium, dissolved	**1.66**	0.0010	mg/L	2018-07-06	
Sulfur, dissolved	**44.1**	3.0	mg/L	2018-07-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-07-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW - 1b (8062674-02) | Matrix: Water | Sampled: 2018-06-26 12:30, Continued					
Dissolved Metals, Continued					
Uranium, dissolved	**0.000110**	0.000020	mg/L	2018-07-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Zinc, dissolved	**0.0066**	0.0040	mg/L	2018-07-06	
Zirconium, dissolved	**0.00155**	0.00010	mg/L	2018-07-06	
DMW - 4 (8062674-03) | Matrix: Water | Sampled: 2018-06-26 13:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-29	
Chloride	**11.8**	0.10	mg/L	2018-06-29	
Fluoride	**0.71**	0.10	mg/L	2018-06-29	
Nitrate (as N)	**0.243**	0.010	mg/L	2018-06-29	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-29	
Sulfate	**238**	1.0	mg/L	2018-06-29	
General Parameters					
Alkalinity, Total (as CaCO3)	**409**	1.0	mg/L	2018-06-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Bicarbonate (as CaCO3)	**409**	1.0	mg/L	2018-06-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Bicarbonate (HCO3)	**499**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.758**	0.020	mg/L	2018-06-28	
Conductivity (EC)	**1140**	2.0	µS/cm	2018-06-28	
pH	**7.89**	0.10	pH units	2018-06-28	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-06-28	
Turbidity	**0.32**	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**572**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0128**	0.0050	mg/L	2018-07-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Arsenic, dissolved	**0.00124**	0.00050	mg/L	2018-07-06	
Barium, dissolved	**0.0159**	0.0050	mg/L	2018-07-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Boron, dissolved	**0.355**	0.0050	mg/L	2018-07-06	
Cadmium, dissolved	**0.000014**	0.000010	mg/L	2018-07-06	
Calcium, dissolved	**74.9**	0.20	mg/L	2018-07-06	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW - 4 (8062674-03) | Matrix: Water | Sampled: 2018-06-26 13:00, Continued					
Dissolved Metals, Continued					
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Cobalt, dissolved	**0.00080**	0.00010	mg/L	2018-07-06	
Copper, dissolved	**0.00594**	0.00040	mg/L	2018-07-06	
Iron, dissolved	**0.039**	0.010	mg/L	2018-07-06	
Lead, dissolved	**0.00028**	0.00020	mg/L	2018-07-06	
Lithium, dissolved	**0.0456**	0.00010	mg/L	2018-07-06	
Magnesium, dissolved	**93.5**	0.010	mg/L	2018-07-06	
Manganese, dissolved	**0.00585**	0.00020	mg/L	2018-07-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-03	
Molybdenum, dissolved	**0.00062**	0.00010	mg/L	2018-07-06	
Nickel, dissolved	**0.00127**	0.00040	mg/L	2018-07-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-06	
Potassium, dissolved	**8.51**	0.10	mg/L	2018-07-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Silicon, dissolved	**6.8**	1.0	mg/L	2018-07-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-06	
Sodium, dissolved	**44.6**	0.10	mg/L	2018-07-06	
Strontium, dissolved	**4.49**	0.0010	mg/L	2018-07-06	
Sulfur, dissolved	**85.5**	3.0	mg/L	2018-07-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-07-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Uranium, dissolved	**0.000954**	0.000020	mg/L	2018-07-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Zinc, dissolved	**0.0431**	0.0040	mg/L	2018-07-06	
Zirconium, dissolved	**0.00057**	0.00010	mg/L	2018-07-06	
Town Well #4 (8062674-04) | Matrix: Wastewater | Sampled: 2018-06-26 13:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-29	
Chloride	**103**	0.10	mg/L	2018-06-29	
Fluoride	**0.15**	0.10	mg/L	2018-06-29	
Nitrate (as N)	**1.26**	0.010	mg/L	2018-06-29	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-29	
Sulfate	**38.8**	1.0	mg/L	2018-06-29	
General Parameters					
Alkalinity, Total (as CaCO3)	**336**	1.0	mg/L	2018-06-28	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (8062674-04) | Matrix: Wastewater | Sampled: 2018-06-26 13:30, Continued					
General Parameters, Continued					
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Bicarbonate (as CaCO3)	**336**	1.0	mg/L	2018-06-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Bicarbonate (HCO3)	**410**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-06-28	
Conductivity (EC)	**1010**	2.0	µS/cm	2018-06-28	
pH	**7.88**	0.10	pH units	2018-06-28	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-06-28	
Turbidity	< 0.10	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**408**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0057**	0.0050	mg/L	2018-07-06	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Barium, dissolved	**0.196**	0.0050	mg/L	2018-07-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Boron, dissolved	**0.0335**	0.0050	mg/L	2018-07-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-07-06	
Calcium, dissolved	**93.1**	0.20	mg/L	2018-07-06	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Copper, dissolved	**0.00099**	0.00040	mg/L	2018-07-06	
Iron, dissolved	< 0.010	0.010	mg/L	2018-07-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Lithium, dissolved	**0.00226**	0.00010	mg/L	2018-07-06	
Magnesium, dissolved	**42.6**	0.010	mg/L	2018-07-06	
Manganese, dissolved	**0.00162**	0.00020	mg/L	2018-07-06	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-03	
Molybdenum, dissolved	**0.00018**	0.00010	mg/L	2018-07-06	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-07-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-06	
Potassium, dissolved	**1.95**	0.10	mg/L	2018-07-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Silicon, dissolved	**4.9**	1.0	mg/L	2018-07-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-06	
Sodium, dissolved	**57.8**	0.10	mg/L	2018-07-06	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (8062674-04) | Matrix: Wastewater | Sampled: 2018-06-26 13:30, Continued					
Dissolved Metals, Continued					
Strontium, dissolved	**0.492**	0.0010	mg/L	2018-07-06	
Sulfur, dissolved	**16.1**	3.0	mg/L	2018-07-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-07-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Uranium, dissolved	**0.00117**	0.000020	mg/L	2018-07-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Zinc, dissolved	**0.0062**	0.0040	mg/L	2018-07-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Town Well #6 (8062674-05) | Matrix: Wastewater | Sampled: 2018-06-26 14:00					
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-29	
Chloride	**39.7**	0.10	mg/L	2018-06-29	
Fluoride	< 0.10	0.10	mg/L	2018-06-29	
Nitrate (as N)	**0.933**	0.010	mg/L	2018-06-29	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-29	
Sulfate	**25.2**	1.0	mg/L	2018-06-29	
General Parameters					
Alkalinity, Total (as CaCO3)	**288**	1.0	mg/L	2018-06-28	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Bicarbonate (as CaCO3)	**288**	1.0	mg/L	2018-06-28	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-28	
Bicarbonate (HCO3)	**351**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-06-28	
Conductivity (EC)	**702**	2.0	µS/cm	2018-06-28	
pH	**7.93**	0.10	pH units	2018-06-28	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-06-28	
Turbidity	< 0.10	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**328**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0069**	0.0050	mg/L	2018-07-06	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #6 (8062674-05) | Matrix: Wastewater | Sampled: 2018-06-26 14:00, Continued					
Dissolved Metals, Continued					
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Barium, dissolved	**0.133**	0.0050	mg/L	2018-07-06	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Boron, dissolved	**0.0170**	0.0050	mg/L	2018-07-06	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-07-06	
Calcium, dissolved	**85.5**	0.20	mg/L	2018-07-06	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Copper, dissolved	**0.00106**	0.00040	mg/L	2018-07-06	
Iron, dissolved	**0.018**	0.010	mg/L	2018-07-06	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Lithium, dissolved	**0.00132**	0.00010	mg/L	2018-07-06	
Magnesium, dissolved	**27.7**	0.010	mg/L	2018-07-06	
Manganese, dissolved	**0.00229**	0.00020	mg/L	2018-07-06	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-07-03	CT5
Molybdenum, dissolved	**0.00044**	0.00010	mg/L	2018-07-06	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-07-06	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-06	
Potassium, dissolved	**1.01**	0.10	mg/L	2018-07-06	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Silicon, dissolved	**4.3**	1.0	mg/L	2018-07-06	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-06	
Sodium, dissolved	**20.3**	0.10	mg/L	2018-07-06	
Strontium, dissolved	**0.281**	0.0010	mg/L	2018-07-06	
Sulfur, dissolved	**9.8**	3.0	mg/L	2018-07-06	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-06	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-07-06	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-07-06	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-06	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Uranium, dissolved	**0.00100**	0.000020	mg/L	2018-07-06	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-06	
Zinc, dissolved	**0.0052**	0.0040	mg/L	2018-07-06	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-07-06	

Sample Qualifiers:

CT5	This sample has been incorrectly preserved for Mercury analysis
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2011)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2011)	Gravimetry (Dried at 103-105C)	Kelowna
Turbidity in Water	SM 2130 B (2011)	Nephelometry	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8F2347										
Blank (B8F2347-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2347-BLK2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2347-BLK3)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8F2347-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Bromide	3.93	0.10	mg/L	4.00		98	85-115			
Chloride	16.0	0.10	mg/L	16.0		100	90-110			
Fluoride	3.72	0.10	mg/L	4.00		93	88-108			
Nitrate (as N)	3.97	0.010	mg/L	4.00		99	93-108			
Nitrite (as N)	1.99	0.010	mg/L	2.00		100	85-114			
Sulfate	14.9	1.0	mg/L	16.0		93	91-109			
LCS (B8F2347-BS2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	3.89	0.10	mg/L	4.00		97	85-115			
Chloride	16.2	0.10	mg/L	16.0		101	90-110			
Fluoride	3.75	0.10	mg/L	4.00		94	88-108			
Nitrate (as N)	3.99	0.010	mg/L	4.00		100	93-108			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8F2347, Continued										
LCS (B8F2347-BS2), Continued				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Nitrite (as N)	1.93	0.010	mg/L	2.00		96	85-114			
Sulfate	15.6	1.0	mg/L	16.0		97	91-109			
LCS (B8F2347-BS3)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	3.90	0.10	mg/L	4.00		97	85-115			
Chloride	15.9	0.10	mg/L	16.0		100	90-110			
Fluoride	3.88	0.10	mg/L	4.00		97	88-108			
Nitrate (as N)	3.94	0.010	mg/L	4.00		98	93-108			
Nitrite (as N)	1.93	0.010	mg/L	2.00		96	85-114			
Sulfate	14.9	1.0	mg/L	16.0		93	91-109			
Duplicate (B8F2347-DUP3)			**Source: 8062674-05**	Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	< 0.10	0.10	mg/L		< 0.10				10	
Chloride	39.1	0.10	mg/L		39.7			2	10	
Fluoride	< 0.10	0.10	mg/L		< 0.10				10	
Nitrate (as N)	0.908	0.010	mg/L		0.933			3	10	
Nitrite (as N)	< 0.010	0.010	mg/L		< 0.010				6	
Sulfate	25.1	1.0	mg/L		25.2			< 1	6	
Matrix Spike (B8F2347-MS3)			**Source: 8062674-05**	Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	3.91	0.10	mg/L	4.00	< 0.10	97	80-120			
Chloride	57.8	0.10	mg/L	16.0	39.7	113	75-125			
Fluoride	3.59	0.10	mg/L	4.00	< 0.10	88	75-125			
Nitrate (as N)	5.30	0.010	mg/L	4.00	0.933	109	75-125			
Nitrite (as N)	1.93	0.010	mg/L	2.00	< 0.010	97	80-120			
Sulfate	39.9	1.0	mg/L	16.0	25.2	92	75-125			
Anions, Batch B8F2411										
Blank (B8F2411-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2411-BLK2)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2411-BLK3)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8F2411-BS1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	3.87	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8F2411, Continued										
LCS (B8F2411-BS1), Continued				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Fluoride	3.63	0.10	mg/L	4.00		91	88-108			
Nitrate (as N)	3.93	0.010	mg/L	4.00		98	93-108			
Nitrite (as N)	1.97	0.010	mg/L	2.00		99	85-114			
Sulfate	14.7	1.0	mg/L	16.0		92	91-109			
LCS (B8F2411-BS2)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	3.87	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	3.70	0.10	mg/L	4.00		93	88-108			
Nitrate (as N)	3.94	0.010	mg/L	4.00		98	93-108			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-114			
Sulfate	15.1	1.0	mg/L	16.0		94	91-109			
LCS (B8F2411-BS3)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	3.88	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	3.66	0.10	mg/L	4.00		92	88-108			
Nitrate (as N)	3.98	0.010	mg/L	4.00		99	93-108			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-114			
Sulfate	14.7	1.0	mg/L	16.0		92	91-109			
Dissolved Metals, Batch B8F2528										
Blank (B8F2528-BLK1)				Prepared: 2018-07-06, Analyzed: 2018-07-06						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8F2528, Continued										
Blank (B8F2528-BLK1), Continued				Prepared: 2018-07-06, Analyzed: 2018-07-06						
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B8F2528-BS1)				Prepared: 2018-07-06, Analyzed: 2018-07-06						
Aluminum, dissolved	0.0212	0.0050	mg/L	0.0200		106	80-120			
Antimony, dissolved	0.0188	0.00020	mg/L	0.0200		94	80-120			
Arsenic, dissolved	0.0179	0.00050	mg/L	0.0200		89	80-120			
Barium, dissolved	0.0171	0.0050	mg/L	0.0200		86	80-120			
Beryllium, dissolved	0.0176	0.00010	mg/L	0.0200		88	80-120			
Bismuth, dissolved	0.0180	0.00010	mg/L	0.0200		90	80-120			
Boron, dissolved	0.0189	0.0050	mg/L	0.0200		94	80-120			
Cadmium, dissolved	0.0182	0.000010	mg/L	0.0200		91	80-120			
Calcium, dissolved	1.90	0.20	mg/L	2.00		95	80-120			
Chromium, dissolved	0.0174	0.00050	mg/L	0.0200		87	80-120			
Cobalt, dissolved	0.0177	0.00010	mg/L	0.0200		88	80-120			
Copper, dissolved	0.0185	0.00040	mg/L	0.0200		92	80-120			
Iron, dissolved	1.80	0.010	mg/L	2.00		90	80-120			
Lead, dissolved	0.0181	0.00020	mg/L	0.0200		90	80-120			
Lithium, dissolved	0.0186	0.00010	mg/L	0.0200		93	80-120			
Magnesium, dissolved	1.92	0.010	mg/L	2.00		96	80-120			
Manganese, dissolved	0.0176	0.00020	mg/L	0.0200		88	80-120			
Molybdenum, dissolved	0.0175	0.00010	mg/L	0.0200		88	80-120			
Nickel, dissolved	0.0179	0.00040	mg/L	0.0200		89	80-120			
Phosphorus, dissolved	1.82	0.050	mg/L	2.00		91	80-120			
Potassium, dissolved	1.88	0.10	mg/L	2.00		94	80-120			
Selenium, dissolved	0.0197	0.00050	mg/L	0.0200		98	80-120			
Silicon, dissolved	2.0	1.0	mg/L	2.00		98	80-120			
Silver, dissolved	0.0177	0.000050	mg/L	0.0200		89	80-120			
Sodium, dissolved	1.96	0.10	mg/L	2.00		98	80-120			
Strontium, dissolved	0.0173	0.0010	mg/L	0.0200		86	80-120			
Sulfur, dissolved	4.6	3.0	mg/L	5.00		92	80-120			
Tellurium, dissolved	0.0188	0.00050	mg/L	0.0200		94	80-120			
Thallium, dissolved	0.0182	0.000020	mg/L	0.0200		91	80-120			
Thorium, dissolved	0.0177	0.00010	mg/L	0.0200		89	80-120			
Tin, dissolved	0.0185	0.00020	mg/L	0.0200		92	80-120			
Titanium, dissolved	0.0185	0.0050	mg/L	0.0200		92	80-120			
Tungsten, dissolved	0.0172	0.0010	mg/L	0.0200		86	80-120			
Uranium, dissolved	0.0224	0.000020	mg/L	0.0200		112	80-120			
Vanadium, dissolved	0.0168	0.0010	mg/L	0.0200		84	80-120			
Zinc, dissolved	0.0206	0.0040	mg/L	0.0200		103	80-120			
Zirconium, dissolved	0.0194	0.00010	mg/L	0.0200		97	80-120			
Reference (B8F2528-SRM1)				Prepared: 2018-07-06, Analyzed: 2018-07-06						
Aluminum, dissolved	0.221	0.0050	mg/L	0.233		95	79-114			
Antimony, dissolved	0.0417	0.00020	mg/L	0.0430		97	89-123			
Arsenic, dissolved	0.423	0.00050	mg/L	0.438		97	87-113			
Barium, dissolved	3.06	0.0050	mg/L	3.35		91	85-114			
Beryllium, dissolved	0.204	0.00010	mg/L	0.213		96	79-122			
Boron, dissolved	1.59	0.0050	mg/L	1.74		91	79-117			
Cadmium, dissolved	0.212	0.000010	mg/L	0.224		95	89-112			
Calcium, dissolved	7.35	0.20	mg/L	7.69		96	85-120			
Chromium, dissolved	0.413	0.00050	mg/L	0.437		94	87-113			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8F2528, Continued										
Reference (B8F2528-SRM1), Continued				Prepared: 2018-07-06, Analyzed: 2018-07-06						
Cobalt, dissolved	0.122	0.00010	mg/L	0.128		95	90-117			
Copper, dissolved	0.802	0.00040	mg/L	0.844		95	90-115			
Iron, dissolved	1.20	0.010	mg/L	1.29		93	86-112			
Lead, dissolved	0.106	0.00020	mg/L	0.112		95	90-113			
Lithium, dissolved	0.101	0.00010	mg/L	0.104		97	77-127			
Magnesium, dissolved	6.64	0.010	mg/L	6.92		96	84-116			
Manganese, dissolved	0.324	0.00020	mg/L	0.345		94	85-113			
Molybdenum, dissolved	0.393	0.00010	mg/L	0.426		92	87-112			
Nickel, dissolved	0.802	0.00040	mg/L	0.840		95	90-114			
Phosphorus, dissolved	0.450	0.050	mg/L	0.495		91	74-119			
Potassium, dissolved	3.11	0.10	mg/L	3.19		98	78-119			
Selenium, dissolved	0.0343	0.00050	mg/L	0.0331		103	89-123			
Sodium, dissolved	18.5	0.10	mg/L	19.1		97	81-117			
Strontium, dissolved	0.831	0.0010	mg/L	0.916		91	82-111			
Thallium, dissolved	0.0367	0.000020	mg/L	0.0393		93	90-113			
Uranium, dissolved	0.241	0.000020	mg/L	0.266		91	87-113			
Vanadium, dissolved	0.796	0.0010	mg/L	0.869		92	85-110			
Zinc, dissolved	0.853	0.0040	mg/L	0.881		97	88-114			
Dissolved Metals, Batch B8G0044										
Blank (B8G0044-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B8G0044-SRM1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Mercury, dissolved	0.00429	0.000010	mg/L	0.00489		88	80-120			
Dissolved Metals, Batch B8G0053										
Blank (B8G0053-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Mercury, dissolved	< 0.000040	0.000040	mg/L							
LCS (B8G0053-BS1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Mercury, dissolved	0.000844	0.000040	mg/L	0.00100		84	80-120			
General Parameters, Batch B8F2309										
Blank (B8F2309-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8F2309-BLK2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8F2309-BLK3)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
LCS (B8F2309-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	1.00	0.020	mg/L	1.00		100	90-115			
LCS (B8F2309-BS2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	1.04	0.020	mg/L	1.00		104	90-115			
LCS (B8F2309-BS3)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	1.05	0.020	mg/L	1.00		105	90-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8F2309, Continued										
Duplicate (B8F2309-DUP3)		**Source: 8062674-05**		Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	< 0.020	0.020	mg/L		< 0.020				15	
Matrix Spike (B8F2309-MS3)		**Source: 8062674-05**		Prepared: 2018-06-28, Analyzed: 2018-06-28						
Ammonia, Total (as N)	0.262	0.020	mg/L	0.250	< 0.020	101	75-125			
General Parameters, Batch B8F2353										
Blank (B8F2353-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B8F2353-BLK2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B8F2353-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Solids, Total Suspended	91.0	10.0	mg/L	100		91	91-106			
LCS (B8F2353-BS2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Solids, Total Suspended	93.0	10.0	mg/L	100		93	91-106			
General Parameters, Batch B8F2359										
Blank (B8F2359-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	< 0.10	0.10	NTU							
Blank (B8F2359-BLK2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	< 0.10	0.10	NTU							
LCS (B8F2359-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	39.6	0.10	NTU	40.0		99	90-110			
LCS (B8F2359-BS2)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	39.1	0.10	NTU	40.0		98	90-110			
General Parameters, Batch B8F2414										
Blank (B8F2414-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	< 0.10	0.10	NTU							
LCS (B8F2414-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	39.8	0.10	NTU	40.0		100	90-110			
General Parameters, Batch B8F2441										
Blank (B8F2441-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8F2441-BLK2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062674
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-06 16:12

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8F2441, Continued										
Blank (B8F2441-BLK2), Continued				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B8F2441-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Alkalinity, Total (as CaCO3)	101	1.0	mg/L	100		101	92-106			
LCS (B8F2441-BS2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	92-106			
LCS (B8F2441-BS3)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
LCS (B8F2441-BS4)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			
Duplicate (B8F2441-DUP1)	**Source: 8062674-01**			Prepared: 2018-06-28, Analyzed: 2018-06-28						
Alkalinity, Total (as CaCO3)	1100	1.0	mg/L		1050			5	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	1100	1.0	mg/L		1050			5	10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Conductivity (EC)	4060	2.0	µS/cm		4060			< 1	5	
pH	7.40	0.10	pH units		7.39			< 1	4	HT2
Reference (B8F2441-SRM1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
pH	7.01	0.10	pH units	7.01		100	98-102			HT2
Reference (B8F2441-SRM2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
pH	7.01	0.10	pH units	7.01		100	98-102			HT2

QC Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8062805
PO NUMBER		**RECEIVED / TEMP**	2018-06-28 13:00 / 6°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39
PROJECT INFO	14-024-16	**COC NUMBER**	B40971

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

This is a revised report; please refer to Appendix 3 for details.

If you have any questions or concerns, please contact me at jnobrega@caro.ca

Authorized By:

Jessica Nobrega, B.Sc.
Client Service Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Analyzed	Qualifier
MW15-01 (8062805-01) | Matrix: Water | Sampled: 2018-06-26 19:00					PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-30	
Chloride	**105**	0.10	mg/L	2018-06-30	
Fluoride	< 0.10	0.10	mg/L	2018-06-30	
Nitrate (as N)	**0.892**	0.010	mg/L	2018-06-30	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-30	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-07-09	HT1
Sulfate	**43.5**	1.0	mg/L	2018-06-30	
General Parameters					
Alkalinity, Total (as CaCO3)	**330**	1.0	mg/L	2018-06-29	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Alkalinity, Bicarbonate (as CaCO3)	**330**	1.0	mg/L	2018-06-29	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Bicarbonate (HCO3)	**402**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-06-29	
Carbon, Total Organic	**0.9**	0.5	mg/L	2018-07-11	CST2
Conductivity (EC)	**999**	2.0	µS/cm	2018-06-29	
pH	**7.74**	0.10	pH units	2018-06-29	HT2
Solids, Total Suspended	**3.4**	2.0	mg/L	2018-06-29	
Turbidity	**1.41**	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**417**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0154**	0.0050	mg/L	2018-07-04	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-07-04	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Barium, dissolved	**0.152**	0.0050	mg/L	2018-07-04	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Boron, dissolved	**0.0432**	0.0050	mg/L	2018-07-04	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-07-04	
Calcium, dissolved	**91.9**	0.20	mg/L	2018-07-04	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Copper, dissolved	**0.00052**	0.00040	mg/L	2018-07-04	
Iron, dissolved	**0.034**	0.010	mg/L	2018-07-04	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-07-04	
Lithium, dissolved	**0.00523**	0.00010	mg/L	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Analyzed	Qualifier
MW15-01 (8062805-01) | Matrix: Water | Sampled: 2018-06-26 19:00, Continued					PRES
Dissolved Metals, Continued					
Magnesium, dissolved	**45.6**	0.010	mg/L	2018-07-04	
Manganese, dissolved	**0.00291**	0.00020	mg/L	2018-07-04	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-04	
Molybdenum, dissolved	**0.00032**	0.00010	mg/L	2018-07-04	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-07-04	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-04	
Potassium, dissolved	**2.21**	0.10	mg/L	2018-07-04	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Silicon, dissolved	**4.5**	1.0	mg/L	2018-07-04	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-04	
Sodium, dissolved	**56.5**	0.10	mg/L	2018-07-04	
Strontium, dissolved	**0.532**	0.0010	mg/L	2018-07-04	
Sulfur, dissolved	**16.4**	3.0	mg/L	2018-07-04	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-07-04	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-07-04	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-04	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-04	
Uranium, dissolved	**0.00105**	0.000020	mg/L	2018-07-04	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-04	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-07-04	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Microbiological Parameters					
Coliforms, Total (MPN)	< 3.0	3.0	MPN/100 mL	2018-07-09	HT1
Coliforms, Fecal (MPN)	< 3.0	3.0	MPN/100 mL	2018-07-09	HT1
E. coli (MPN)	< 3.0	3.0	MPN/100 mL	2018-07-09	HT1
MW15-01 (8062805-01RE1) | Matrix: Water | Sampled: 2018-06-26 19:00					PRES
General Parameters					
Carbon, Total Organic	**0.71**	0.50	mg/L	2018-07-17	
MW18-10 (8062805-02) | Matrix: Water | Sampled: 2018-06-27 10:30					
Anions					
Bromide	< 0.10	0.10	mg/L	2018-06-30	
Chloride	**314**	0.10	mg/L	2018-06-30	
Fluoride	**0.32**	0.10	mg/L	2018-06-30	
Nitrate (as N)	**12.9**	0.010	mg/L	2018-07-03	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-06-30	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8062805-02) | Matrix: Water | Sampled: 2018-06-27 10:30, Continued					
Anions, Continued					
Sulfate	**89.5**	1.0	mg/L	2018-07-03	
General Parameters					
Alkalinity, Total (as CaCO3)	**667**	1.0	mg/L	2018-06-29	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Alkalinity, Bicarbonate (as CaCO3)	**667**	1.0	mg/L	2018-06-29	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-06-29	
Bicarbonate (HCO3)	**813**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**1.80**	0.020	mg/L	2018-06-29	
Conductivity (EC)	**2390**	2.0	µS/cm	2018-06-29	
pH	**7.81**	0.10	pH units	2018-06-29	HT2
Solids, Total Suspended	**264**	2.0	mg/L	2018-06-29	
Turbidity	**267**	0.10	NTU	2018-06-28	
Calculated Parameters					
Hardness, Total (as CaCO3)	**911**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0126**	0.0050	mg/L	2018-07-04	
Antimony, dissolved	**0.00070**	0.00020	mg/L	2018-07-04	
Arsenic, dissolved	**0.00269**	0.00050	mg/L	2018-07-04	
Barium, dissolved	**0.140**	0.0050	mg/L	2018-07-04	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Boron, dissolved	**0.187**	0.0050	mg/L	2018-07-04	
Cadmium, dissolved	**0.000032**	0.000010	mg/L	2018-07-04	
Calcium, dissolved	**136**	0.20	mg/L	2018-07-04	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Cobalt, dissolved	**0.00273**	0.00010	mg/L	2018-07-04	
Copper, dissolved	**0.00242**	0.00040	mg/L	2018-07-04	
Iron, dissolved	**0.038**	0.010	mg/L	2018-07-04	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-07-04	
Lithium, dissolved	**0.0294**	0.00010	mg/L	2018-07-04	
Magnesium, dissolved	**138**	0.010	mg/L	2018-07-04	
Manganese, dissolved	**0.168**	0.00020	mg/L	2018-07-04	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-07-04	
Molybdenum, dissolved	**0.00287**	0.00010	mg/L	2018-07-04	
Nickel, dissolved	**0.0355**	0.00040	mg/L	2018-07-04	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-07-04	
Potassium, dissolved	**13.7**	0.10	mg/L	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8062805-02) | Matrix: Water | Sampled: 2018-06-27 10:30, Continued					
Dissolved Metals, Continued					
Selenium, dissolved	**0.00109**	0.00050	mg/L	2018-07-04	
Silicon, dissolved	**8.5**	1.0	mg/L	2018-07-04	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-07-04	
Sodium, dissolved	**168**	0.10	mg/L	2018-07-04	
Strontium, dissolved	**0.842**	0.0010	mg/L	2018-07-04	
Sulfur, dissolved	**37.5**	3.0	mg/L	2018-07-04	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-07-04	
Thallium, dissolved	**0.000088**	0.000020	mg/L	2018-07-04	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-07-04	
Tin, dissolved	**0.00077**	0.00020	mg/L	2018-07-04	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-07-04	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-07-04	
Uranium, dissolved	**0.00902**	0.000020	mg/L	2018-07-04	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-07-04	
Zinc, dissolved	**0.0065**	0.0040	mg/L	2018-07-04	
Zirconium, dissolved	**0.00060**	0.00010	mg/L	2018-07-04	
Kicking Horse (8062805-03) | Matrix: Water | Sampled: 2018-06-27 17:00					
Anions					
Chloride	**4.04**	0.10	mg/L	2018-06-30	
Nitrate (as N)	**0.096**	0.010	mg/L	2018-06-30	
MW18-11 360 ft. (8062805-04) | Matrix: Soil | Sampled: 2018-06-27					
General Parameters					
Bromide, Water-Soluble	< 5.00	0.50	mg/kg dry	2018-07-16	
Chloride, Water-Soluble	**15.6**	1.0	mg/kg dry	2018-07-16	
Fluoride, Water-Soluble	< 5.00	0.50	mg/kg dry	2018-07-16	
Moisture	**17.1**	1.0	% wet	2018-07-11	
Nitrate, Water-Soluble (as N)	< 0.500	0.050	mg/kg dry	2018-07-16	
Nitrite, Water-Soluble (as N)	< 0.500	0.050	mg/kg dry	2018-07-16	
Phosphorus, Total (as P)	**48.9**	1.0	mg/kg dry	2018-07-16	HT1
Sulfate, Water-Soluble	**69.3**	5.0	mg/kg dry	2018-07-16	
Strong Acid Leachable Metals					
Aluminum	**16300**	40	mg/kg dry	2018-07-04	
Antimony	**0.41**	0.10	mg/kg dry	2018-07-04	
Arsenic	**4.77**	0.30	mg/kg dry	2018-07-04	
Barium	**104**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.37**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.15**	0.10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-11 360 ft. (8062805-04) | Matrix: Soil | Sampled: 2018-06-27, Continued					
Strong Acid Leachable Metals, Continued					
Boron	**2.2**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.050**	0.040	mg/kg dry	2018-07-04	
Calcium	**123000**	100	mg/kg dry	2018-07-04	
Chromium	**20.1**	1.0	mg/kg dry	2018-07-04	
Cobalt	**10.2**	0.10	mg/kg dry	2018-07-04	
Copper	**40.2**	0.40	mg/kg dry	2018-07-04	
Iron	**27100**	20	mg/kg dry	2018-07-04	
Lead	**14.4**	0.20	mg/kg dry	2018-07-04	
Lithium	**21.9**	0.10	mg/kg dry	2018-07-04	
Magnesium	**29600**	10	mg/kg dry	2018-07-04	
Manganese	**509**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.084**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**2.02**	0.10	mg/kg dry	2018-07-04	
Nickel	**22.5**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**571**	10	mg/kg dry	2018-07-04	
Potassium	**963**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**183**	50	mg/kg dry	2018-07-04	
Strontium	**277**	0.20	mg/kg dry	2018-07-04	
Sulfur	**4180**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**7.55**	0.50	mg/kg dry	2018-07-04	
Tin	**0.26**	0.20	mg/kg dry	2018-07-04	
Titanium	**109**	1.0	mg/kg dry	2018-07-04	
Tungsten	**0.23**	0.20	mg/kg dry	2018-07-04	
Uranium	**0.567**	0.050	mg/kg dry	2018-07-04	
Vanadium	**12.0**	1.0	mg/kg dry	2018-07-04	
Zinc	**63.2**	2.0	mg/kg dry	2018-07-04	
Zirconium	**4.3**	2.0	mg/kg dry	2018-07-04	

Sample Qualifiers:

CST2	Carbon, Total Organic in Water (Sublet)
HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
PRES	Sample has been preserved for Micro, TOC in the laboratory and the holding time has been extended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
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Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Soil	Carter 15.2.2 / SM 4110 B (2011)	Fixed Ratio H2O Ext (1:5) / Ion Chromatography	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Carbon, Total Organic in Water	SM 5310 B (2011)	Combustion, Infrared CO2 Detection	Kelowna
Coliforms, Fecal in Water	SM 9221 E (2006)	Most Probable Number / Multiple-Tube Fermentation	Kelowna
Coliforms, Total in Water	SM 9221 B (2006)	Most Probable Number / Multiple-Tube Fermentation	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
E. coli in Water	SM 9221 (2006)	Most Probable Number / Multiple-Tube Fermentation	Kelowna
Hardness in Water	SM 2340 B (2011)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Moisture in Soil	ASTM D2974-87*	Gravimetry (Dried at 105C)	N/A
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Phosphorus, Total in Soil	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
SALM in Soil	BCMOE SALM V.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Solids, Total Suspended in Water	SM 2540 D* (2011)	Gravimetry (Dried at 103-105C)	Kelowna
Turbidity in Water	SM 2130 B (2011)	Nephelometry	Kelowna

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
% wet	Percent (as received basis)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/kg dry	Milligrams per kilogram (dry weight basis)
mg/L	Milligrams per litre
MPN/100 mL	Most Probable Number per 100 millilitres
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, ph > 7 = basic
µS/cm	Microsiemens per centimetre
ASTM	ASTM International Test Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
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General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in fibatchesfl and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8F2411										
Blank (B8F2411-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2411-BLK2)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8F2411-BLK3)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8F2411-BS1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Bromide	3.87	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	3.63	0.10	mg/L	4.00		91	88-108			
Nitrate (as N)	3.93	0.010	mg/L	4.00		98	93-108			
Nitrite (as N)	1.97	0.010	mg/L	2.00		99	85-114			
Sulfate	14.7	1.0	mg/L	16.0		92	91-109			
LCS (B8F2411-BS2)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	3.87	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	3.70	0.10	mg/L	4.00		93	88-108			
Nitrate (as N)	3.94	0.010	mg/L	4.00		98	93-108			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8F2411, Continued										
LCS (B8F2411-BS2), Continued				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-114			
Sulfate	15.1	1.0	mg/L	16.0		94	91-109			
LCS (B8F2411-BS3)				Prepared: 2018-06-30, Analyzed: 2018-06-30						
Bromide	3.88	0.10	mg/L	4.00		97	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	3.66	0.10	mg/L	4.00		92	88-108			
Nitrate (as N)	3.98	0.010	mg/L	4.00		99	93-108			
Nitrite (as N)	1.96	0.010	mg/L	2.00		98	85-114			
Sulfate	14.7	1.0	mg/L	16.0		92	91-109			
Anions, Batch B8G0485										
Blank (B8G0485-BLK1)				Prepared: 2018-07-08, Analyzed: 2018-07-08						
Phosphate (as P)	< 0.0050	0.0050	mg/L							
LCS (B8G0485-BS1)				Prepared: 2018-07-08, Analyzed: 2018-07-08						
Phosphate (as P)	0.976	0.0050	mg/L	1.00		98	80-120			
Dissolved Metals, Batch B8G0057										
Blank (B8G0057-BLK1)				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8G0057, Continued										
Blank (B8G0057-BLK1), Continued				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B8G0057-BS1)				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Aluminum, dissolved	0.0215	0.0050	mg/L	0.0200		108	80-120			
Antimony, dissolved	0.0199	0.00020	mg/L	0.0200		100	80-120			
Arsenic, dissolved	0.0179	0.00050	mg/L	0.0200		90	80-120			
Barium, dissolved	0.0181	0.0050	mg/L	0.0200		91	80-120			
Beryllium, dissolved	0.0193	0.00010	mg/L	0.0200		96	80-120			
Bismuth, dissolved	0.0197	0.00010	mg/L	0.0200		99	80-120			
Boron, dissolved	0.0220	0.0050	mg/L	0.0200		110	80-120			
Cadmium, dissolved	0.0185	0.000010	mg/L	0.0200		92	80-120			
Calcium, dissolved	2.15	0.20	mg/L	2.00		107	80-120			
Chromium, dissolved	0.0180	0.00050	mg/L	0.0200		90	80-120			
Cobalt, dissolved	0.0188	0.00010	mg/L	0.0200		94	80-120			
Copper, dissolved	0.0199	0.00040	mg/L	0.0200		100	80-120			
Iron, dissolved	1.94	0.010	mg/L	2.00		97	80-120			
Lead, dissolved	0.0191	0.00020	mg/L	0.0200		96	80-120			
Lithium, dissolved	0.0193	0.00010	mg/L	0.0200		97	80-120			
Magnesium, dissolved	2.02	0.010	mg/L	2.00		101	80-120			
Manganese, dissolved	0.0184	0.00020	mg/L	0.0200		92	80-120			
Molybdenum, dissolved	0.0183	0.00010	mg/L	0.0200		91	80-120			
Nickel, dissolved	0.0187	0.00040	mg/L	0.0200		93	80-120			
Phosphorus, dissolved	1.85	0.050	mg/L	2.00		92	80-120			
Potassium, dissolved	1.94	0.10	mg/L	2.00		97	80-120			
Selenium, dissolved	0.0180	0.00050	mg/L	0.0200		90	80-120			
Silicon, dissolved	2.0	1.0	mg/L	2.00		100	80-120			
Silver, dissolved	0.0187	0.000050	mg/L	0.0200		93	80-120			
Sodium, dissolved	2.01	0.10	mg/L	2.00		101	80-120			
Strontium, dissolved	0.0183	0.0010	mg/L	0.0200		91	80-120			
Sulfur, dissolved	4.6	3.0	mg/L	5.00		92	80-120			
Tellurium, dissolved	0.0184	0.00050	mg/L	0.0200		92	80-120			
Thallium, dissolved	0.0194	0.000020	mg/L	0.0200		97	80-120			
Thorium, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Tin, dissolved	0.0197	0.00020	mg/L	0.0200		99	80-120			
Titanium, dissolved	0.0191	0.0050	mg/L	0.0200		96	80-120			
Tungsten, dissolved	0.0202	0.0010	mg/L	0.0200		101	80-120			
Uranium, dissolved	0.0211	0.000020	mg/L	0.0200		106	80-120			
Vanadium, dissolved	0.0176	0.0010	mg/L	0.0200		88	80-120			
Zinc, dissolved	0.0219	0.0040	mg/L	0.0200		109	80-120			
Zirconium, dissolved	0.0195	0.00010	mg/L	0.0200		98	80-120			
Reference (B8G0057-SRM1)				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Aluminum, dissolved	0.234	0.0050	mg/L	0.233		100	79-114			
Antimony, dissolved	0.0441	0.00020	mg/L	0.0430		103	89-123			
Arsenic, dissolved	0.435	0.00050	mg/L	0.438		99	87-113			
Barium, dissolved	3.33	0.0050	mg/L	3.35		99	85-114			
Beryllium, dissolved	0.218	0.00010	mg/L	0.213		102	79-122			
Boron, dissolved	1.60	0.0050	mg/L	1.74		92	79-117			
Cadmium, dissolved	0.220	0.000010	mg/L	0.224		98	89-112			
Calcium, dissolved	7.71	0.20	mg/L	7.69		100	85-120			
Chromium, dissolved	0.426	0.00050	mg/L	0.437		97	87-113			
Cobalt, dissolved	0.130	0.00010	mg/L	0.128		102	90-117			
Copper, dissolved	0.855	0.00040	mg/L	0.844		101	90-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
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Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8G0057, Continued										
Reference (B8G0057-SRM1), Continued				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Iron, dissolved	1.29	0.010	mg/L	1.29		100	86-112			
Lead, dissolved	0.110	0.00020	mg/L	0.112		98	90-113			
Lithium, dissolved	0.105	0.00010	mg/L	0.104		101	77-127			
Magnesium, dissolved	7.02	0.010	mg/L	6.92		101	84-116			
Manganese, dissolved	0.342	0.00020	mg/L	0.345		99	85-113			
Molybdenum, dissolved	0.414	0.00010	mg/L	0.426		97	87-112			
Nickel, dissolved	0.844	0.00040	mg/L	0.840		101	90-114			
Phosphorus, dissolved	0.504	0.050	mg/L	0.495		102	74-119			
Potassium, dissolved	3.15	0.10	mg/L	3.19		99	78-119			
Selenium, dissolved	0.0320	0.00050	mg/L	0.0331		97	89-123			
Sodium, dissolved	18.7	0.10	mg/L	19.1		98	81-117			
Strontium, dissolved	0.894	0.0010	mg/L	0.916		98	82-111			
Thallium, dissolved	0.0394	0.000020	mg/L	0.0393		100	90-113			
Uranium, dissolved	0.253	0.000020	mg/L	0.266		95	87-113			
Vanadium, dissolved	0.836	0.0010	mg/L	0.869		96	85-110			
Zinc, dissolved	0.876	0.0040	mg/L	0.881		99	88-114			
Dissolved Metals, Batch B8G0148										
Blank (B8G0148-BLK1)				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B8G0148-SRM1)				Prepared: 2018-07-04, Analyzed: 2018-07-04						
Mercury, dissolved	0.00425	0.000010	mg/L	0.00489		87	80-120			
General Parameters, Batch B8F2414										
Blank (B8F2414-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	< 0.10	0.10	NTU							
LCS (B8F2414-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Turbidity	39.8	0.10	NTU	40.0		100	90-110			
General Parameters, Batch B8F2426										
Blank (B8F2426-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
LCS (B8F2426-BS1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Ammonia, Total (as N)	1.02	0.020	mg/L	1.00		102	90-115			
General Parameters, Batch B8F2441										
Blank (B8F2441-BLK1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8F2441-BLK2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8F2441, Continued										
Blank (B8F2441-BLK2), Continued				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B8F2441-BS1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Alkalinity, Total (as CaCO3)	101	1.0	mg/L	100		101	92-106			
LCS (B8F2441-BS2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	92-106			
LCS (B8F2441-BS3)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
LCS (B8F2441-BS4)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			
Duplicate (B8F2441-DUP2)		**Source: 8062805-01**		Prepared: 2018-06-29, Analyzed: 2018-06-29						
Alkalinity, Total (as CaCO3)	339	1.0	mg/L		330			3	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	339	1.0	mg/L		330			3	10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Conductivity (EC)	1000	2.0	µS/cm		999			< 1	5	
pH	7.78	0.10	pH units		7.74			< 1	4	HT2
Reference (B8F2441-SRM1)				Prepared: 2018-06-28, Analyzed: 2018-06-28						
pH	7.01	0.10	pH units	7.01		100	98-102			HT2
Reference (B8F2441-SRM2)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
pH	7.01	0.10	pH units	7.01		100	98-102			HT2
General Parameters, Batch B8F2454										
Blank (B8F2454-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B8F2454-BS1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Solids, Total Suspended	99.0	10.0	mg/L	100		99	91-106			
Reference (B8F2454-SRM1)				Prepared: 2018-06-29, Analyzed: 2018-06-29						
Solids, Total Suspended	308	20.0	mg/L	328		94	80-120			
General Parameters, Batch B8G0726										
Blank (B8G0726-BLK1)				Prepared: 2018-07-13, Analyzed: 2018-07-13						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Blank (B8G0726-BLK2)				Prepared: 2018-07-13, Analyzed: 2018-07-13						
Carbon, Total Organic	< 0.50	0.50	mg/L							
LCS (B8G0726-BS1)				Prepared: 2018-07-13, Analyzed: 2018-07-13						
Carbon, Total Organic	9.23	0.50	mg/L	10.0		92	78-116			
LCS (B8G0726-BS2)				Prepared: 2018-07-13, Analyzed: 2018-07-13						
Carbon, Total Organic	9.24	0.50	mg/L	10.0		92	78-116			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8G1073										
Blank (B8G1073-BLK1)				Prepared: 2018-07-13, Analyzed: 2018-07-15						
Bromide, Water-Soluble	< 0.50	0.50	mg/kg dry							
Chloride, Water-Soluble	< 1.0	1.0	mg/kg dry							
Fluoride, Water-Soluble	< 0.50	0.50	mg/kg dry							
Nitrate, Water-Soluble (as N)	< 0.050	0.050	mg/kg dry							
Nitrite, Water-Soluble (as N)	< 0.050	0.050	mg/kg dry							
Sulfate, Water-Soluble	< 5.0	5.0	mg/kg dry							
LCS (B8G1073-BS1)				Prepared: 2018-07-13, Analyzed: 2018-07-16						
Chloride, Water-Soluble	15.9	1.0	mg/kg dry	16.0		99	90-109			
Fluoride, Water-Soluble	3.99	0.50	mg/kg dry	4.00		100	89-108			
Nitrate, Water-Soluble (as N)	4.00	0.050	mg/kg dry	4.00		100	93-110			
Nitrite, Water-Soluble (as N)	1.89	0.050	mg/kg dry	2.00		94	86-111			
Sulfate, Water-Soluble	15.8	5.0	mg/kg dry	16.0		99	80-120			
Duplicate (B8G1073-DUP1)		**Source: 8062805-04**		Prepared: 2018-07-13, Analyzed: 2018-07-16						
Bromide, Water-Soluble	< 0.50	0.50	mg/kg dry		< 5.00				30	
Chloride, Water-Soluble	15.5	1.0	mg/kg dry		15.6			< 1	18	
Fluoride, Water-Soluble	1.73	0.50	mg/kg dry		< 5.00				28	
Nitrate, Water-Soluble (as N)	0.397	0.050	mg/kg dry		< 0.500			< 1	20	
Nitrite, Water-Soluble (as N)	< 0.050	0.050	mg/kg dry		< 0.500				14	
Sulfate, Water-Soluble	69.9	5.0	mg/kg dry		69.3			< 1	21	
General Parameters, Batch B8G1153										
Blank (B8G1153-BLK1)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Blank (B8G1153-BLK2)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
Blank (B8G1153-BLK3)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	< 0.50	0.50	mg/L							
LCS (B8G1153-BS1)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	9.88	0.50	mg/L	10.0		99	78-116			
LCS (B8G1153-BS2)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	9.15	0.50	mg/L	10.0		92	78-116			
LCS (B8G1153-BS3)				Prepared: 2018-07-17, Analyzed: 2018-07-17						
Carbon, Total Organic	9.15	0.50	mg/L	10.0		92	78-116			
General Parameters, Batch B8G1215										
Blank (B8G1215-BLK1)				Prepared: 2018-07-16, Analyzed: 2018-07-16						
Phosphorus, Total (as P)	< 1.0	1.0	mg/kg wet							
Duplicate (B8G1215-DUP1)		**Source: 8062805-04**		Prepared: 2018-07-16, Analyzed: 2018-07-16						
Phosphorus, Total (as P)	51.4	1.0	mg/kg dry		48.9				24	
Reference (B8G1215-SRM1)				Prepared: 2018-07-16, Analyzed: 2018-07-16						
Phosphorus, Total (as P)	2730	485	mg/kg wet	2850		96	27.5-154			
Microbiological Parameters, Batch B8G0587										

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REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Microbiological Parameters, Batch B8G0587, Continued										
Blank (B8G0587-BLK1)				Prepared: 2018-07-09, Analyzed: 2018-07-09						
Coliforms, Total (MPN)	< 3.0	3.0	MPN/100 mL							
Coliforms, Fecal (MPN)	< 3.0	3.0	MPN/100 mL							
E. coli (MPN)	< 3.0	3.0	MPN/100 mL							
Duplicate (B8G0587-DUP1)				**Source: 8062805-01**	Prepared: 2018-07-09, Analyzed: 2018-07-09					
Coliforms, Total (MPN)	< 3.0	3.0	MPN/100 mL		< 3.0				136	
Coliforms, Fecal (MPN)	< 3.0	3.0	MPN/100 mL		< 3.0				107	
E. coli (MPN)	< 3.0	3.0	MPN/100 mL		< 3.0				133	
Strong Acid Leachable Metals, Batch B8G0020										
Blank (B8G0020-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
Blank (B8G0020-BLK2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Blank (B8G0020-BLK2), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
LCS (B8G0020-BS1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Antimony	2.17	0.10	mg/kg dry	2.00		109	80-120			
Arsenic	1.66	0.30	mg/kg dry	2.00		83	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		86	80-120			
Beryllium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Bismuth	1.87	0.10	mg/kg dry	2.00		93	80-120			
Boron	2.2	2.0	mg/kg dry	2.00		108	80-120			
Cadmium	1.79	0.040	mg/kg dry	2.00		90	80-120			
Calcium	191	100	mg/kg dry	200		95	80-120			
Chromium	1.8	1.0	mg/kg dry	2.00		88	80-120			
Cobalt	1.82	0.10	mg/kg dry	2.00		91	80-120			
Copper	1.95	0.40	mg/kg dry	2.00		97	80-120			
Iron	187	20	mg/kg dry	200		93	80-120			
Lead	2.13	0.20	mg/kg dry	2.00		107	80-120			
Lithium	2.01	0.10	mg/kg dry	2.00		101	80-120			
Magnesium	209	10	mg/kg dry	200		104	80-120			
Manganese	1.75	0.40	mg/kg dry	2.00		87	80-120			
Mercury	0.088	0.040	mg/kg dry	0.100		88	80-120			
Molybdenum	1.99	0.10	mg/kg dry	2.00		100	80-120			
Nickel	1.78	0.60	mg/kg dry	2.00		89	80-120			
Phosphorus	188	10	mg/kg dry	200		94	80-120			
Potassium	199	40	mg/kg dry	200		100	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
LCS (B8G0020-BS1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Selenium	1.83	0.20	mg/kg dry	2.00		92	80-120			
Silver	1.86	0.10	mg/kg dry	2.00		93	80-120			
Sodium	217	50	mg/kg dry	240		90	80-120			
Strontium	1.74	0.20	mg/kg dry	2.00		87	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		105	80-120			
Tellurium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Thallium	1.86	0.10	mg/kg dry	2.00		93	80-120			
Thorium	1.97	0.50	mg/kg dry	2.00		99	80-120			
Tin	2.07	0.20	mg/kg dry	2.00		103	80-120			
Titanium	2.2	1.0	mg/kg dry	2.00		108	80-120			
Tungsten	1.97	0.20	mg/kg dry	2.00		99	80-120			
Uranium	2.29	0.050	mg/kg dry	2.00		114	80-120			
Vanadium	1.7	1.0	mg/kg dry	2.00		87	80-120			
Zinc	2.0	2.0	mg/kg dry	2.00		101	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		96	80-120			
LCS (B8G0020-BS2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Antimony	2.00	0.10	mg/kg dry	2.00		100	80-120			
Arsenic	1.63	0.30	mg/kg dry	2.00		82	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		84	80-120			
Beryllium	1.76	0.10	mg/kg dry	2.00		88	80-120			
Bismuth	1.81	0.10	mg/kg dry	2.00		90	80-120			
Boron	2.0	2.0	mg/kg dry	2.00		98	80-120			
Cadmium	1.70	0.040	mg/kg dry	2.00		85	80-120			
Calcium	185	100	mg/kg dry	200		92	80-120			
Chromium	1.7	1.0	mg/kg dry	2.00		85	80-120			
Cobalt	1.74	0.10	mg/kg dry	2.00		87	80-120			
Copper	1.87	0.40	mg/kg dry	2.00		93	80-120			
Iron	180	20	mg/kg dry	200		90	80-120			
Lead	1.96	0.20	mg/kg dry	2.00		98	80-120			
Lithium	1.88	0.10	mg/kg dry	2.00		94	80-120			
Magnesium	198	10	mg/kg dry	200		99	80-120			
Manganese	1.71	0.40	mg/kg dry	2.00		85	80-120			
Mercury	0.085	0.040	mg/kg dry	0.100		85	80-120			
Molybdenum	1.81	0.10	mg/kg dry	2.00		91	80-120			
Nickel	1.72	0.60	mg/kg dry	2.00		86	80-120			
Phosphorus	182	10	mg/kg dry	200		91	80-120			
Potassium	192	40	mg/kg dry	200		96	80-120			
Selenium	1.76	0.20	mg/kg dry	2.00		88	80-120			
Silver	1.74	0.10	mg/kg dry	2.00		87	80-120			
Sodium	206	50	mg/kg dry	240		86	80-120			
Strontium	1.67	0.20	mg/kg dry	2.00		83	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		81	80-120			
Tellurium	1.81	0.10	mg/kg dry	2.00		90	80-120			
Thallium	1.77	0.10	mg/kg dry	2.00		89	80-120			
Thorium	1.94	0.50	mg/kg dry	2.00		97	80-120			
Tin	1.87	0.20	mg/kg dry	2.00		93	80-120			
Titanium	2.0	1.0	mg/kg dry	2.00		100	80-120			
Tungsten	1.80	0.20	mg/kg dry	2.00		90	80-120			
Uranium	2.30	0.050	mg/kg dry	2.00		115	80-120			
Vanadium	1.8	1.0	mg/kg dry	2.00		89	80-120			
Zinc	2.2	2.0	mg/kg dry	2.00		112	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		88	80-120			
Reference (B8G0020-SRM1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	17600	40	mg/kg dry	17500		101	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Reference (B8G0020-SRM1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Antimony	6.40	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.4	0.30	mg/kg dry	15.1		96	70-130			
Barium	74.8	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.2	2.0	mg/kg dry	3.00		105	70-130			
Cadmium	0.215	0.040	mg/kg dry	0.216		99	70-130			
Calcium	3330	100	mg/kg dry	3290		101	70-130			
Chromium	26.3	1.0	mg/kg dry	27.5		96	70-130			
Cobalt	11.7	0.10	mg/kg dry	12.4		94	70-130			
Copper	42.5	0.40	mg/kg dry	45.3		94	70-130			
Iron	31100	20	mg/kg dry	32600		95	70-130			
Lead	13.5	0.20	mg/kg dry	13.8		98	70-130			
Lithium	10.4	0.10	mg/kg dry	9.91		105	70-130			
Magnesium	6030	10	mg/kg dry	5770		105	70-130			
Manganese	987	0.40	mg/kg dry	1090		91	70-130			
Mercury	0.100	0.040	mg/kg dry	0.103		97	70-130			
Molybdenum	0.74	0.10	mg/kg dry	0.731		101	70-130			
Nickel	16.2	0.60	mg/kg dry	17.4		93	70-130			
Phosphorus	780	10	mg/kg dry	756		103	70-130			
Potassium	663	40	mg/kg dry	631		105	70-130			
Sodium	417	50	mg/kg dry	388		108	70-130			
Strontium	11.2	0.20	mg/kg dry	11.5		97	70-130			
Thorium	3.68	0.50	mg/kg dry	3.61		102	70-130			
Tin	1.08	0.20	mg/kg dry	1.03		105	70-130			
Titanium	805	1.0	mg/kg dry	833		97	70-130			
Uranium	0.810	0.050	mg/kg dry	0.837		97	70-130			
Vanadium	50.8	1.0	mg/kg dry	54.9		93	70-130			
Zinc	61.8	2.0	mg/kg dry	66.8		92	70-130			
Reference (B8G0020-SRM2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	17400	40	mg/kg dry	17500		99	70-130			
Antimony	6.39	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.9	0.30	mg/kg dry	15.1		99	70-130			
Barium	75.1	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.7	2.0	mg/kg dry	3.00		124	70-130			
Cadmium	0.229	0.040	mg/kg dry	0.216		106	70-130			
Calcium	3300	100	mg/kg dry	3290		100	70-130			
Chromium	26.9	1.0	mg/kg dry	27.5		98	70-130			
Cobalt	12.0	0.10	mg/kg dry	12.4		97	70-130			
Copper	43.5	0.40	mg/kg dry	45.3		96	70-130			
Iron	31400	20	mg/kg dry	32600		96	70-130			
Lead	14.0	0.20	mg/kg dry	13.8		101	70-130			
Lithium	10.1	0.10	mg/kg dry	9.91		102	70-130			
Magnesium	5980	10	mg/kg dry	5770		104	70-130			
Manganese	1010	0.40	mg/kg dry	1090		93	70-130			
Mercury	0.112	0.040	mg/kg dry	0.103		109	70-130			
Molybdenum	0.73	0.10	mg/kg dry	0.731		99	70-130			
Nickel	16.7	0.60	mg/kg dry	17.4		96	70-130			
Phosphorus	752	10	mg/kg dry	756		99	70-130			
Potassium	652	40	mg/kg dry	631		103	70-130			
Sodium	407	50	mg/kg dry	388		105	70-130			
Strontium	11.3	0.20	mg/kg dry	11.5		98	70-130			
Thorium	3.88	0.50	mg/kg dry	3.61		107	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Reference (B8G0020-SRM2), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Tin	1.16	0.20	mg/kg dry	1.03		113	70-130			
Titanium	819	1.0	mg/kg dry	833		98	70-130			
Uranium	0.844	0.050	mg/kg dry	0.837		101	70-130			
Vanadium	51.8	1.0	mg/kg dry	54.9		94	70-130			
Zinc	63.0	2.0	mg/kg dry	66.8		94	70-130			

QC Qualifiers:

HT2 The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.

APPENDIX 3: REVISION HISTORY

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062805
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-19 12:39

Sample ID	Changed	Change	Analysis	Analyte(s)
8062805-01RE1	2018-07-17	Added	Carbon, Total Organic	Carbon, Total Organic

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8062810
PO NUMBER		**RECEIVED / TEMP**	2018-06-28 13:00 / 10°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48
PROJECT INFO	14-024-21 Additional Work	**COC NUMBER**	B40970

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

This is a revised report; please refer to Appendix 3 for details.

If you have any questions or concerns, please contact me at jnobrega@caro.ca

Authorized By:

Jessica Nobrega, B.Sc.
Client Service Manager

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-1 (8062810-01) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.409**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.57**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**86.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**23.6**	5.0	mg/L	2018-07-05	
Chloride, Saturated Paste	< 43	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**13100**	40	mg/kg dry	2018-07-04	
Antimony	**0.16**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.12**	0.30	mg/kg dry	2018-07-04	
Barium	**190**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.36**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.15**	0.10	mg/kg dry	2018-07-04	
Boron	**2.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.075**	0.040	mg/kg dry	2018-07-04	
Calcium	**7820**	100	mg/kg dry	2018-07-04	
Chromium	**9.4**	1.0	mg/kg dry	2018-07-04	
Cobalt	**4.08**	0.10	mg/kg dry	2018-07-04	
Copper	**4.00**	0.40	mg/kg dry	2018-07-04	
Iron	**15300**	20	mg/kg dry	2018-07-04	
Lead	**15.8**	0.20	mg/kg dry	2018-07-04	
Lithium	**12.1**	0.10	mg/kg dry	2018-07-04	
Magnesium	**3410**	10	mg/kg dry	2018-07-04	
Manganese	**551**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.075**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.78**	0.10	mg/kg dry	2018-07-04	
Nickel	**9.78**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**554**	10	mg/kg dry	2018-07-04	
Potassium	**1140**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**131**	50	mg/kg dry	2018-07-04	
Strontium	**28.0**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2000**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**2.48**	0.50	mg/kg dry	2018-07-04	
Tin	**0.47**	0.20	mg/kg dry	2018-07-04	
Titanium	**218**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.181**	0.050	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-1 (8062810-01) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Vanadium	**11.1**	1.0	mg/kg dry	2018-07-04	
Zinc	**55.3**	2.0	mg/kg dry	2018-07-04	
Zirconium	**4.4**	2.0	mg/kg dry	2018-07-04	
LOC-2 (8062810-02) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.206**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.90**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**96.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**315**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	**302**	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**14500**	40	mg/kg dry	2018-07-04	
Antimony	**0.18**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.40**	0.30	mg/kg dry	2018-07-04	
Barium	**174**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.44**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.14**	0.10	mg/kg dry	2018-07-04	
Boron	**4.7**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.139**	0.040	mg/kg dry	2018-07-04	
Calcium	**19000**	100	mg/kg dry	2018-07-04	
Chromium	**10.1**	1.0	mg/kg dry	2018-07-04	
Cobalt	**5.16**	0.10	mg/kg dry	2018-07-04	
Copper	**8.28**	0.40	mg/kg dry	2018-07-04	
Iron	**18100**	20	mg/kg dry	2018-07-04	
Lead	**18.8**	0.20	mg/kg dry	2018-07-04	
Lithium	**13.0**	0.10	mg/kg dry	2018-07-04	
Magnesium	**4690**	10	mg/kg dry	2018-07-04	
Manganese	**579**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.086**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.60**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.0**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**437**	10	mg/kg dry	2018-07-04	
Potassium	**1420**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**102**	50	mg/kg dry	2018-07-04	
Strontium	**43.9**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2650**	1000	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-2 (8062810-02) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.22**	0.50	mg/kg dry	2018-07-04	
Tin	**0.43**	0.20	mg/kg dry	2018-07-04	
Titanium	**192**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.171**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.4**	1.0	mg/kg dry	2018-07-04	
Zinc	**51.1**	2.0	mg/kg dry	2018-07-04	
Zirconium	**8.5**	2.0	mg/kg dry	2018-07-04	
LOC-3 (8062810-03) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.311**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.25**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**69.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**15.3**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 34	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**15800**	40	mg/kg dry	2018-07-04	
Antimony	**0.27**	0.10	mg/kg dry	2018-07-04	
Arsenic	**4.46**	0.30	mg/kg dry	2018-07-04	
Barium	**165**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.53**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.15**	0.10	mg/kg dry	2018-07-04	
Boron	**5.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.062**	0.040	mg/kg dry	2018-07-04	
Calcium	**49100**	100	mg/kg dry	2018-07-04	
Chromium	**14.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**8.06**	0.10	mg/kg dry	2018-07-04	
Copper	**13.1**	0.40	mg/kg dry	2018-07-04	
Iron	**21800**	20	mg/kg dry	2018-07-04	
Lead	**14.5**	0.20	mg/kg dry	2018-07-04	
Lithium	**18.9**	0.10	mg/kg dry	2018-07-04	
Magnesium	**9690**	10	mg/kg dry	2018-07-04	
Manganese	**439**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.079**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.82**	0.10	mg/kg dry	2018-07-04	
Nickel	**18.4**	0.60	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-3 (8062810-03) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Phosphorus	**571**	10	mg/kg dry	2018-07-04	
Potassium	**1940**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**143**	50	mg/kg dry	2018-07-04	
Strontium	**110**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3990**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**4.40**	0.50	mg/kg dry	2018-07-04	
Tin	**0.39**	0.20	mg/kg dry	2018-07-04	
Titanium	**184**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.311**	0.050	mg/kg dry	2018-07-04	
Vanadium	**11.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**59.3**	2.0	mg/kg dry	2018-07-04	
Zirconium	**4.8**	2.0	mg/kg dry	2018-07-04	
LOC-4 (8062810-04) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.158**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**5.68**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**281**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**33.7**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 140	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**5160**	40	mg/kg dry	2018-07-04	
Antimony	**0.46**	0.10	mg/kg dry	2018-07-04	
Arsenic	**1.36**	0.30	mg/kg dry	2018-07-04	
Barium	**178**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.14**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.13**	0.10	mg/kg dry	2018-07-04	
Boron	**4.6**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.168**	0.040	mg/kg dry	2018-07-04	
Calcium	**15600**	100	mg/kg dry	2018-07-04	
Chromium	**4.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**1.97**	0.10	mg/kg dry	2018-07-04	
Copper	**5.40**	0.40	mg/kg dry	2018-07-04	
Iron	**5980**	20	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-4 (8062810-04) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Lead	**25.4**	0.20	mg/kg dry	2018-07-04	
Lithium	**4.72**	0.10	mg/kg dry	2018-07-04	
Magnesium	**2170**	10	mg/kg dry	2018-07-04	
Manganese	**539**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.158**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**1.05**	0.10	mg/kg dry	2018-07-04	
Nickel	**5.14**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**505**	10	mg/kg dry	2018-07-04	
Potassium	**700**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**73**	50	mg/kg dry	2018-07-04	
Strontium	**54.5**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3990**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**1.07**	0.50	mg/kg dry	2018-07-04	
Tin	**0.66**	0.20	mg/kg dry	2018-07-04	
Titanium	**114**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.104**	0.050	mg/kg dry	2018-07-04	
Vanadium	**4.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**27.2**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.2**	2.0	mg/kg dry	2018-07-04	
LOC-5 (8062810-05) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.133**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.97**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**46.5**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**13.2**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**10900**	40	mg/kg dry	2018-07-04	
Antimony	**0.34**	0.10	mg/kg dry	2018-07-04	
Arsenic	**5.28**	0.30	mg/kg dry	2018-07-04	
Barium	**77.9**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.41**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.12**	0.10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-5 (8062810-05) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Boron	**6.3**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.060**	0.040	mg/kg dry	2018-07-04	
Calcium	**124000**	100	mg/kg dry	2018-07-04	
Chromium	**15.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**9.23**	0.10	mg/kg dry	2018-07-04	
Copper	**14.0**	0.40	mg/kg dry	2018-07-04	
Iron	**22500**	20	mg/kg dry	2018-07-04	
Lead	**15.0**	0.20	mg/kg dry	2018-07-04	
Lithium	**19.3**	0.10	mg/kg dry	2018-07-04	
Magnesium	**18800**	10	mg/kg dry	2018-07-04	
Manganese	**430**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.070**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.53**	0.10	mg/kg dry	2018-07-04	
Nickel	**20.4**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**573**	10	mg/kg dry	2018-07-04	
Potassium	**1620**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**123**	50	mg/kg dry	2018-07-04	
Strontium	**267**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3660**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**6.05**	0.50	mg/kg dry	2018-07-04	
Tin	**0.29**	0.20	mg/kg dry	2018-07-04	
Titanium	**50.3**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.358**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**56.1**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	
LOC-6 (8062810-06) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.300**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.58**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**142**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**13.8**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 71	25	mg/kg dry	2018-07-23	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-6 (8062810-06) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals					
Aluminum	**12300**	40	mg/kg dry	2018-07-04	
Antimony	**0.48**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.81**	0.30	mg/kg dry	2018-07-04	
Barium	**406**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.33**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.21**	0.10	mg/kg dry	2018-07-04	
Boron	**6.9**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.346**	0.040	mg/kg dry	2018-07-04	
Calcium	**18000**	100	mg/kg dry	2018-07-04	
Chromium	**9.2**	1.0	mg/kg dry	2018-07-04	
Cobalt	**5.22**	0.10	mg/kg dry	2018-07-04	
Copper	**7.40**	0.40	mg/kg dry	2018-07-04	
Iron	**14300**	20	mg/kg dry	2018-07-04	
Lead	**35.9**	0.20	mg/kg dry	2018-07-04	
Lithium	**11.4**	0.10	mg/kg dry	2018-07-04	
Magnesium	**3630**	10	mg/kg dry	2018-07-04	
Manganese	**2910**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.133**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**1.06**	0.10	mg/kg dry	2018-07-04	
Nickel	**12.2**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**784**	10	mg/kg dry	2018-07-04	
Potassium	**1020**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**154**	50	mg/kg dry	2018-07-04	
Strontium	**61.4**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2950**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**2.53**	0.50	mg/kg dry	2018-07-04	
Tin	**0.79**	0.20	mg/kg dry	2018-07-04	
Titanium	**256**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.194**	0.050	mg/kg dry	2018-07-04	
Vanadium	**11.3**	1.0	mg/kg dry	2018-07-04	
Zinc	**70.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.9**	2.0	mg/kg dry	2018-07-04	
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.115**	0.010	ds/m	2018-07-03	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
General Parameters, Continued					
pH (1:2 H2O Solution)	**6.06**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**56.7**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**20.4**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**25100**	40	mg/kg dry	2018-07-04	
Antimony	**0.19**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.63**	0.30	mg/kg dry	2018-07-04	
Barium	**258**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.68**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.17**	0.10	mg/kg dry	2018-07-04	
Boron	**3.5**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.062**	0.040	mg/kg dry	2018-07-04	
Calcium	**6250**	100	mg/kg dry	2018-07-04	
Chromium	**14.3**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.30**	0.10	mg/kg dry	2018-07-04	
Copper	**6.93**	0.40	mg/kg dry	2018-07-04	
Iron	**22500**	20	mg/kg dry	2018-07-04	
Lead	**15.6**	0.20	mg/kg dry	2018-07-04	
Lithium	**18.4**	0.10	mg/kg dry	2018-07-04	
Magnesium	**4230**	10	mg/kg dry	2018-07-04	
Manganese	**696**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.094**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.73**	0.10	mg/kg dry	2018-07-04	
Nickel	**16.7**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**828**	10	mg/kg dry	2018-07-04	
Potassium	**1140**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**188**	50	mg/kg dry	2018-07-04	
Strontium	**25.6**	0.20	mg/kg dry	2018-07-04	
Sulfur	< 1000	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**4.40**	0.50	mg/kg dry	2018-07-04	
Tin	**0.68**	0.20	mg/kg dry	2018-07-04	
Titanium	**509**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.320**	0.050	mg/kg dry	2018-07-04	
Vanadium	**15.5**	1.0	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Zinc	**45.5**	2.0	mg/kg dry	2018-07-04	
Zirconium	**14.1**	2.0	mg/kg dry	2018-07-04	
LOC-9 (8062810-09) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.215**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.84**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**81.4**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**12.7**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 41	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**10400**	40	mg/kg dry	2018-07-04	
Antimony	**0.40**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.52**	0.30	mg/kg dry	2018-07-04	
Barium	**105**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.39**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.11**	0.10	mg/kg dry	2018-07-04	
Boron	**4.6**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.187**	0.040	mg/kg dry	2018-07-04	
Calcium	**88900**	100	mg/kg dry	2018-07-04	
Chromium	**11.1**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.07**	0.10	mg/kg dry	2018-07-04	
Copper	**15.3**	0.40	mg/kg dry	2018-07-04	
Iron	**18300**	20	mg/kg dry	2018-07-04	
Lead	**34.3**	0.20	mg/kg dry	2018-07-04	
Lithium	**12.3**	0.10	mg/kg dry	2018-07-04	
Magnesium	**14400**	10	mg/kg dry	2018-07-04	
Manganese	**456**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.086**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.49**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.4**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**619**	10	mg/kg dry	2018-07-04	
Potassium	**991**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**143**	50	mg/kg dry	2018-07-04	
Strontium	**153**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3920**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-9 (8062810-09) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.02**	0.50	mg/kg dry	2018-07-04	
Tin	**0.75**	0.20	mg/kg dry	2018-07-04	
Titanium	**148**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.237**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.0**	1.0	mg/kg dry	2018-07-04	
Zinc	**94.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.0**	2.0	mg/kg dry	2018-07-04	
LOC-10 (8062810-10) | Matrix: Soil | Sampled: 2018-06-27 11:00					
General Parameters					
Conductivity (EC)	**0.193**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.18**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**50.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**30.6**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**11700**	40	mg/kg dry	2018-07-04	
Antimony	**0.46**	0.10	mg/kg dry	2018-07-04	
Arsenic	**4.34**	0.30	mg/kg dry	2018-07-04	
Barium	**111**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.43**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.13**	0.10	mg/kg dry	2018-07-04	
Boron	**4.9**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.067**	0.040	mg/kg dry	2018-07-04	
Calcium	**81900**	100	mg/kg dry	2018-07-04	
Chromium	**12.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**7.16**	0.10	mg/kg dry	2018-07-04	
Copper	**12.8**	0.40	mg/kg dry	2018-07-04	
Iron	**19900**	20	mg/kg dry	2018-07-04	
Lead	**14.1**	0.20	mg/kg dry	2018-07-04	
Lithium	**15.5**	0.10	mg/kg dry	2018-07-04	
Magnesium	**13900**	10	mg/kg dry	2018-07-04	
Manganese	**404**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.112**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.59**	0.10	mg/kg dry	2018-07-04	
Nickel	**16.2**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**551**	10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-10 (8062810-10) | Matrix: Soil | Sampled: 2018-06-27 11:00, Continued					
Strong Acid Leachable Metals, Continued					
Potassium	**1270**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**119**	50	mg/kg dry	2018-07-04	
Strontium	**162**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3650**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.73**	0.50	mg/kg dry	2018-07-04	
Tin	**0.52**	0.20	mg/kg dry	2018-07-04	
Titanium	**109**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.317**	0.050	mg/kg dry	2018-07-04	
Vanadium	**10.3**	1.0	mg/kg dry	2018-07-04	
Zinc	**51.7**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	
LOC-11 (8062810-11) | Matrix: Soil | Sampled: 2018-06-27 11:00					
General Parameters					
Conductivity (EC)	**0.132**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.38**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**48.6**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**17.1**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**7390**	40	mg/kg dry	2018-07-04	
Antimony	**0.20**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.46**	0.30	mg/kg dry	2018-07-04	
Barium	**75.1**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.31**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.10**	0.10	mg/kg dry	2018-07-04	
Boron	**3.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.068**	0.040	mg/kg dry	2018-07-04	
Calcium	**116000**	100	mg/kg dry	2018-07-04	
Chromium	**11.2**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.05**	0.10	mg/kg dry	2018-07-04	
Copper	**12.0**	0.40	mg/kg dry	2018-07-04	
Iron	**17400**	20	mg/kg dry	2018-07-04	
Lead	**14.2**	0.20	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-11 (8062810-11) | Matrix: Soil | Sampled: 2018-06-27 11:00, Continued					
Strong Acid Leachable Metals, Continued					
Lithium	**10.9**	0.10	mg/kg dry	2018-07-04	
Magnesium	**20100**	10	mg/kg dry	2018-07-04	
Manganese	**428**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.073**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.61**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.6**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**612**	10	mg/kg dry	2018-07-04	
Potassium	**780**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**97**	50	mg/kg dry	2018-07-04	
Strontium	**215**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3860**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.00**	0.50	mg/kg dry	2018-07-04	
Tin	**0.30**	0.20	mg/kg dry	2018-07-04	
Titanium	**67.5**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.258**	0.050	mg/kg dry	2018-07-04	
Vanadium	**7.8**	1.0	mg/kg dry	2018-07-04	
Zinc	**44.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	

Sample Qualifiers:

CST2	Limited sample
PH1	Due to limited sample volume or matrix, the ratio of water to soil was greater than 2:1

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analysis Description	Method Ref.	Technique	Location
Conductivity in Soil	Carter 15.2.2 / SM 2510 B (2011)	Fixed Ratio H2O Ext (1:5) / Conductivity Meter	Kelowna
pH in Soil	Carter 16.2 / SM 4500-H+ B (2011)	1:2 Soil/Water Slurry / Electrometry	Kelowna
SALM in Soil	BCMOE SALM V.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Saturated Paste Anions in Soil	SM 4110 B (2011)	Ion Chromatography	Kelowna
Saturated Paste Chloride in Soil	SM 4500-Cl- D* (2011)	Potentiometric Titration	Richmond
Saturated Paste Extraction in Soil	Carter 15.2.1 / Carter 15.2.1	Saturated Paste Extraction / Calculation	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
ds/m	Decisiemens per metre
mg/kg dry	Milligrams per kilogram (dry weight basis)
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
Carter	Soil Sampling and Methods of Analysis, 2nd Edition (2007), Carter/Gregorich
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in fibatchesfl and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8F2435										
Blank (B8F2435-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	< 0.010	0.010	ds/m							
LCS (B8F2435-BS1)				Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	1.38	0.010	ds/m	1.41		98	95-105			
Duplicate (B8F2435-DUP1)		**Source: 8062810-11**		Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	0.135	0.010	ds/m		0.132			2	7	
General Parameters, Batch B8F2436										
Duplicate (B8F2436-DUP1)		**Source: 8062810-11**		Prepared: 2018-06-29, Analyzed: 2018-06-29						
pH (1:2 H2O Solution)	7.41	0.10	pH units		7.38			< 1	10	PH1
Salinity Parameters (Sat. Paste Extract), Batch B8G0061										
Blank (B8G0061-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Saturation	50.0	1.0	%							
Salinity Parameters (Sat. Paste Extract), Batch B8G0455										
Duplicate (B8G0455-DUP1)		**Source: 8062810-11**		Prepared: 2018-07-05, Analyzed: 2018-07-06						
Chloride, Saturated Paste	< 50.0	5.0	mg/L		17.1				30	
Salinity Parameters (Sat. Paste Extract), Batch B8G1833										
Blank (B8G1833-BLK1)				Prepared: 2018-07-23, Analyzed: 2018-07-23						
Chloride, Saturated Paste	< 25	25	mg/kg dry							
Strong Acid Leachable Metals, Batch B8G0020										
Blank (B8G0020-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Blank (B8G0020-BLK1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
Blank (B8G0020-BLK2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Blank (B8G0020-BLK2), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
LCS (B8G0020-BS1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Antimony	2.17	0.10	mg/kg dry	2.00		109	80-120			
Arsenic	1.66	0.30	mg/kg dry	2.00		83	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		86	80-120			
Beryllium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Bismuth	1.87	0.10	mg/kg dry	2.00		93	80-120			
Boron	2.2	2.0	mg/kg dry	2.00		108	80-120			
Cadmium	1.79	0.040	mg/kg dry	2.00		90	80-120			
Calcium	191	100	mg/kg dry	200		95	80-120			
Chromium	1.8	1.0	mg/kg dry	2.00		88	80-120			
Cobalt	1.82	0.10	mg/kg dry	2.00		91	80-120			
Copper	1.95	0.40	mg/kg dry	2.00		97	80-120			
Iron	187	20	mg/kg dry	200		93	80-120			
Lead	2.13	0.20	mg/kg dry	2.00		107	80-120			
Lithium	2.01	0.10	mg/kg dry	2.00		101	80-120			
Magnesium	209	10	mg/kg dry	200		104	80-120			
Manganese	1.75	0.40	mg/kg dry	2.00		87	80-120			
Mercury	0.088	0.040	mg/kg dry	0.100		88	80-120			
Molybdenum	1.99	0.10	mg/kg dry	2.00		100	80-120			
Nickel	1.78	0.60	mg/kg dry	2.00		89	80-120			
Phosphorus	188	10	mg/kg dry	200		94	80-120			
Potassium	199	40	mg/kg dry	200		100	80-120			
Selenium	1.83	0.20	mg/kg dry	2.00		92	80-120			
Silver	1.86	0.10	mg/kg dry	2.00		93	80-120			
Sodium	217	50	mg/kg dry	240		90	80-120			
Strontium	1.74	0.20	mg/kg dry	2.00		87	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		105	80-120			
Tellurium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Thallium	1.86	0.10	mg/kg dry	2.00		93	80-120			
Thorium	1.97	0.50	mg/kg dry	2.00		99	80-120			
Tin	2.07	0.20	mg/kg dry	2.00		103	80-120			
Titanium	2.2	1.0	mg/kg dry	2.00		108	80-120			
Tungsten	1.97	0.20	mg/kg dry	2.00		99	80-120			
Uranium	2.29	0.050	mg/kg dry	2.00		114	80-120			
Vanadium	1.7	1.0	mg/kg dry	2.00		87	80-120			
Zinc	2.0	2.0	mg/kg dry	2.00		101	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		96	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
LCS (B8G0020-BS2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Antimony	2.00	0.10	mg/kg dry	2.00		100	80-120			
Arsenic	1.63	0.30	mg/kg dry	2.00		82	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		84	80-120			
Beryllium	1.76	0.10	mg/kg dry	2.00		88	80-120			
Bismuth	1.81	0.10	mg/kg dry	2.00		90	80-120			
Boron	2.0	2.0	mg/kg dry	2.00		98	80-120			
Cadmium	1.70	0.040	mg/kg dry	2.00		85	80-120			
Calcium	185	100	mg/kg dry	200		92	80-120			
Chromium	1.7	1.0	mg/kg dry	2.00		85	80-120			
Cobalt	1.74	0.10	mg/kg dry	2.00		87	80-120			
Copper	1.87	0.40	mg/kg dry	2.00		93	80-120			
Iron	180	20	mg/kg dry	200		90	80-120			
Lead	1.96	0.20	mg/kg dry	2.00		98	80-120			
Lithium	1.88	0.10	mg/kg dry	2.00		94	80-120			
Magnesium	198	10	mg/kg dry	200		99	80-120			
Manganese	1.71	0.40	mg/kg dry	2.00		85	80-120			
Mercury	0.085	0.040	mg/kg dry	0.100		85	80-120			
Molybdenum	1.81	0.10	mg/kg dry	2.00		91	80-120			
Nickel	1.72	0.60	mg/kg dry	2.00		86	80-120			
Phosphorus	182	10	mg/kg dry	200		91	80-120			
Potassium	192	40	mg/kg dry	200		96	80-120			
Selenium	1.76	0.20	mg/kg dry	2.00		88	80-120			
Silver	1.74	0.10	mg/kg dry	2.00		87	80-120			
Sodium	206	50	mg/kg dry	240		86	80-120			
Strontium	1.67	0.20	mg/kg dry	2.00		83	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		81	80-120			
Tellurium	1.81	0.10	mg/kg dry	2.00		90	80-120			
Thallium	1.77	0.10	mg/kg dry	2.00		89	80-120			
Thorium	1.94	0.50	mg/kg dry	2.00		97	80-120			
Tin	1.87	0.20	mg/kg dry	2.00		93	80-120			
Titanium	2.0	1.0	mg/kg dry	2.00		100	80-120			
Tungsten	1.80	0.20	mg/kg dry	2.00		90	80-120			
Uranium	2.30	0.050	mg/kg dry	2.00		115	80-120			
Vanadium	1.8	1.0	mg/kg dry	2.00		89	80-120			
Zinc	2.2	2.0	mg/kg dry	2.00		112	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		88	80-120			
Reference (B8G0020-SRM1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	17600	40	mg/kg dry	17500		101	70-130			
Antimony	6.40	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.4	0.30	mg/kg dry	15.1		96	70-130			
Barium	74.8	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.2	2.0	mg/kg dry	3.00		105	70-130			
Cadmium	0.215	0.040	mg/kg dry	0.216		99	70-130			
Calcium	3330	100	mg/kg dry	3290		101	70-130			
Chromium	26.3	1.0	mg/kg dry	27.5		96	70-130			
Cobalt	11.7	0.10	mg/kg dry	12.4		94	70-130			
Copper	42.5	0.40	mg/kg dry	45.3		94	70-130			
Iron	31100	20	mg/kg dry	32600		95	70-130			
Lead	13.5	0.20	mg/kg dry	13.8		98	70-130			
Lithium	10.4	0.10	mg/kg dry	9.91		105	70-130			
Magnesium	6030	10	mg/kg dry	5770		105	70-130			
Manganese	987	0.40	mg/kg dry	1090		91	70-130			
Mercury	0.100	0.040	mg/kg dry	0.103		97	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Reference (B8G0020-SRM1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Molybdenum	0.74	0.10	mg/kg dry	0.731		101	70-130			
Nickel	16.2	0.60	mg/kg dry	17.4		93	70-130			
Phosphorus	780	10	mg/kg dry	756		103	70-130			
Potassium	663	40	mg/kg dry	631		105	70-130			
Sodium	417	50	mg/kg dry	388		108	70-130			
Strontium	11.2	0.20	mg/kg dry	11.5		97	70-130			
Thorium	3.68	0.50	mg/kg dry	3.61		102	70-130			
Tin	1.08	0.20	mg/kg dry	1.03		105	70-130			
Titanium	805	1.0	mg/kg dry	833		97	70-130			
Uranium	0.810	0.050	mg/kg dry	0.837		97	70-130			
Vanadium	50.8	1.0	mg/kg dry	54.9		93	70-130			
Zinc	61.8	2.0	mg/kg dry	66.8		92	70-130			
Reference (B8G0020-SRM2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	17400	40	mg/kg dry	17500		99	70-130			
Antimony	6.39	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.9	0.30	mg/kg dry	15.1		99	70-130			
Barium	75.1	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.7	2.0	mg/kg dry	3.00		124	70-130			
Cadmium	0.229	0.040	mg/kg dry	0.216		106	70-130			
Calcium	3300	100	mg/kg dry	3290		100	70-130			
Chromium	26.9	1.0	mg/kg dry	27.5		98	70-130			
Cobalt	12.0	0.10	mg/kg dry	12.4		97	70-130			
Copper	43.5	0.40	mg/kg dry	45.3		96	70-130			
Iron	31400	20	mg/kg dry	32600		96	70-130			
Lead	14.0	0.20	mg/kg dry	13.8		101	70-130			
Lithium	10.1	0.10	mg/kg dry	9.91		102	70-130			
Magnesium	5980	10	mg/kg dry	5770		104	70-130			
Manganese	1010	0.40	mg/kg dry	1090		93	70-130			
Mercury	0.112	0.040	mg/kg dry	0.103		109	70-130			
Molybdenum	0.73	0.10	mg/kg dry	0.731		99	70-130			
Nickel	16.7	0.60	mg/kg dry	17.4		96	70-130			
Phosphorus	752	10	mg/kg dry	756		99	70-130			
Potassium	652	40	mg/kg dry	631		103	70-130			
Sodium	407	50	mg/kg dry	388		105	70-130			
Strontium	11.3	0.20	mg/kg dry	11.5		98	70-130			
Thorium	3.88	0.50	mg/kg dry	3.61		107	70-130			
Tin	1.16	0.20	mg/kg dry	1.03		113	70-130			
Titanium	819	1.0	mg/kg dry	833		98	70-130			
Uranium	0.844	0.050	mg/kg dry	0.837		101	70-130			
Vanadium	51.8	1.0	mg/kg dry	54.9		94	70-130			
Zinc	63.0	2.0	mg/kg dry	66.8		94	70-130			

QC Qualifiers:

PH1 Due to limited sample volume or matrix, the ratio of water to soil was greater than 2:1

APPENDIX 3: REVISION HISTORY

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-23 14:48

Sample ID	Changed	Change	Analysis	Analyte(s)
8062810-01	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-02	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-03	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-04	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-05	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-06	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-08	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-09	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-10	2018-07-23	**DELETED**	Saturated Paste Chloride (mg/kg)	
8062810-10	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-11	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8062810
PO NUMBER		**RECEIVED / TEMP**	2018-06-28 13:00 / 10°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44
PROJECT INFO	14-024-21 Additional Work	**COC NUMBER**	B40970

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

Work Order Comments:

This is a revised report; please refer to Appendix 3 for details.

If you have any questions or concerns, please contact me at jnobrega@caro.ca

Authorized By:

Jessica Nobrega, B.Sc.
Client Service Manager

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-1 (8062810-01) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.409**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.57**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**86.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**23.6**	5.0	mg/L	2018-07-05	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**13100**	40	mg/kg dry	2018-07-04	
Antimony	**0.16**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.12**	0.30	mg/kg dry	2018-07-04	
Barium	**190**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.36**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.15**	0.10	mg/kg dry	2018-07-04	
Boron	**2.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.075**	0.040	mg/kg dry	2018-07-04	
Calcium	**7820**	100	mg/kg dry	2018-07-04	
Chromium	**9.4**	1.0	mg/kg dry	2018-07-04	
Cobalt	**4.08**	0.10	mg/kg dry	2018-07-04	
Copper	**4.00**	0.40	mg/kg dry	2018-07-04	
Iron	**15300**	20	mg/kg dry	2018-07-04	
Lead	**15.8**	0.20	mg/kg dry	2018-07-04	
Lithium	**12.1**	0.10	mg/kg dry	2018-07-04	
Magnesium	**3410**	10	mg/kg dry	2018-07-04	
Manganese	**551**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.075**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.78**	0.10	mg/kg dry	2018-07-04	
Nickel	**9.78**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**554**	10	mg/kg dry	2018-07-04	
Potassium	**1140**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**131**	50	mg/kg dry	2018-07-04	
Strontium	**28.0**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2000**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**2.48**	0.50	mg/kg dry	2018-07-04	
Tin	**0.47**	0.20	mg/kg dry	2018-07-04	
Titanium	**218**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.181**	0.050	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-1 (8062810-01) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Vanadium	**11.1**	1.0	mg/kg dry	2018-07-04	
Zinc	**55.3**	2.0	mg/kg dry	2018-07-04	
Zirconium	**4.4**	2.0	mg/kg dry	2018-07-04	
LOC-2 (8062810-02) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.206**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.90**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**96.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**315**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	**302.4**	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**14500**	40	mg/kg dry	2018-07-04	
Antimony	**0.18**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.40**	0.30	mg/kg dry	2018-07-04	
Barium	**174**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.44**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.14**	0.10	mg/kg dry	2018-07-04	
Boron	**4.7**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.139**	0.040	mg/kg dry	2018-07-04	
Calcium	**19000**	100	mg/kg dry	2018-07-04	
Chromium	**10.1**	1.0	mg/kg dry	2018-07-04	
Cobalt	**5.16**	0.10	mg/kg dry	2018-07-04	
Copper	**8.28**	0.40	mg/kg dry	2018-07-04	
Iron	**18100**	20	mg/kg dry	2018-07-04	
Lead	**18.8**	0.20	mg/kg dry	2018-07-04	
Lithium	**13.0**	0.10	mg/kg dry	2018-07-04	
Magnesium	**4690**	10	mg/kg dry	2018-07-04	
Manganese	**579**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.086**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.60**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.0**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**437**	10	mg/kg dry	2018-07-04	
Potassium	**1420**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**102**	50	mg/kg dry	2018-07-04	
Strontium	**43.9**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2650**	1000	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-2 (8062810-02) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.22**	0.50	mg/kg dry	2018-07-04	
Tin	**0.43**	0.20	mg/kg dry	2018-07-04	
Titanium	**192**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.171**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.4**	1.0	mg/kg dry	2018-07-04	
Zinc	**51.1**	2.0	mg/kg dry	2018-07-04	
Zirconium	**8.5**	2.0	mg/kg dry	2018-07-04	
LOC-3 (8062810-03) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.311**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.25**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**69.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**15.3**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**15800**	40	mg/kg dry	2018-07-04	
Antimony	**0.27**	0.10	mg/kg dry	2018-07-04	
Arsenic	**4.46**	0.30	mg/kg dry	2018-07-04	
Barium	**165**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.53**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.15**	0.10	mg/kg dry	2018-07-04	
Boron	**5.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.062**	0.040	mg/kg dry	2018-07-04	
Calcium	**49100**	100	mg/kg dry	2018-07-04	
Chromium	**14.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**8.06**	0.10	mg/kg dry	2018-07-04	
Copper	**13.1**	0.40	mg/kg dry	2018-07-04	
Iron	**21800**	20	mg/kg dry	2018-07-04	
Lead	**14.5**	0.20	mg/kg dry	2018-07-04	
Lithium	**18.9**	0.10	mg/kg dry	2018-07-04	
Magnesium	**9690**	10	mg/kg dry	2018-07-04	
Manganese	**439**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.079**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.82**	0.10	mg/kg dry	2018-07-04	
Nickel	**18.4**	0.60	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-3 (8062810-03) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Phosphorus	**571**	10	mg/kg dry	2018-07-04	
Potassium	**1940**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**143**	50	mg/kg dry	2018-07-04	
Strontium	**110**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3990**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**4.40**	0.50	mg/kg dry	2018-07-04	
Tin	**0.39**	0.20	mg/kg dry	2018-07-04	
Titanium	**184**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.311**	0.050	mg/kg dry	2018-07-04	
Vanadium	**11.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**59.3**	2.0	mg/kg dry	2018-07-04	
Zirconium	**4.8**	2.0	mg/kg dry	2018-07-04	
LOC-4 (8062810-04) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.158**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**5.68**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**281**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**33.7**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	**94.7**	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**5160**	40	mg/kg dry	2018-07-04	
Antimony	**0.46**	0.10	mg/kg dry	2018-07-04	
Arsenic	**1.36**	0.30	mg/kg dry	2018-07-04	
Barium	**178**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.14**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.13**	0.10	mg/kg dry	2018-07-04	
Boron	**4.6**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.168**	0.040	mg/kg dry	2018-07-04	
Calcium	**15600**	100	mg/kg dry	2018-07-04	
Chromium	**4.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**1.97**	0.10	mg/kg dry	2018-07-04	
Copper	**5.40**	0.40	mg/kg dry	2018-07-04	
Iron	**5980**	20	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-4 (8062810-04) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Lead	**25.4**	0.20	mg/kg dry	2018-07-04	
Lithium	**4.72**	0.10	mg/kg dry	2018-07-04	
Magnesium	**2170**	10	mg/kg dry	2018-07-04	
Manganese	**539**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.158**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**1.05**	0.10	mg/kg dry	2018-07-04	
Nickel	**5.14**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**505**	10	mg/kg dry	2018-07-04	
Potassium	**700**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**73**	50	mg/kg dry	2018-07-04	
Strontium	**54.5**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3990**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**1.07**	0.50	mg/kg dry	2018-07-04	
Tin	**0.66**	0.20	mg/kg dry	2018-07-04	
Titanium	**114**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.104**	0.050	mg/kg dry	2018-07-04	
Vanadium	**4.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**27.2**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.2**	2.0	mg/kg dry	2018-07-04	
LOC-5 (8062810-05) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.133**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.97**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**46.5**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**13.2**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**10900**	40	mg/kg dry	2018-07-04	
Antimony	**0.34**	0.10	mg/kg dry	2018-07-04	
Arsenic	**5.28**	0.30	mg/kg dry	2018-07-04	
Barium	**77.9**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.41**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.12**	0.10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-5 (8062810-05) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Boron	**6.3**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.060**	0.040	mg/kg dry	2018-07-04	
Calcium	**124000**	100	mg/kg dry	2018-07-04	
Chromium	**15.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**9.23**	0.10	mg/kg dry	2018-07-04	
Copper	**14.0**	0.40	mg/kg dry	2018-07-04	
Iron	**22500**	20	mg/kg dry	2018-07-04	
Lead	**15.0**	0.20	mg/kg dry	2018-07-04	
Lithium	**19.3**	0.10	mg/kg dry	2018-07-04	
Magnesium	**18800**	10	mg/kg dry	2018-07-04	
Manganese	**430**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.070**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.53**	0.10	mg/kg dry	2018-07-04	
Nickel	**20.4**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**573**	10	mg/kg dry	2018-07-04	
Potassium	**1620**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**123**	50	mg/kg dry	2018-07-04	
Strontium	**267**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3660**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**6.05**	0.50	mg/kg dry	2018-07-04	
Tin	**0.29**	0.20	mg/kg dry	2018-07-04	
Titanium	**50.3**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.358**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.7**	1.0	mg/kg dry	2018-07-04	
Zinc	**56.1**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	
LOC-6 (8062810-06) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.300**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.58**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**142**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**13.8**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-6 (8062810-06) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals					
Aluminum	**12300**	40	mg/kg dry	2018-07-04	
Antimony	**0.48**	0.10	mg/kg dry	2018-07-04	
Arsenic	**2.81**	0.30	mg/kg dry	2018-07-04	
Barium	**406**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.33**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.21**	0.10	mg/kg dry	2018-07-04	
Boron	**6.9**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.346**	0.040	mg/kg dry	2018-07-04	
Calcium	**18000**	100	mg/kg dry	2018-07-04	
Chromium	**9.2**	1.0	mg/kg dry	2018-07-04	
Cobalt	**5.22**	0.10	mg/kg dry	2018-07-04	
Copper	**7.40**	0.40	mg/kg dry	2018-07-04	
Iron	**14300**	20	mg/kg dry	2018-07-04	
Lead	**35.9**	0.20	mg/kg dry	2018-07-04	
Lithium	**11.4**	0.10	mg/kg dry	2018-07-04	
Magnesium	**3630**	10	mg/kg dry	2018-07-04	
Manganese	**2910**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.133**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**1.06**	0.10	mg/kg dry	2018-07-04	
Nickel	**12.2**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**784**	10	mg/kg dry	2018-07-04	
Potassium	**1020**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**154**	50	mg/kg dry	2018-07-04	
Strontium	**61.4**	0.20	mg/kg dry	2018-07-04	
Sulfur	**2950**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**2.53**	0.50	mg/kg dry	2018-07-04	
Tin	**0.79**	0.20	mg/kg dry	2018-07-04	
Titanium	**256**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.194**	0.050	mg/kg dry	2018-07-04	
Vanadium	**11.3**	1.0	mg/kg dry	2018-07-04	
Zinc	**70.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.9**	2.0	mg/kg dry	2018-07-04	
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.115**	0.010	ds/m	2018-07-03	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
General Parameters, Continued					
pH (1:2 H2O Solution)	**6.06**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**56.7**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**20.4**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**25100**	40	mg/kg dry	2018-07-04	
Antimony	**0.19**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.63**	0.30	mg/kg dry	2018-07-04	
Barium	**258**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.68**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.17**	0.10	mg/kg dry	2018-07-04	
Boron	**3.5**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.062**	0.040	mg/kg dry	2018-07-04	
Calcium	**6250**	100	mg/kg dry	2018-07-04	
Chromium	**14.3**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.30**	0.10	mg/kg dry	2018-07-04	
Copper	**6.93**	0.40	mg/kg dry	2018-07-04	
Iron	**22500**	20	mg/kg dry	2018-07-04	
Lead	**15.6**	0.20	mg/kg dry	2018-07-04	
Lithium	**18.4**	0.10	mg/kg dry	2018-07-04	
Magnesium	**4230**	10	mg/kg dry	2018-07-04	
Manganese	**696**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.094**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.73**	0.10	mg/kg dry	2018-07-04	
Nickel	**16.7**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**828**	10	mg/kg dry	2018-07-04	
Potassium	**1140**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**188**	50	mg/kg dry	2018-07-04	
Strontium	**25.6**	0.20	mg/kg dry	2018-07-04	
Sulfur	< 1000	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**4.40**	0.50	mg/kg dry	2018-07-04	
Tin	**0.68**	0.20	mg/kg dry	2018-07-04	
Titanium	**509**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.320**	0.050	mg/kg dry	2018-07-04	
Vanadium	**15.5**	1.0	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-8 (8062810-08) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Zinc	**45.5**	2.0	mg/kg dry	2018-07-04	
Zirconium	**14.1**	2.0	mg/kg dry	2018-07-04	
LOC-9 (8062810-09) | Matrix: Soil | Sampled: 2018-06-25 15:30					
General Parameters					
Conductivity (EC)	**0.215**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**6.84**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**81.4**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**12.7**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**10400**	40	mg/kg dry	2018-07-04	
Antimony	**0.40**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.52**	0.30	mg/kg dry	2018-07-04	
Barium	**105**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.39**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.11**	0.10	mg/kg dry	2018-07-04	
Boron	**4.6**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.187**	0.040	mg/kg dry	2018-07-04	
Calcium	**88900**	100	mg/kg dry	2018-07-04	
Chromium	**11.1**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.07**	0.10	mg/kg dry	2018-07-04	
Copper	**15.3**	0.40	mg/kg dry	2018-07-04	
Iron	**18300**	20	mg/kg dry	2018-07-04	
Lead	**34.3**	0.20	mg/kg dry	2018-07-04	
Lithium	**12.3**	0.10	mg/kg dry	2018-07-04	
Magnesium	**14400**	10	mg/kg dry	2018-07-04	
Manganese	**456**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.086**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.49**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.4**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**619**	10	mg/kg dry	2018-07-04	
Potassium	**991**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**143**	50	mg/kg dry	2018-07-04	
Strontium	**153**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3920**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-9 (8062810-09) | Matrix: Soil | Sampled: 2018-06-25 15:30, Continued					
Strong Acid Leachable Metals, Continued					
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.02**	0.50	mg/kg dry	2018-07-04	
Tin	**0.75**	0.20	mg/kg dry	2018-07-04	
Titanium	**148**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.237**	0.050	mg/kg dry	2018-07-04	
Vanadium	**9.0**	1.0	mg/kg dry	2018-07-04	
Zinc	**94.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	**3.0**	2.0	mg/kg dry	2018-07-04	
LOC-10 (8062810-10) | Matrix: Soil | Sampled: 2018-06-27 11:00					
General Parameters					
Conductivity (EC)	**0.193**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.18**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**50.0**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**30.6**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**11700**	40	mg/kg dry	2018-07-04	
Antimony	**0.46**	0.10	mg/kg dry	2018-07-04	
Arsenic	**4.34**	0.30	mg/kg dry	2018-07-04	
Barium	**111**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.43**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.13**	0.10	mg/kg dry	2018-07-04	
Boron	**4.9**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.067**	0.040	mg/kg dry	2018-07-04	
Calcium	**81900**	100	mg/kg dry	2018-07-04	
Chromium	**12.6**	1.0	mg/kg dry	2018-07-04	
Cobalt	**7.16**	0.10	mg/kg dry	2018-07-04	
Copper	**12.8**	0.40	mg/kg dry	2018-07-04	
Iron	**19900**	20	mg/kg dry	2018-07-04	
Lead	**14.1**	0.20	mg/kg dry	2018-07-04	
Lithium	**15.5**	0.10	mg/kg dry	2018-07-04	
Magnesium	**13900**	10	mg/kg dry	2018-07-04	
Manganese	**404**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.112**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.59**	0.10	mg/kg dry	2018-07-04	
Nickel	**16.2**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**551**	10	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-10 (8062810-10) | Matrix: Soil | Sampled: 2018-06-27 11:00, Continued					
Strong Acid Leachable Metals, Continued					
Potassium	**1270**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**119**	50	mg/kg dry	2018-07-04	
Strontium	**162**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3650**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.73**	0.50	mg/kg dry	2018-07-04	
Tin	**0.52**	0.20	mg/kg dry	2018-07-04	
Titanium	**109**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.317**	0.050	mg/kg dry	2018-07-04	
Vanadium	**10.3**	1.0	mg/kg dry	2018-07-04	
Zinc	**51.7**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	
LOC-11 (8062810-11) | Matrix: Soil | Sampled: 2018-06-27 11:00					
General Parameters					
Conductivity (EC)	**0.132**	0.010	ds/m	2018-07-03	
pH (1:2 H2O Solution)	**7.38**	0.10	pH units	2018-06-29	PH1
Salinity Parameters (Sat. Paste Extract)					
Saturation	**48.6**	1.0	%	2018-07-04	CST2
Chloride, Saturated Paste	**17.1**	5.0	mg/L	2018-07-06	
Chloride, Saturated Paste	< 25	25	mg/kg dry	2018-07-23	
Strong Acid Leachable Metals					
Aluminum	**7390**	40	mg/kg dry	2018-07-04	
Antimony	**0.20**	0.10	mg/kg dry	2018-07-04	
Arsenic	**3.46**	0.30	mg/kg dry	2018-07-04	
Barium	**75.1**	1.0	mg/kg dry	2018-07-04	
Beryllium	**0.31**	0.10	mg/kg dry	2018-07-04	
Bismuth	**0.10**	0.10	mg/kg dry	2018-07-04	
Boron	**3.8**	2.0	mg/kg dry	2018-07-04	
Cadmium	**0.068**	0.040	mg/kg dry	2018-07-04	
Calcium	**116000**	100	mg/kg dry	2018-07-04	
Chromium	**11.2**	1.0	mg/kg dry	2018-07-04	
Cobalt	**6.05**	0.10	mg/kg dry	2018-07-04	
Copper	**12.0**	0.40	mg/kg dry	2018-07-04	
Iron	**17400**	20	mg/kg dry	2018-07-04	
Lead	**14.2**	0.20	mg/kg dry	2018-07-04	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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Analyte	Result	RL	Units	Analyzed	Qualifier
LOC-11 (8062810-11) | Matrix: Soil | Sampled: 2018-06-27 11:00, Continued					
Strong Acid Leachable Metals, Continued					
Lithium	**10.9**	0.10	mg/kg dry	2018-07-04	
Magnesium	**20100**	10	mg/kg dry	2018-07-04	
Manganese	**428**	0.40	mg/kg dry	2018-07-04	
Mercury	**0.073**	0.040	mg/kg dry	2018-07-04	
Molybdenum	**0.61**	0.10	mg/kg dry	2018-07-04	
Nickel	**13.6**	0.60	mg/kg dry	2018-07-04	
Phosphorus	**612**	10	mg/kg dry	2018-07-04	
Potassium	**780**	40	mg/kg dry	2018-07-04	
Selenium	< 0.20	0.20	mg/kg dry	2018-07-04	
Silver	< 0.10	0.10	mg/kg dry	2018-07-04	
Sodium	**97**	50	mg/kg dry	2018-07-04	
Strontium	**215**	0.20	mg/kg dry	2018-07-04	
Sulfur	**3860**	1000	mg/kg dry	2018-07-04	
Tellurium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thallium	< 0.10	0.10	mg/kg dry	2018-07-04	
Thorium	**3.00**	0.50	mg/kg dry	2018-07-04	
Tin	**0.30**	0.20	mg/kg dry	2018-07-04	
Titanium	**67.5**	1.0	mg/kg dry	2018-07-04	
Tungsten	< 0.20	0.20	mg/kg dry	2018-07-04	
Uranium	**0.258**	0.050	mg/kg dry	2018-07-04	
Vanadium	**7.8**	1.0	mg/kg dry	2018-07-04	
Zinc	**44.8**	2.0	mg/kg dry	2018-07-04	
Zirconium	< 2.0	2.0	mg/kg dry	2018-07-04	

Sample Qualifiers:

CST2	Limited sample
PH1	Due to limited sample volume or matrix, the ratio of water to soil was greater than 2:1

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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Analysis Description	Method Ref.	Technique	Location
Conductivity in Soil	Carter 15.2.2 / SM 2510 B (2011)	Fixed Ratio H2O Ext (1:5) / Conductivity Meter	Kelowna
pH in Soil	Carter 16.2 / SM 4500-H+ B (2011)	1:2 Soil/Water Slurry / Electrometry	Kelowna
SALM in Soil	BCMOE SALM V.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Saturated Paste Anions in Soil	SM 4110 B (2011)	Ion Chromatography	Kelowna
Saturated Paste Chloride in Soil	SM 4500-Cl- D* (2011)	Potentiometric Titration	Richmond
Saturated Paste Extraction in Soil	Carter 15.2.1 / Carter 15.2.1	Saturated Paste Extraction / Calculation	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
ds/m	Decisiemens per metre
mg/kg dry	Milligrams per kilogram (dry weight basis)
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
Carter	Soil Sampling and Methods of Analysis, 2nd Edition (2007), Carter/Gregorich
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in fibatchesfl and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8F2435										
Blank (B8F2435-BLK1)				Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	< 0.010	0.010	ds/m							
LCS (B8F2435-BS1)				Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	1.38	0.010	ds/m	1.41		98	95-105			
Duplicate (B8F2435-DUP1)		**Source: 8062810-11**		Prepared: 2018-06-29, Analyzed: 2018-07-03						
Conductivity (EC)	0.135	0.010	ds/m		0.132			2	7	
General Parameters, Batch B8F2436										
Duplicate (B8F2436-DUP1)		**Source: 8062810-11**		Prepared: 2018-06-29, Analyzed: 2018-06-29						
pH (1:2 H2O Solution)	7.41	0.10	pH units		7.38			< 1	10	PH1
Salinity Parameters (Sat. Paste Extract), Batch B8G0061										
Blank (B8G0061-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Saturation	50.0	1.0	%							
Salinity Parameters (Sat. Paste Extract), Batch B8G0455										
Duplicate (B8G0455-DUP1)		**Source: 8062810-11**		Prepared: 2018-07-05, Analyzed: 2018-07-06						
Chloride, Saturated Paste	< 50.0	5.0	mg/L		17.1				30	
Salinity Parameters (Sat. Paste Extract), Batch B8G1833										
Blank (B8G1833-BLK1)				Prepared: 2018-07-23, Analyzed: 2018-07-23						
Chloride, Saturated Paste	< 25	25	mg/kg dry							
Strong Acid Leachable Metals, Batch B8G0020										
Blank (B8G0020-BLK1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Blank (B8G0020-BLK1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
Blank (B8G0020-BLK2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	< 40	40	mg/kg dry							
Antimony	< 0.10	0.10	mg/kg dry							
Arsenic	< 0.30	0.30	mg/kg dry							
Barium	< 1.0	1.0	mg/kg dry							
Beryllium	< 0.10	0.10	mg/kg dry							
Bismuth	< 0.10	0.10	mg/kg dry							
Boron	< 2.0	2.0	mg/kg dry							
Cadmium	< 0.040	0.040	mg/kg dry							
Calcium	< 100	100	mg/kg dry							
Chromium	< 1.0	1.0	mg/kg dry							
Cobalt	< 0.10	0.10	mg/kg dry							
Copper	< 0.40	0.40	mg/kg dry							
Iron	< 20	20	mg/kg dry							
Lead	< 0.20	0.20	mg/kg dry							
Lithium	< 0.10	0.10	mg/kg dry							
Magnesium	< 10	10	mg/kg dry							
Manganese	< 0.40	0.40	mg/kg dry							
Mercury	< 0.040	0.040	mg/kg dry							
Molybdenum	< 0.10	0.10	mg/kg dry							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Blank (B8G0020-BLK2), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Nickel	< 0.60	0.60	mg/kg dry							
Phosphorus	< 10	10	mg/kg dry							
Potassium	< 40	40	mg/kg dry							
Selenium	< 0.20	0.20	mg/kg dry							
Silver	< 0.10	0.10	mg/kg dry							
Sodium	< 50	50	mg/kg dry							
Strontium	< 0.20	0.20	mg/kg dry							
Sulfur	< 1000	1000	mg/kg dry							
Tellurium	< 0.10	0.10	mg/kg dry							
Thallium	< 0.10	0.10	mg/kg dry							
Thorium	< 0.50	0.50	mg/kg dry							
Tin	< 0.20	0.20	mg/kg dry							
Titanium	< 1.0	1.0	mg/kg dry							
Tungsten	< 0.20	0.20	mg/kg dry							
Uranium	< 0.050	0.050	mg/kg dry							
Vanadium	< 1.0	1.0	mg/kg dry							
Zinc	< 2.0	2.0	mg/kg dry							
Zirconium	< 2.0	2.0	mg/kg dry							
LCS (B8G0020-BS1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Antimony	2.17	0.10	mg/kg dry	2.00		109	80-120			
Arsenic	1.66	0.30	mg/kg dry	2.00		83	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		86	80-120			
Beryllium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Bismuth	1.87	0.10	mg/kg dry	2.00		93	80-120			
Boron	2.2	2.0	mg/kg dry	2.00		108	80-120			
Cadmium	1.79	0.040	mg/kg dry	2.00		90	80-120			
Calcium	191	100	mg/kg dry	200		95	80-120			
Chromium	1.8	1.0	mg/kg dry	2.00		88	80-120			
Cobalt	1.82	0.10	mg/kg dry	2.00		91	80-120			
Copper	1.95	0.40	mg/kg dry	2.00		97	80-120			
Iron	187	20	mg/kg dry	200		93	80-120			
Lead	2.13	0.20	mg/kg dry	2.00		107	80-120			
Lithium	2.01	0.10	mg/kg dry	2.00		101	80-120			
Magnesium	209	10	mg/kg dry	200		104	80-120			
Manganese	1.75	0.40	mg/kg dry	2.00		87	80-120			
Mercury	0.088	0.040	mg/kg dry	0.100		88	80-120			
Molybdenum	1.99	0.10	mg/kg dry	2.00		100	80-120			
Nickel	1.78	0.60	mg/kg dry	2.00		89	80-120			
Phosphorus	188	10	mg/kg dry	200		94	80-120			
Potassium	199	40	mg/kg dry	200		100	80-120			
Selenium	1.83	0.20	mg/kg dry	2.00		92	80-120			
Silver	1.86	0.10	mg/kg dry	2.00		93	80-120			
Sodium	217	50	mg/kg dry	240		90	80-120			
Strontium	1.74	0.20	mg/kg dry	2.00		87	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		105	80-120			
Tellurium	1.85	0.10	mg/kg dry	2.00		93	80-120			
Thallium	1.86	0.10	mg/kg dry	2.00		93	80-120			
Thorium	1.97	0.50	mg/kg dry	2.00		99	80-120			
Tin	2.07	0.20	mg/kg dry	2.00		103	80-120			
Titanium	2.2	1.0	mg/kg dry	2.00		108	80-120			
Tungsten	1.97	0.20	mg/kg dry	2.00		99	80-120			
Uranium	2.29	0.050	mg/kg dry	2.00		114	80-120			
Vanadium	1.7	1.0	mg/kg dry	2.00		87	80-120			
Zinc	2.0	2.0	mg/kg dry	2.00		101	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		96	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
LCS (B8G0020-BS2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Antimony	2.00	0.10	mg/kg dry	2.00		100	80-120			
Arsenic	1.63	0.30	mg/kg dry	2.00		82	80-120			
Barium	1.7	1.0	mg/kg dry	2.00		84	80-120			
Beryllium	1.76	0.10	mg/kg dry	2.00		88	80-120			
Bismuth	1.81	0.10	mg/kg dry	2.00		90	80-120			
Boron	2.0	2.0	mg/kg dry	2.00		98	80-120			
Cadmium	1.70	0.040	mg/kg dry	2.00		85	80-120			
Calcium	185	100	mg/kg dry	200		92	80-120			
Chromium	1.7	1.0	mg/kg dry	2.00		85	80-120			
Cobalt	1.74	0.10	mg/kg dry	2.00		87	80-120			
Copper	1.87	0.40	mg/kg dry	2.00		93	80-120			
Iron	180	20	mg/kg dry	200		90	80-120			
Lead	1.96	0.20	mg/kg dry	2.00		98	80-120			
Lithium	1.88	0.10	mg/kg dry	2.00		94	80-120			
Magnesium	198	10	mg/kg dry	200		99	80-120			
Manganese	1.71	0.40	mg/kg dry	2.00		85	80-120			
Mercury	0.085	0.040	mg/kg dry	0.100		85	80-120			
Molybdenum	1.81	0.10	mg/kg dry	2.00		91	80-120			
Nickel	1.72	0.60	mg/kg dry	2.00		86	80-120			
Phosphorus	182	10	mg/kg dry	200		91	80-120			
Potassium	192	40	mg/kg dry	200		96	80-120			
Selenium	1.76	0.20	mg/kg dry	2.00		88	80-120			
Silver	1.74	0.10	mg/kg dry	2.00		87	80-120			
Sodium	206	50	mg/kg dry	240		86	80-120			
Strontium	1.67	0.20	mg/kg dry	2.00		83	80-120			
Sulfur	< 1000	1000	mg/kg dry	500		81	80-120			
Tellurium	1.81	0.10	mg/kg dry	2.00		90	80-120			
Thallium	1.77	0.10	mg/kg dry	2.00		89	80-120			
Thorium	1.94	0.50	mg/kg dry	2.00		97	80-120			
Tin	1.87	0.20	mg/kg dry	2.00		93	80-120			
Titanium	2.0	1.0	mg/kg dry	2.00		100	80-120			
Tungsten	1.80	0.20	mg/kg dry	2.00		90	80-120			
Uranium	2.30	0.050	mg/kg dry	2.00		115	80-120			
Vanadium	1.8	1.0	mg/kg dry	2.00		89	80-120			
Zinc	2.2	2.0	mg/kg dry	2.00		112	80-120			
Zirconium	< 2.0	2.0	mg/kg dry	2.00		88	80-120			
Reference (B8G0020-SRM1)				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Aluminum	17600	40	mg/kg dry	17500		101	70-130			
Antimony	6.40	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.4	0.30	mg/kg dry	15.1		96	70-130			
Barium	74.8	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.2	2.0	mg/kg dry	3.00		105	70-130			
Cadmium	0.215	0.040	mg/kg dry	0.216		99	70-130			
Calcium	3330	100	mg/kg dry	3290		101	70-130			
Chromium	26.3	1.0	mg/kg dry	27.5		96	70-130			
Cobalt	11.7	0.10	mg/kg dry	12.4		94	70-130			
Copper	42.5	0.40	mg/kg dry	45.3		94	70-130			
Iron	31100	20	mg/kg dry	32600		95	70-130			
Lead	13.5	0.20	mg/kg dry	13.8		98	70-130			
Lithium	10.4	0.10	mg/kg dry	9.91		105	70-130			
Magnesium	6030	10	mg/kg dry	5770		105	70-130			
Manganese	987	0.40	mg/kg dry	1090		91	70-130			
Mercury	0.100	0.040	mg/kg dry	0.103		97	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Strong Acid Leachable Metals, Batch B8G0020, Continued										
Reference (B8G0020-SRM1), Continued				Prepared: 2018-07-03, Analyzed: 2018-07-03						
Molybdenum	0.74	0.10	mg/kg dry	0.731		101	70-130			
Nickel	16.2	0.60	mg/kg dry	17.4		93	70-130			
Phosphorus	780	10	mg/kg dry	756		103	70-130			
Potassium	663	40	mg/kg dry	631		105	70-130			
Sodium	417	50	mg/kg dry	388		108	70-130			
Strontium	11.2	0.20	mg/kg dry	11.5		97	70-130			
Thorium	3.68	0.50	mg/kg dry	3.61		102	70-130			
Tin	1.08	0.20	mg/kg dry	1.03		105	70-130			
Titanium	805	1.0	mg/kg dry	833		97	70-130			
Uranium	0.810	0.050	mg/kg dry	0.837		97	70-130			
Vanadium	50.8	1.0	mg/kg dry	54.9		93	70-130			
Zinc	61.8	2.0	mg/kg dry	66.8		92	70-130			
Reference (B8G0020-SRM2)				Prepared: 2018-07-03, Analyzed: 2018-07-04						
Aluminum	17400	40	mg/kg dry	17500		99	70-130			
Antimony	6.39	0.10	mg/kg dry	6.46		99	70-130			
Arsenic	14.9	0.30	mg/kg dry	15.1		99	70-130			
Barium	75.1	1.0	mg/kg dry	80.6		93	70-130			
Beryllium	0.51	0.10	mg/kg dry	0.522		98	70-130			
Bismuth	1.93	0.10	mg/kg dry	1.89		102	70-130			
Boron	3.7	2.0	mg/kg dry	3.00		124	70-130			
Cadmium	0.229	0.040	mg/kg dry	0.216		106	70-130			
Calcium	3300	100	mg/kg dry	3290		100	70-130			
Chromium	26.9	1.0	mg/kg dry	27.5		98	70-130			
Cobalt	12.0	0.10	mg/kg dry	12.4		97	70-130			
Copper	43.5	0.40	mg/kg dry	45.3		96	70-130			
Iron	31400	20	mg/kg dry	32600		96	70-130			
Lead	14.0	0.20	mg/kg dry	13.8		101	70-130			
Lithium	10.1	0.10	mg/kg dry	9.91		102	70-130			
Magnesium	5980	10	mg/kg dry	5770		104	70-130			
Manganese	1010	0.40	mg/kg dry	1090		93	70-130			
Mercury	0.112	0.040	mg/kg dry	0.103		109	70-130			
Molybdenum	0.73	0.10	mg/kg dry	0.731		99	70-130			
Nickel	16.7	0.60	mg/kg dry	17.4		96	70-130			
Phosphorus	752	10	mg/kg dry	756		99	70-130			
Potassium	652	40	mg/kg dry	631		103	70-130			
Sodium	407	50	mg/kg dry	388		105	70-130			
Strontium	11.3	0.20	mg/kg dry	11.5		98	70-130			
Thorium	3.88	0.50	mg/kg dry	3.61		107	70-130			
Tin	1.16	0.20	mg/kg dry	1.03		113	70-130			
Titanium	819	1.0	mg/kg dry	833		98	70-130			
Uranium	0.844	0.050	mg/kg dry	0.837		101	70-130			
Vanadium	51.8	1.0	mg/kg dry	54.9		94	70-130			
Zinc	63.0	2.0	mg/kg dry	66.8		94	70-130			

QC Qualifiers:

PH1 Due to limited sample volume or matrix, the ratio of water to soil was greater than 2:1

APPENDIX 3: REVISION HISTORY

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8062810
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-07-24 12:44

Sample ID	Changed	Change	Analysis	Analyte(s)
8062810-01	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-01	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-02	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-02	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-03	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-03	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-04	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-04	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-05	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-05	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-06	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-08	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-08	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-09	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-09	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-10	2018-07-23	**DELETED**	Saturated Paste Chloride (mg/kg)	
8062810-10	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-10	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-11	2018-07-23	Added	Saturated Paste Chloride (mg/kg)	
8062810-11	2018-07-23	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-01	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-02	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-03	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-04	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-06	2018-07-24	Result Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-06	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste
8062810-09	2018-07-24	RL Revised	Saturated Paste Chloride (mg/kg)	Chloride, Saturated Paste

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8090975
PO NUMBER		**RECEIVED / TEMP**	2018-09-12 07:30 / 10°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09
PROJECT INFO		**COC NUMBER**	B74141

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at jnobrega@caro.ca

Authorized By:

Jessica Nobrega, B.Sc.
Client Service Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
MW-6S (8090975-01) | Matrix: Water | Sampled: 2018-09-10 14:00					F1
Anions					
Bromide	< 10.0	0.10	mg/L	2018-09-13	
Chloride	**809**	0.10	mg/L	2018-09-13	
Fluoride	**0.28**	0.10	mg/L	2018-09-13	
Nitrate (as N)	**67.4**	0.010	mg/L	2018-09-13	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-09-13	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-13	
Sulfate	**1320**	1.0	mg/L	2018-09-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**1140**	1.0	mg/L	2018-09-12	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-12	
Alkalinity, Bicarbonate (as CaCO3)	**1140**	1.0	mg/L	2018-09-12	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-12	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-12	
Bicarbonate (HCO3)	**1390**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**1.12**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**4070**	2.0	µS/cm	2018-09-12	
pH	**7.45**	0.10	pH units	2018-09-12	HT2
Solids, Total Suspended	**1160**	2.0	mg/L	2018-09-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1500**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0081**	0.0050	mg/L	2018-09-15	
Antimony, dissolved	**0.00076**	0.00020	mg/L	2018-09-15	
Arsenic, dissolved	**0.00067**	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.0491**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**1.60**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**148**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	**0.00162**	0.00010	mg/L	2018-09-15	
Copper, dissolved	**0.00312**	0.00040	mg/L	2018-09-15	
Iron, dissolved	**0.046**	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.0403**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**274**	0.010	mg/L	2018-09-15	
Manganese, dissolved	**0.0262**	0.00020	mg/L	2018-09-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
MW-6S (8090975-01) | Matrix: Water | Sampled: 2018-09-10 14:00, Continued					F1
Dissolved Metals, Continued					
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00033**	0.00010	mg/L	2018-09-15	
Nickel, dissolved	**0.0123**	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**180**	0.10	mg/L	2018-09-15	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**11.3**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**297**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**1.65**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**257**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	**0.000057**	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.00763**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	**0.0044**	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	**0.00019**	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
MW-6S (8090975-01) | Matrix: Water | Sampled: 2018-09-10 14:00, Continued					F1
Volatile Organic Compounds (VOC), Continued					
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	< 1.0	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*105*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*93*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*88*	*70-130*	%	*2018-09-16*	
MW18-10 (8090975-02) | Matrix: Water | Sampled: 2018-09-10 15:00					F1
Anions					
Bromide	< 1.00	0.10	mg/L	2018-09-13	
Chloride	**313**	0.10	mg/L	2018-09-13	
Fluoride	**0.29**	0.10	mg/L	2018-09-14	
Nitrate (as N)	**21.7**	0.010	mg/L	2018-09-13	
Nitrite (as N)	**0.134**	0.010	mg/L	2018-09-13	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-13	
Sulfate	**89.0**	1.0	mg/L	2018-09-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**992**	1.0	mg/L	2018-09-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Bicarbonate (as CaCO3)	**992**	1.0	mg/L	2018-09-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Bicarbonate (HCO3)	**1210**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**2.14**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**2590**	2.0	µS/cm	2018-09-13	
pH	**7.70**	0.10	pH units	2018-09-13	HT2
Solids, Total Suspended	**1190**	2.0	mg/L	2018-09-14	
Calculated Parameters					

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8090975-02) | Matrix: Water | Sampled: 2018-09-10 15:00, Continued					F1
Calculated Parameters, Continued					
Hardness, Total (as CaCO3)	**1020**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0124**	0.0050	mg/L	2018-09-15	
Antimony, dissolved	**0.00072**	0.00020	mg/L	2018-09-15	
Arsenic, dissolved	**0.00212**	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.167**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**0.465**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	**0.000010**	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**97.8**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	**0.00322**	0.00010	mg/L	2018-09-15	
Copper, dissolved	**0.00263**	0.00040	mg/L	2018-09-15	
Iron, dissolved	**0.011**	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.0260**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**188**	0.010	mg/L	2018-09-15	
Manganese, dissolved	**0.126**	0.00020	mg/L	2018-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00257**	0.00010	mg/L	2018-09-15	
Nickel, dissolved	**0.0388**	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**20.0**	0.10	mg/L	2018-09-15	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**10.2**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**185**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**1.18**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**31.3**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	**0.000085**	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.00845**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	**0.00060**	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8090975-02) | Matrix: Water | Sampled: 2018-09-10 15:00, Continued					F1
Volatile Organic Compounds (VOC), Continued					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.4	1.0	µg/L	2018-09-16	RA1
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	**10.8**	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*108*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*94*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*91*	*70-130*	%	*2018-09-16*	
TH-8 (8090975-03) | Matrix: Water | Sampled: 2018-09-11 10:00					F1
Anions					
Bromide	< 0.10	0.10	mg/L	2018-09-14	
Chloride	**509**	0.10	mg/L	2018-09-14	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
TH-8 (8090975-03) | Matrix: Water | Sampled: 2018-09-11 10:00, Continued					F1
Anions, Continued					
Fluoride	**0.28**	0.10	mg/L	2018-09-14	
Nitrate (as N)	**0.940**	0.010	mg/L	2018-09-14	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-09-14	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-14	
Sulfate	**48.6**	1.0	mg/L	2018-09-14	
General Parameters					
Alkalinity, Total (as CaCO3)	**797**	1.0	mg/L	2018-09-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Bicarbonate (as CaCO3)	**797**	1.0	mg/L	2018-09-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Bicarbonate (HCO3)	**972**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.052**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**2770**	2.0	µS/cm	2018-09-13	
pH	**7.83**	0.10	pH units	2018-09-13	HT2
Solids, Total Suspended	**1460**	2.0	mg/L	2018-09-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**704**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Antimony, dissolved	**0.00028**	0.00020	mg/L	2018-09-15	
Arsenic, dissolved	**0.00200**	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.174**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**0.0602**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**84.0**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Copper, dissolved	**0.00086**	0.00040	mg/L	2018-09-15	
Iron, dissolved	< 0.010	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.0198**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**120**	0.010	mg/L	2018-09-15	
Manganese, dissolved	**0.00139**	0.00020	mg/L	2018-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00072**	0.00010	mg/L	2018-09-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
TH-8 (8090975-03) | Matrix: Water | Sampled: 2018-09-11 10:00, Continued					F1
Dissolved Metals, Continued					
Nickel, dissolved	**0.00298**	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**5.61**	0.10	mg/L	2018-09-15	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**8.8**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**316**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**1.30**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**17.2**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	**0.000074**	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	**0.0060**	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.00231**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
TH-8 (8090975-03) | Matrix: Water | Sampled: 2018-09-11 10:00, Continued					F1
Volatile Organic Compounds (VOC), Continued					
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	**60.2**	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*108*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*95*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*90*	*70-130*	%	*2018-09-16*	
DMW-1b (8090975-04) | Matrix: Water | Sampled: 2018-09-11 11:00					F1
Anions					
Bromide	< 0.10	0.10	mg/L	2018-09-14	
Chloride	**52.3**	0.10	mg/L	2018-09-14	
Fluoride	**1.38**	0.10	mg/L	2018-09-14	
Nitrate (as N)	< 0.100	0.010	mg/L	2018-09-14	RA1
Nitrite (as N)	< 0.100	0.010	mg/L	2018-09-14	RA1
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-14	
Sulfate	**119**	1.0	mg/L	2018-09-14	
General Parameters					
Alkalinity, Total (as CaCO3)	**522**	1.0	mg/L	2018-09-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Bicarbonate (as CaCO3)	**522**	1.0	mg/L	2018-09-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Bicarbonate (HCO3)	**637**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.249**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**1180**	2.0	µS/cm	2018-09-13	
pH	**7.79**	0.10	pH units	2018-09-13	HT2
Solids, Total Suspended	< 2.5	2.0	mg/L	2018-09-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**613**	0.500	mg/L	N/A	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-1b (8090975-04) | Matrix: Water | Sampled: 2018-09-11 11:00, Continued					F1
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Arsenic, dissolved	**0.0411**	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.0222**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**0.134**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**70.8**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-09-15	
Iron, dissolved	< 0.010	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.0245**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**106**	0.010	mg/L	2018-09-15	
Manganese, dissolved	**0.00389**	0.00020	mg/L	2018-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00036**	0.00010	mg/L	2018-09-15	
Nickel, dissolved	**0.00201**	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**4.79**	0.10	mg/L	2018-09-15	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**7.6**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**28.8**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**1.76**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**41.4**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.000071**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	**0.00167**	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-1b (8090975-04) | Matrix: Water | Sampled: 2018-09-11 11:00, Continued					F1
Volatile Organic Compounds (VOC), Continued					
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	< 1.0	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*107*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*96*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*91*	*70-130*	%	*2018-09-16*	
DMW-4 (8090975-05) | Matrix: Water | Sampled: 2018-09-11 11:30					F1
Anions					
Bromide	< 0.10	0.10	mg/L	2018-09-14	
Chloride	**12.6**	0.10	mg/L	2018-09-14	
Fluoride	**0.72**	0.10	mg/L	2018-09-14	
Nitrate (as N)	**0.048**	0.010	mg/L	2018-09-14	
Nitrite (as N)	**0.336**	0.010	mg/L	2018-09-14	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8090975-05) | Matrix: Water | Sampled: 2018-09-11 11:30, Continued					F1
Anions, Continued					
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-14	
Sulfate	**252**	1.0	mg/L	2018-09-14	
General Parameters					
Alkalinity, Total (as CaCO3)	**452**	1.0	mg/L	2018-09-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Bicarbonate (as CaCO3)	**452**	1.0	mg/L	2018-09-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Bicarbonate (HCO3)	**552**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.849**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**1180**	2.0	µS/cm	2018-09-13	
pH	**7.80**	0.10	pH units	2018-09-13	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-09-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**587**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Arsenic, dissolved	**0.00137**	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.0155**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**0.336**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	**0.000015**	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**78.6**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	**0.00112**	0.00010	mg/L	2018-09-15	
Copper, dissolved	**0.0263**	0.00040	mg/L	2018-09-15	
Iron, dissolved	< 0.010	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.0443**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**94.7**	0.010	mg/L	2018-09-15	
Manganese, dissolved	**0.00658**	0.00020	mg/L	2018-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00079**	0.00010	mg/L	2018-09-15	
Nickel, dissolved	**0.00132**	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**8.04**	0.10	mg/L	2018-09-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8090975-05) | Matrix: Water | Sampled: 2018-09-11 11:30, Continued					F1
Dissolved Metals, Continued					
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**6.5**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**41.2**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**4.80**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**86.6**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.00118**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	**0.0550**	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	**0.00047**	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8090975-05) | Matrix: Water | Sampled: 2018-09-11 11:30, Continued					F1
Volatile Organic Compounds (VOC), Continued					
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	< 1.0	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*109*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*97*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*93*	*70-130*	%	*2018-09-16*	
Town Well #4 (8090975-06) | Matrix: Water | Sampled: 2018-09-11 12:00					F1
Anions					
Bromide	< 0.10	0.10	mg/L	2018-09-14	
Chloride	**87.4**	0.10	mg/L	2018-09-14	
Fluoride	< 0.10	0.10	mg/L	2018-09-14	
Nitrate (as N)	**1.76**	0.010	mg/L	2018-09-14	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-09-14	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-09-14	
Sulfate	**42.3**	1.0	mg/L	2018-09-14	
General Parameters					
Alkalinity, Total (as CaCO3)	**378**	1.0	mg/L	2018-09-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Bicarbonate (as CaCO3)	**378**	1.0	mg/L	2018-09-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-09-13	
Bicarbonate (HCO3)	**461**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.020**	0.020	mg/L	2018-09-15	
Conductivity (EC)	**1020**	2.0	µS/cm	2018-09-13	
pH	**7.83**	0.10	pH units	2018-09-13	HT2
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-09-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**399**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (8090975-06) | Matrix: Water | Sampled: 2018-09-11 12:00, Continued					F1
Dissolved Metals, Continued					
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Barium, dissolved	**0.219**	0.0050	mg/L	2018-09-15	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Boron, dissolved	**0.0357**	0.0050	mg/L	2018-09-15	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-09-15	
Calcium, dissolved	**90.1**	0.20	mg/L	2018-09-15	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Copper, dissolved	**0.00182**	0.00040	mg/L	2018-09-15	
Iron, dissolved	< 0.010	0.010	mg/L	2018-09-15	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Lithium, dissolved	**0.00212**	0.00010	mg/L	2018-09-15	
Magnesium, dissolved	**42.3**	0.010	mg/L	2018-09-15	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-09-15	CT5
Molybdenum, dissolved	**0.00021**	0.00010	mg/L	2018-09-15	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-09-15	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-09-15	
Potassium, dissolved	**1.77**	0.10	mg/L	2018-09-15	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Silicon, dissolved	**4.6**	1.0	mg/L	2018-09-15	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-09-15	
Sodium, dissolved	**56.9**	0.10	mg/L	2018-09-15	
Strontium, dissolved	**0.460**	0.0010	mg/L	2018-09-15	
Sulfur, dissolved	**14.3**	3.0	mg/L	2018-09-15	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-09-15	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-09-15	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-09-15	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-09-15	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Uranium, dissolved	**0.00132**	0.000020	mg/L	2018-09-15	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-09-15	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-09-15	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-09-15	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-09-16	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-09-16	
Bromoform	< 1.0	1.0	µg/L	2018-09-16	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-09-16	
Chlorobenzene	< 1.0	1.0	µg/L	2018-09-16	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well #4 (8090975-06) | Matrix: Water | Sampled: 2018-09-11 12:00, Continued					F1
Volatile Organic Compounds (VOC), Continued					
Chloroethane	< 2.0	2.0	µg/L	2018-09-16	
Chloroform	< 1.0	1.0	µg/L	2018-09-16	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-09-16	
Dibromomethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-09-16	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Dichloromethane	< 3.0	3.0	µg/L	2018-09-16	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-09-16	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-09-16	
Ethylbenzene	< 1.0	1.0	µg/L	2018-09-16	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-09-16	
Styrene	< 1.0	1.0	µg/L	2018-09-16	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-09-16	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Toluene	< 1.0	1.0	µg/L	2018-09-16	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-09-16	
Trichloroethylene	< 1.0	1.0	µg/L	2018-09-16	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-09-16	
Vinyl chloride	< 1.0	1.0	µg/L	2018-09-16	
Xylenes (total)	< 2.0	2.0	µg/L	2018-09-16	
Surrogate: Toluene-d8	*105*	*70-130*	%	*2018-09-16*	
Surrogate: 4-Bromofluorobenzene	*94*	*70-130*	%	*2018-09-16*	
Surrogate: 1,4-Dichlorobenzene-d4	*89*	*70-130*	%	*2018-09-16*	

Sample Qualifiers:

CT5	This sample has been incorrectly preserved for Mercury analysis
F1	The sample was not field-filtered and was therefore filtered through a 0.45 µm membrane in the laboratory and preserved with HNO3 prior to analysis for dissolved metals.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
RA1	The Reporting Limit has been raised due to matrix interference.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2011)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2011)	Gravimetry (Dried at 103-105C)	Kelowna
Volatile Organic Compounds in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, ph > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8I0870										
Blank (B8I0870-BLK1)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8I0870-BLK2)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8I0870-BLK3)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8I0870-BS1)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Bromide	4.38	0.10	mg/L	4.00		110	85-115			
Chloride	15.5	0.10	mg/L	16.0		97	90-110			
Fluoride	3.93	0.10	mg/L	4.00		98	88-108			
Nitrate (as N)	3.96	0.010	mg/L	4.00		99	93-108			
Nitrite (as N)	1.88	0.010	mg/L	2.00		94	85-114			
Phosphate (as P)	1.03	0.0050	mg/L	1.00		103	80-120			
Sulfate	15.9	1.0	mg/L	16.0		99	91-109			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8I0870, Continued										
LCS (B8I0870-BS2)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Bromide	4.34	0.10	mg/L	4.00		109	85-115			
Chloride	15.6	0.10	mg/L	16.0		98	90-110			
Fluoride	4.05	0.10	mg/L	4.00		101	88-108			
Nitrate (as N)	4.06	0.010	mg/L	4.00		101	93-108			
Nitrite (as N)	1.92	0.010	mg/L	2.00		96	85-114			
Phosphate (as P)	1.03	0.0050	mg/L	1.00		103	80-120			
Sulfate	15.8	1.0	mg/L	16.0		99	91-109			
LCS (B8I0870-BS3)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Bromide	4.40	0.10	mg/L	4.00		110	85-115			
Chloride	15.7	0.10	mg/L	16.0		98	90-110			
Fluoride	4.03	0.10	mg/L	4.00		101	88-108			
Nitrate (as N)	3.95	0.010	mg/L	4.00		99	93-108			
Nitrite (as N)	1.88	0.010	mg/L	2.00		94	85-114			
Phosphate (as P)	0.948	0.0050	mg/L	1.00		95	80-120			
Sulfate	15.7	1.0	mg/L	16.0		98	91-109			
Dissolved Metals, Batch B8I1053										
Blank (B8I1053-BLK1)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Mercury, dissolved	< 0.000040	0.000040	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8I1053, Continued										
Blank (B8I1053-BLK1), Continued				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B8I1053-BS1)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Aluminum, dissolved	0.0232	0.0050	mg/L	0.0200		116	80-120			
Antimony, dissolved	0.0197	0.00020	mg/L	0.0200		98	80-120			
Arsenic, dissolved	0.0210	0.00050	mg/L	0.0200		105	80-120			
Barium, dissolved	0.0204	0.0050	mg/L	0.0200		102	80-120			
Beryllium, dissolved	0.0202	0.00010	mg/L	0.0200		101	80-120			
Bismuth, dissolved	0.0205	0.00010	mg/L	0.0200		102	80-120			
Boron, dissolved	0.0173	0.0050	mg/L	0.0200		87	80-120			
Cadmium, dissolved	0.0211	0.000010	mg/L	0.0200		105	80-120			
Calcium, dissolved	1.95	0.20	mg/L	2.00		98	80-120			
Chromium, dissolved	0.0204	0.00050	mg/L	0.0200		102	80-120			
Cobalt, dissolved	0.0207	0.00010	mg/L	0.0200		103	80-120			
Copper, dissolved	0.0213	0.00040	mg/L	0.0200		107	80-120			
Iron, dissolved	1.92	0.010	mg/L	2.00		96	80-120			
Lead, dissolved	0.0208	0.00020	mg/L	0.0200		104	80-120			
Lithium, dissolved	0.0207	0.00010	mg/L	0.0200		104	80-120			
Magnesium, dissolved	2.01	0.010	mg/L	2.00		100	80-120			
Manganese, dissolved	0.0204	0.00020	mg/L	0.0200		102	80-120			
Mercury, dissolved	0.000892	0.000040	mg/L	0.00100		89	80-120			
Molybdenum, dissolved	0.0196	0.00010	mg/L	0.0200		98	80-120			
Nickel, dissolved	0.0207	0.00040	mg/L	0.0200		103	80-120			
Phosphorus, dissolved	1.97	0.050	mg/L	2.00		98	80-120			
Potassium, dissolved	1.89	0.10	mg/L	2.00		94	80-120			
Selenium, dissolved	0.0220	0.00050	mg/L	0.0200		110	80-120			
Silicon, dissolved	1.7	1.0	mg/L	2.00		87	80-120			
Silver, dissolved	0.0207	0.000050	mg/L	0.0200		104	80-120			
Sodium, dissolved	1.93	0.10	mg/L	2.00		96	80-120			
Strontium, dissolved	0.0200	0.0010	mg/L	0.0200		100	80-120			
Sulfur, dissolved	4.6	3.0	mg/L	5.00		92	80-120			
Tellurium, dissolved	0.0204	0.00050	mg/L	0.0200		102	80-120			
Thallium, dissolved	0.0210	0.000020	mg/L	0.0200		105	80-120			
Thorium, dissolved	0.0198	0.00010	mg/L	0.0200		99	80-120			
Tin, dissolved	0.0202	0.00020	mg/L	0.0200		101	80-120			
Titanium, dissolved	0.0200	0.0050	mg/L	0.0200		100	80-120			
Tungsten, dissolved	0.0208	0.0010	mg/L	0.0200		104	80-120			
Uranium, dissolved	0.0206	0.000020	mg/L	0.0200		103	80-120			
Vanadium, dissolved	0.0199	0.0010	mg/L	0.0200		99	80-120			
Zinc, dissolved	0.0240	0.0040	mg/L	0.0200		120	80-120			
Zirconium, dissolved	0.0204	0.00010	mg/L	0.0200		102	80-120			
Reference (B8I1053-SRM1)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Aluminum, dissolved	0.235	0.0050	mg/L	0.233		101	79-114			
Antimony, dissolved	0.0449	0.00020	mg/L	0.0430		104	89-123			
Arsenic, dissolved	0.461	0.00050	mg/L	0.438		105	87-113			
Barium, dissolved	3.15	0.0050	mg/L	3.35		94	85-114			
Beryllium, dissolved	0.209	0.00010	mg/L	0.213		98	79-122			
Boron, dissolved	1.49	0.0050	mg/L	1.74		86	79-117			
Cadmium, dissolved	0.228	0.000010	mg/L	0.224		102	89-112			
Calcium, dissolved	7.35	0.20	mg/L	7.69		96	85-120			
Chromium, dissolved	0.431	0.00050	mg/L	0.437		99	87-113			
Cobalt, dissolved	0.127	0.00010	mg/L	0.128		99	90-117			
Copper, dissolved	0.848	0.00040	mg/L	0.844		100	90-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8I1053, Continued										
Reference (B8I1053-SRM1), Continued				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Iron, dissolved	1.21	0.010	mg/L	1.29		94	86-112			
Lead, dissolved	0.112	0.00020	mg/L	0.112		100	90-113			
Lithium, dissolved	0.101	0.00010	mg/L	0.104		97	77-127			
Magnesium, dissolved	6.52	0.010	mg/L	6.92		94	84-116			
Manganese, dissolved	0.336	0.00020	mg/L	0.345		97	85-113			
Molybdenum, dissolved	0.404	0.00010	mg/L	0.426		95	87-112			
Nickel, dissolved	0.846	0.00040	mg/L	0.840		101	90-114			
Phosphorus, dissolved	0.494	0.050	mg/L	0.495		100	74-119			
Potassium, dissolved	2.79	0.10	mg/L	3.19		88	78-119			
Selenium, dissolved	0.0375	0.00050	mg/L	0.0331		113	89-123			
Sodium, dissolved	17.4	0.10	mg/L	19.1		91	81-117			
Strontium, dissolved	0.911	0.0010	mg/L	0.916		99	82-111			
Thallium, dissolved	0.0403	0.000020	mg/L	0.0393		103	90-113			
Uranium, dissolved	0.252	0.000020	mg/L	0.266		95	87-113			
Vanadium, dissolved	0.845	0.0010	mg/L	0.869		97	85-110			
Zinc, dissolved	0.974	0.0040	mg/L	0.881		111	88-114			
General Parameters, Batch B8I0803										
Blank (B8I0803-BLK1)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8I0803-BLK2)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8I0803-BLK3)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B8I0803-BS1)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Alkalinity, Total (as CaCO3)	106	1.0	mg/L	1000		11	92-106			
LCS (B8I0803-BS2)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Alkalinity, Total (as CaCO3)	106	1.0	mg/L	1000		11	92-106			
LCS (B8I0803-BS3)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	1000		10	92-106			
LCS (B8I0803-BS4)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8I0803, Continued										
LCS (B8I0803-BS5)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
Conductivity (EC)	1410	2.0	µS/cm	1410		100	95-104			
LCS (B8I0803-BS6)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			
Reference (B8I0803-SRM1)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
pH	6.96	0.10	pH units	7.00		99	80-120			
Reference (B8I0803-SRM2)				Prepared: 2018-09-12, Analyzed: 2018-09-12						
pH	6.96	0.10	pH units	7.00		99	80-120			
Reference (B8I0803-SRM3)				Prepared: 2018-09-13, Analyzed: 2018-09-13						
pH	6.96	0.10	pH units	7.00		99	80-120			
General Parameters, Batch B8I0878										
Blank (B8I0878-BLK1)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8I0878-BLK2)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8I0878-BLK3)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
LCS (B8I0878-BS1)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	0.916	0.020	mg/L	1.00		92	90-115			
LCS (B8I0878-BS2)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	0.994	0.020	mg/L	1.00		99	90-115			
LCS (B8I0878-BS3)				Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	1.02	0.020	mg/L	1.00		102	90-115			
Duplicate (B8I0878-DUP3)		**Source: 8090975-06**		Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	0.020	0.020	mg/L		0.020				15	
Matrix Spike (B8I0878-MS3)		**Source: 8090975-06**		Prepared: 2018-09-15, Analyzed: 2018-09-15						
Ammonia, Total (as N)	0.275	0.020	mg/L	0.250	0.020	102	75-125			
General Parameters, Batch B8I0956										
Blank (B8I0956-BLK1)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B8I0956-BLK2)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B8I0956-BS1)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Solids, Total Suspended	97.0	10.0	mg/L	100		97	91-106			
LCS (B8I0956-BS2)				Prepared: 2018-09-14, Analyzed: 2018-09-14						
Solids, Total Suspended	99.0	10.0	mg/L	100		99	91-106			
Volatile Organic Compounds (VOC), Batch B8I1052										

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8I1052, Continued										
Blank (B8I1052-BLK1)				Prepared: 2018-09-16, Analyzed: 2018-09-16						
Benzene	< 0.5	0.5	µg/L							
Bromodichloromethane	< 1.0	1.0	µg/L							
Bromoform	< 1.0	1.0	µg/L							
Carbon tetrachloride	< 0.5	0.5	µg/L							
Chlorobenzene	< 1.0	1.0	µg/L							
Chloroethane	< 2.0	2.0	µg/L							
Chloroform	< 1.0	1.0	µg/L							
Dibromochloromethane	< 1.0	1.0	µg/L							
1,2-Dibromoethane	< 0.3	0.3	µg/L							
Dibromomethane	< 1.0	1.0	µg/L							
1,2-Dichlorobenzene	< 0.5	0.5	µg/L							
1,3-Dichlorobenzene	< 1.0	1.0	µg/L							
1,4-Dichlorobenzene	< 1.0	1.0	µg/L							
1,1-Dichloroethane	< 1.0	1.0	µg/L							
1,2-Dichloroethane	< 1.0	1.0	µg/L							
1,1-Dichloroethylene	< 1.0	1.0	µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
Dichloromethane	< 3.0	3.0	µg/L							
1,2-Dichloropropane	< 1.0	1.0	µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L							
Ethylbenzene	< 1.0	1.0	µg/L							
Methyl tert-butyl ether	< 1.0	1.0	µg/L							
Styrene	< 1.0	1.0	µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L							
Tetrachloroethylene	< 1.0	1.0	µg/L							
Toluene	< 1.0	1.0	µg/L							
1,1,1-Trichloroethane	< 1.0	1.0	µg/L							
1,1,2-Trichloroethane	< 1.0	1.0	µg/L							
Trichloroethylene	< 1.0	1.0	µg/L							
Trichlorofluoromethane	< 1.0	1.0	µg/L							
Vinyl chloride	< 1.0	1.0	µg/L							
Xylenes (total)	< 2.0	2.0	µg/L							
Surrogate: Toluene-d8	*28.4*		*µg/L*	26.2		*109*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.3*		*µg/L*	25.0		*97*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*22.8*		*µg/L*	25.0		*91*	*70-130*			
LCS (B8I1052-BS1)				Prepared: 2018-09-16, Analyzed: 2018-09-16						
Benzene	20.3	0.5	µg/L	20.0		102	70-130			
Bromodichloromethane	22.2	1.0	µg/L	20.2		110	70-130			
Bromoform	19.7	1.0	µg/L	20.1		98	70-130			
Carbon tetrachloride	24.6	0.5	µg/L	20.1		122	70-130			
Chlorobenzene	21.2	1.0	µg/L	20.2		105	70-130			
Chloroethane	30.0	2.0	µg/L	20.0		150	60-140			SPK
Chloroform	21.9	1.0	µg/L	20.1		109	70-130			
Dibromochloromethane	20.8	1.0	µg/L	20.2		103	70-130			
1,2-Dibromoethane	20.1	0.3	µg/L	20.0		101	70-130			
Dibromomethane	19.7	1.0	µg/L	20.0		98	70-130			
1,2-Dichlorobenzene	21.8	0.5	µg/L	20.1		108	70-130			
1,3-Dichlorobenzene	21.3	1.0	µg/L	20.1		106	70-130			
1,4-Dichlorobenzene	20.8	1.0	µg/L	20.1		104	70-130			
1,1-Dichloroethane	21.3	1.0	µg/L	20.1		106	70-130			
1,2-Dichloroethane	21.7	1.0	µg/L	20.1		108	70-130			
1,1-Dichloroethylene	19.2	1.0	µg/L	20.1		95	70-130			
cis-1,2-Dichloroethylene	20.8	1.0	µg/L	20.0		104	70-130			
trans-1,2-Dichloroethylene	20.7	1.0	µg/L	20.1		103	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8090975
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-09-19 14:09

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8I1052, Continued										
LCS (B8I1052-BS1), Continued				Prepared: 2018-09-16, Analyzed: 2018-09-16						
Dichloromethane	18.7	3.0	µg/L	20.1		93	70-130			
1,2-Dichloropropane	20.5	1.0	µg/L	20.2		101	70-130			
1,3-Dichloropropene (cis + trans)	43.7	1.0	µg/L	40.0		109	70-130			
Ethylbenzene	17.1	1.0	µg/L	20.0		86	70-130			
Methyl tert-butyl ether	17.7	1.0	µg/L	20.0		88	70-130			
Styrene	20.9	1.0	µg/L	20.0		105	70-130			
1,1,2,2-Tetrachloroethane	19.3	0.5	µg/L	20.2		96	70-130			
Tetrachloroethylene	20.2	1.0	µg/L	20.1		100	70-130			
Toluene	17.3	1.0	µg/L	20.1		86	70-130			
1,1,1-Trichloroethane	24.3	1.0	µg/L	20.2		120	70-130			
1,1,2-Trichloroethane	19.1	1.0	µg/L	20.1		95	70-130			
Trichloroethylene	16.3	1.0	µg/L	20.1		81	70-130			
Trichlorofluoromethane	28.0	1.0	µg/L	20.0		140	60-140			
Vinyl chloride	21.2	1.0	µg/L	20.0		106	60-140			
Xylenes (total)	53.1	2.0	µg/L	60.1		88	70-130			
Surrogate: Toluene-d8	*29.3*		*µg/L*	26.2		*112*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.1*		*µg/L*	25.0		*96*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*22.3*		*µg/L*	25.0		*89*	*70-130*			

QC Qualifiers:

SPK The recovery of this analyte was outside of established control limits.

CERTIFICATE OF ANALYSIS

REPORTED TO	Western Water Associates Ltd 106 - 5145 26th Street Vernon, BC V1T 8G4		
ATTENTION	Bryer Manwell	**WORK ORDER**	8120636
PO NUMBER		**RECEIVED / TEMP**	2018-12-06 10:10 / 0°C
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15
PROJECT INFO	14-024-16	**COC NUMBER**	B67270

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO 17025:2005 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

If you have any questions or concerns, please contact me at estclair@caro.ca

Authorized By:

Eilish St.Clair, B.Sc., C.I.T.
Client Service Representative

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6D (8120636-01) | Matrix: Water | Sampled: 2018-12-03 11:30					F1, FILT, PRES
Anions					
Bromide	**1.88**	0.10	mg/L	2018-12-08	
Chloride	**358**	0.10	mg/L	2018-12-08	
Fluoride	**0.25**	0.10	mg/L	2018-12-08	
Nitrate (as N)	**27.2**	0.010	mg/L	2018-12-08	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-12-08	
Phosphate (as P)	**0.0179**	0.0050	mg/L	2018-12-08	
Sulfate	**582**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1630**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0101**	0.0050	mg/L	2018-12-13	
Antimony, dissolved	**0.00191**	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	**0.00063**	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.0465**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**1.95**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**164**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	**0.00164**	0.00010	mg/L	2018-12-13	
Copper, dissolved	**0.00328**	0.00040	mg/L	2018-12-13	
Iron, dissolved	< 0.010	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00048**	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.0443**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**297**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.00199**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, dissolved	**0.00047**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	**0.0120**	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**186**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**12.8**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**323**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**1.75**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**292**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	**0.000048**	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW09-6D (8120636-01) | Matrix: Water | Sampled: 2018-12-03 11:30, Continued					F1, FILT, PRES
Dissolved Metals, Continued					
Tin, dissolved	**0.00151**	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.00793**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0057**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	**0.00021**	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**939**	1.0	mg/L	2018-12-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Bicarbonate (as CaCO3)	**939**	1.0	mg/L	2018-12-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Bicarbonate (HCO3)	**1150**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.790**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**789**	2.0	µS/cm	2018-12-11	
pH	**7.32**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	**0.163**	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	**157**	2.0	mg/L	2018-12-10	
Turbidity	**176**	0.10	NTU	2018-12-08	
MW18-10 (8120636-02) | Matrix: Water | Sampled: 2018-12-03 13:00					F1, FILT, PRES
Anions					
Bromide	**0.64**	0.10	mg/L	2018-12-08	
Chloride	**343**	0.10	mg/L	2018-12-08	
Fluoride	**0.20**	0.10	mg/L	2018-12-08	
Nitrate (as N)	**15.7**	0.010	mg/L	2018-12-08	
Nitrite (as N)	**0.020**	0.010	mg/L	2018-12-08	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-08	
Sulfate	**76.5**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1060**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, dissolved	**0.00036**	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	**0.00161**	0.00050	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8120636-02) | Matrix: Water | Sampled: 2018-12-03 13:00, Continued					F1, FILT, PRES
Dissolved Metals, Continued					
Barium, dissolved	**0.227**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.452**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	**0.000045**	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**86.3**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	**0.00402**	0.00010	mg/L	2018-12-13	
Copper, dissolved	**0.00297**	0.00040	mg/L	2018-12-13	
Iron, dissolved	< 0.010	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00040**	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.0232**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**204**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.202**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, dissolved	**0.00190**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	**0.0438**	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**19.9**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**10.9**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**190**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**1.43**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**30.9**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	**0.000071**	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.00597**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0060**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	**0.00044**	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**876**	1.0	mg/L	2018-12-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Bicarbonate (as CaCO3)	**876**	1.0	mg/L	2018-12-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8120636-02) | Matrix: Water | Sampled: 2018-12-03 13:00, Continued					F1, FILT, PRES
General Parameters, Continued					
Bicarbonate (HCO3)	**1070**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**2.40**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**2500**	2.0	µS/cm	2018-12-11	
pH	**7.62**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	**0.0130**	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	**520**	2.0	mg/L	2018-12-10	
Turbidity	**661**	0.10	NTU	2018-12-08	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-12-12	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-12-12	
Bromoform	< 1.0	1.0	µg/L	2018-12-12	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-12-12	
Chlorobenzene	< 1.0	1.0	µg/L	2018-12-12	
Chloroethane	< 2.0	2.0	µg/L	2018-12-12	
Chloroform	< 1.0	1.0	µg/L	2018-12-12	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-12-12	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-12-12	
Dibromomethane	< 1.0	1.0	µg/L	2018-12-12	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-12-12	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-12-12	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-12-12	
1,1-Dichloroethane	**1.0**	1.0	µg/L	2018-12-12	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-12-12	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-12	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-12	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-12	
Dichloromethane	< 3.0	3.0	µg/L	2018-12-12	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-12-12	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-12-12	
Ethylbenzene	< 1.0	1.0	µg/L	2018-12-12	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-12-12	
Styrene	< 1.0	1.0	µg/L	2018-12-12	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-12-12	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-12-12	
Toluene	**16.2**	1.0	µg/L	2018-12-12	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-12-12	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-12-12	
Trichloroethylene	< 1.0	1.0	µg/L	2018-12-12	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-12-12	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-10 (8120636-02) | Matrix: Water | Sampled: 2018-12-03 13:00, Continued					F1, FILT, PRES
Volatile Organic Compounds (VOC), Continued					
Vinyl chloride	< 1.0	1.0	µg/L	2018-12-12	
Xylenes (total)	< 2.0	2.0	µg/L	2018-12-12	
Surrogate: Toluene-d8	*104*	*70-130*	%	*2018-12-12*	
Surrogate: 4-Bromofluorobenzene	*124*	*70-130*	%	*2018-12-12*	
Surrogate: 1,4-Dichlorobenzene-d4	*125*	*70-130*	%	*2018-12-12*	
MW10-8 (8120636-03) | Matrix: Water | Sampled: 2018-12-03 15:00					F1, FILT, PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-08	
Chloride	**580**	0.10	mg/L	2018-12-08	
Fluoride	**0.22**	0.10	mg/L	2018-12-08	
Nitrate (as N)	**0.778**	0.010	mg/L	2018-12-08	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-12-08	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-08	
Sulfate	**51.8**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**761**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, dissolved	**0.00029**	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	**0.00204**	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.199**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.0413**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**93.3**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Iron, dissolved	< 0.010	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00056**	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.0218**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**128**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.00063**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, dissolved	**0.00061**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	**0.00318**	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW10-8 (8120636-03) | Matrix: Water | Sampled: 2018-12-03 15:00, Continued					F1, FILT, PRES
Dissolved Metals, Continued					
Potassium, dissolved	**5.93**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**9.8**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**370**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**1.44**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**20.2**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	**0.000062**	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	**0.0064**	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.00238**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**1100**	1.0	mg/L	2018-12-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Bicarbonate (as CaCO3)	**1100**	1.0	mg/L	2018-12-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Bicarbonate (HCO3)	**1340**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.061**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**2.2**	2.0	µS/cm	2018-12-11	
pH	**7.81**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	**3520**	2.0	mg/L	2018-12-10	
Turbidity	**3750**	0.10	NTU	2018-12-08	
DMW-4 (8120636-04) | Matrix: Water | Sampled: 2018-12-03 16:00					F2, FILT, PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-08	
Chloride	**10.9**	0.10	mg/L	2018-12-08	
Fluoride	**0.62**	0.10	mg/L	2018-12-08	
Nitrate (as N)	**0.402**	0.010	mg/L	2018-12-08	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8120636-04) | Matrix: Water | Sampled: 2018-12-03 16:00, Continued					F2, FILT, PRES
Anions, Continued					HT1
Nitrite (as N)	**0.035**	0.010	mg/L	2018-12-08	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-08	
Sulfate	**215**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**551**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	**0.00146**	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.0224**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.330**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**67.9**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	**0.00076**	0.00010	mg/L	2018-12-13	
Copper, dissolved	**0.00315**	0.00040	mg/L	2018-12-13	
Iron, dissolved	**0.060**	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00032**	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.0429**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**92.6**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.00333**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Molybdenum, dissolved	**0.00077**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	**0.00116**	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**7.11**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**7.0**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**40.7**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**4.10**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**78.8**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.00134**	0.000020	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8120636-04) | Matrix: Water | Sampled: 2018-12-03 16:00, Continued					F2, FILT, PRES
Dissolved Metals, Continued					
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0189**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	**0.00053**	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**411**	1.0	mg/L	2018-12-13	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-13	
Alkalinity, Bicarbonate (as CaCO3)	**411**	1.0	mg/L	2018-12-13	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-13	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-13	
Bicarbonate (HCO3)	**502**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.416**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**1100**	2.0	µS/cm	2018-12-11	
pH	**7.83**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	< 3.3	2.0	mg/L	2018-12-10	
Turbidity	**0.58**	0.10	NTU	2018-12-08	
Total Metals					
Aluminum, total	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, total	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, total	**0.00161**	0.00050	mg/L	2018-12-13	
Barium, total	**0.0154**	0.0050	mg/L	2018-12-13	
Beryllium, total	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, total	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, total	**0.335**	0.0050	mg/L	2018-12-13	
Cadmium, total	**0.000010**	0.000010	mg/L	2018-12-13	
Calcium, total	**68.6**	0.20	mg/L	2018-12-13	
Chromium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, total	**0.00075**	0.00010	mg/L	2018-12-13	
Copper, total	**0.00488**	0.00040	mg/L	2018-12-13	
Iron, total	**0.062**	0.010	mg/L	2018-12-13	
Lead, total	**0.00078**	0.00020	mg/L	2018-12-13	
Lithium, total	**0.0435**	0.00010	mg/L	2018-12-13	
Magnesium, total	**94.9**	0.010	mg/L	2018-12-13	
Manganese, total	**0.00392**	0.00020	mg/L	2018-12-13	
Mercury, total	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, total	**0.00080**	0.00010	mg/L	2018-12-13	
Nickel, total	**0.00118**	0.00040	mg/L	2018-12-13	
Phosphorus, total	< 0.050	0.050	mg/L	2018-12-13	
Potassium, total	**7.38**	0.10	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
DMW-4 (8120636-04) | Matrix: Water | Sampled: 2018-12-03 16:00, Continued					F2, FILT, PRES
Total Metals, Continued					
Selenium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, total	**7.2**	1.0	mg/L	2018-12-13	
Silver, total	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, total	**41.5**	0.10	mg/L	2018-12-13	
Strontium, total	**4.14**	0.0010	mg/L	2018-12-13	
Sulfur, total	**81.0**	3.0	mg/L	2018-12-13	
Tellurium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, total	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, total	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, total	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, total	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, total	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, total	**0.00131**	0.000020	mg/L	2018-12-13	
Vanadium, total	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, total	**0.0192**	0.0040	mg/L	2018-12-13	
Zirconium, total	**0.00049**	0.00010	mg/L	2018-12-13	
Town Well 4 (8120636-05) | Matrix: Water | Sampled: 2018-12-03 14:30					FILT, PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-08	
Chloride	**97.0**	0.10	mg/L	2018-12-09	
Fluoride	< 0.10	0.10	mg/L	2018-12-08	
Nitrate (as N)	**1.60**	0.010	mg/L	2018-12-08	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-12-08	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-08	
Sulfate	**42.9**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**397**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.214**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.0293**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**86.2**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well 4 (8120636-05) | Matrix: Water | Sampled: 2018-12-03 14:30, Continued					FILT, PRES
Dissolved Metals, Continued					
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Copper, dissolved	**0.00065**	0.00040	mg/L	2018-12-13	
Iron, dissolved	< 0.010	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00025**	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.00231**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**44.1**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.00517**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Molybdenum, dissolved	**0.00023**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**2.12**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**4.9**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**58.5**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**0.471**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**15.0**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	**0.00022**	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.00133**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0063**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**355**	1.0	mg/L	2018-12-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Bicarbonate (as CaCO3)	**355**	1.0	mg/L	2018-12-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Bicarbonate (HCO3)	**433**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-12-11	
Conductivity (EC)	**1000**	2.0	µS/cm	2018-12-11	
pH	**7.92**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L	2018-12-10	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Town Well 4 (8120636-05) | Matrix: Water | Sampled: 2018-12-03 14:30, Continued					FILT, PRES
General Parameters, Continued					
Solids, Total Suspended	< 2.0	2.0	mg/L	2018-12-10	
Turbidity	< 0.10	0.10	NTU	2018-12-08	
Hospital Creek (8120636-06) | Matrix: Water | Sampled: 2018-12-04 13:00					F1, FILT, PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-08	
Chloride	**0.97**	0.10	mg/L	2018-12-08	
Fluoride	< 0.10	0.10	mg/L	2018-12-08	
Nitrate (as N)	**0.052**	0.010	mg/L	2018-12-08	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-12-08	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-08	
Sulfate	**28.9**	1.0	mg/L	2018-12-08	
Calculated Parameters					
Hardness, Total (as CaCO3)	**205**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.0555**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.0091**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**53.2**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Iron, dissolved	< 0.010	0.010	mg/L	2018-12-13	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.00102**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**17.5**	0.010	mg/L	2018-12-13	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, dissolved	**0.00036**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**0.47**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**3.3**	1.0	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Hospital Creek (8120636-06) | Matrix: Water | Sampled: 2018-12-04 13:00, Continued					F1, FILT, PRES
Dissolved Metals, Continued					
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**1.89**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**0.174**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**10.8**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.000797**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**189**	1.0	mg/L	2018-12-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Bicarbonate (as CaCO3)	**189**	1.0	mg/L	2018-12-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-11	
Bicarbonate (HCO3)	**230**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-12-11	
Conductivity (EC)	**382**	2.0	µS/cm	2018-12-11	
pH	**8.21**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	< 5.0	2.0	mg/L	2018-12-10	
Turbidity	**0.83**	0.10	NTU	2018-12-08	
Total Metals					
Aluminum, total	**0.0088**	0.0050	mg/L	2018-12-13	
Antimony, total	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, total	< 0.00050	0.00050	mg/L	2018-12-13	
Barium, total	**0.0589**	0.0050	mg/L	2018-12-13	
Beryllium, total	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, total	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, total	**0.0093**	0.0050	mg/L	2018-12-13	
Cadmium, total	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, total	**52.4**	0.20	mg/L	2018-12-13	
Chromium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, total	< 0.00010	0.00010	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Hospital Creek (8120636-06) | Matrix: Water | Sampled: 2018-12-04 13:00, Continued					F1, FILT, PRES
Total Metals, Continued					
Copper, total	**0.00323**	0.00040	mg/L	2018-12-13	
Iron, total	< 0.010	0.010	mg/L	2018-12-13	
Lead, total	**0.00096**	0.00020	mg/L	2018-12-13	
Lithium, total	**0.00107**	0.00010	mg/L	2018-12-13	
Magnesium, total	**18.1**	0.010	mg/L	2018-12-13	
Manganese, total	**0.00048**	0.00020	mg/L	2018-12-13	
Mercury, total	< 0.000010	0.000010	mg/L	2018-12-12	
Molybdenum, total	**0.00040**	0.00010	mg/L	2018-12-13	
Nickel, total	< 0.00040	0.00040	mg/L	2018-12-13	
Phosphorus, total	< 0.050	0.050	mg/L	2018-12-13	
Potassium, total	**0.45**	0.10	mg/L	2018-12-13	
Selenium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, total	**3.3**	1.0	mg/L	2018-12-13	
Silver, total	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, total	**1.86**	0.10	mg/L	2018-12-13	
Strontium, total	**0.173**	0.0010	mg/L	2018-12-13	
Sulfur, total	**10.1**	3.0	mg/L	2018-12-13	
Tellurium, total	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, total	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, total	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, total	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, total	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, total	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, total	**0.000856**	0.000020	mg/L	2018-12-13	
Vanadium, total	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, total	**0.0065**	0.0040	mg/L	2018-12-13	
Zirconium, total	< 0.00010	0.00010	mg/L	2018-12-13	
Well ID 22653 (8120636-07) | Matrix: Water | Sampled: 2018-12-04 14:30					FILT, PRES
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-09	
Chloride	**29.4**	0.10	mg/L	2018-12-09	
Fluoride	**0.13**	0.10	mg/L	2018-12-09	
Nitrate (as N)	< 0.010	0.010	mg/L	2018-12-09	
Nitrite (as N)	< 0.010	0.010	mg/L	2018-12-09	
Phosphate (as P)	< 0.0050	0.0050	mg/L	2018-12-09	
Sulfate	**23.5**	1.0	mg/L	2018-12-09	
Calculated Parameters					
Hardness, Total (as CaCO3)	**159**	0.500	mg/L	N/A	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Well ID 22653 (8120636-07) | Matrix: Water | Sampled: 2018-12-04 14:30, Continued					FILT, PRES
Dissolved Metals					
Aluminum, dissolved	**0.0068**	0.0050	mg/L	2018-12-13	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.0224**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.0156**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**20.4**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Iron, dissolved	**1.93**	0.010	mg/L	2018-12-13	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Lithium, dissolved	**0.00204**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**26.2**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.0986**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-12-13	
Molybdenum, dissolved	**0.00025**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**0.95**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	< 1.0	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**14.7**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**0.115**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**7.1**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	**0.00077**	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0043**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**142**	1.0	mg/L	2018-12-12	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
Well ID 22653 (8120636-07) | Matrix: Water | Sampled: 2018-12-04 14:30, Continued					FILT, PRES
General Parameters, Continued					
Alkalinity, Bicarbonate (as CaCO3)	**142**	1.0	mg/L	2018-12-12	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	
Bicarbonate (HCO3)	**173**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.326**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**387**	2.0	µS/cm	2018-12-12	
pH	**8.00**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	< 0.0020	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	**71.0**	2.0	mg/L	2018-12-10	
Turbidity	**142**	0.10	NTU	2018-12-08	
MW18-11 375ft (8120636-08) | Matrix: Water | Sampled: 2018-12-04 16:30					F1, FILT, PRESa
Anions					
Bromide	< 0.10	0.10	mg/L	2018-12-09	
Chloride	**26.6**	0.10	mg/L	2018-12-09	
Fluoride	**0.90**	0.10	mg/L	2018-12-09	
Nitrate (as N)	**1.03**	0.010	mg/L	2018-12-09	
Nitrite (as N)	**0.068**	0.010	mg/L	2018-12-09	
Phosphate (as P)	**0.0054**	0.0050	mg/L	2018-12-09	
Sulfate	**39.0**	1.0	mg/L	2018-12-09	
Calculated Parameters					
Hardness, Total (as CaCO3)	**278**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0134**	0.0050	mg/L	2018-12-13	
Antimony, dissolved	**0.00072**	0.00020	mg/L	2018-12-13	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Barium, dissolved	**0.0369**	0.0050	mg/L	2018-12-13	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Boron, dissolved	**0.0339**	0.0050	mg/L	2018-12-13	
Cadmium, dissolved	**0.000015**	0.000010	mg/L	2018-12-13	
Calcium, dissolved	**14.9**	0.20	mg/L	2018-12-13	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Cobalt, dissolved	**0.00046**	0.00010	mg/L	2018-12-13	
Copper, dissolved	**0.00271**	0.00040	mg/L	2018-12-13	
Iron, dissolved	**0.017**	0.010	mg/L	2018-12-13	
Lead, dissolved	**0.00031**	0.00020	mg/L	2018-12-13	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Analyzed	Qualifier
MW18-11 375ft (8120636-08) | Matrix: Water | Sampled: 2018-12-04 16:30, Continued					F1, FILT, PRESa
Dissolved Metals, Continued					
Lithium, dissolved	**0.0314**	0.00010	mg/L	2018-12-13	
Magnesium, dissolved	**58.4**	0.010	mg/L	2018-12-13	
Manganese, dissolved	**0.294**	0.00020	mg/L	2018-12-13	
Mercury, dissolved	< 0.000040	0.000040	mg/L	2018-12-13	CT5
Molybdenum, dissolved	**0.00620**	0.00010	mg/L	2018-12-13	
Nickel, dissolved	**0.00553**	0.00040	mg/L	2018-12-13	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-12-13	
Potassium, dissolved	**5.73**	0.10	mg/L	2018-12-13	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Silicon, dissolved	**1.1**	1.0	mg/L	2018-12-13	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-12-13	
Sodium, dissolved	**30.7**	0.10	mg/L	2018-12-13	
Strontium, dissolved	**0.0865**	0.0010	mg/L	2018-12-13	
Sulfur, dissolved	**16.1**	3.0	mg/L	2018-12-13	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-12-13	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-12-13	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-12-13	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-12-13	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Uranium, dissolved	**0.000448**	0.000020	mg/L	2018-12-13	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-12-13	
Zinc, dissolved	**0.0092**	0.0040	mg/L	2018-12-13	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-12-13	
General Parameters					
Alkalinity, Total (as CaCO3)	**494**	1.0	mg/L	2018-12-12	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	
Alkalinity, Bicarbonate (as CaCO3)	**494**	1.0	mg/L	2018-12-12	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-12-12	
Bicarbonate (HCO3)	**603**	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	0.340	mg/L	N/A	
Ammonia, Total (as N)	**0.449**	0.020	mg/L	2018-12-11	
Conductivity (EC)	**193**	2.0	µS/cm	2018-12-12	
pH	**8.07**	0.10	pH units	2018-12-10	HT2
Phosphorus, Total Dissolved	**0.0053**	0.0020	mg/L	2018-12-10	
Solids, Total Suspended	**2980**	2.0	mg/L	2018-12-10	
Turbidity	**≥ 4000**	0.10	NTU	2018-12-08	
Field Blank (8120636-09) | Matrix: Water | Sampled: 2018-12-04 09:00					

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
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Analyte	Result	RL	Units	Analyzed	Qualifier
Field Blank (8120636-09) | Matrix: Water | Sampled: 2018-12-04 09:00, Continued					
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2018-12-13	
Bromodichloromethane	< 1.0	1.0	µg/L	2018-12-13	
Bromoform	< 1.0	1.0	µg/L	2018-12-13	
Carbon tetrachloride	< 0.5	0.5	µg/L	2018-12-13	
Chlorobenzene	< 1.0	1.0	µg/L	2018-12-13	
Chloroethane	< 2.0	2.0	µg/L	2018-12-13	
Chloroform	**1.2**	1.0	µg/L	2018-12-13	
Dibromochloromethane	< 1.0	1.0	µg/L	2018-12-13	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2018-12-13	
Dibromomethane	< 1.0	1.0	µg/L	2018-12-13	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2018-12-13	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2018-12-13	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2018-12-13	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2018-12-13	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2018-12-13	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-13	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-13	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2018-12-13	
Dichloromethane	< 3.0	3.0	µg/L	2018-12-13	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2018-12-13	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2018-12-13	
Ethylbenzene	< 1.0	1.0	µg/L	2018-12-13	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2018-12-13	
Styrene	< 1.0	1.0	µg/L	2018-12-13	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2018-12-13	
Tetrachloroethylene	< 1.0	1.0	µg/L	2018-12-13	
Toluene	< 1.0	1.0	µg/L	2018-12-13	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2018-12-13	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2018-12-13	
Trichloroethylene	< 1.0	1.0	µg/L	2018-12-13	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2018-12-13	
Vinyl chloride	< 1.0	1.0	µg/L	2018-12-13	
Xylenes (total)	< 2.0	2.0	µg/L	2018-12-13	
Surrogate: Toluene-d8	*93*	*70-130*	%	*2018-12-13*	
Surrogate: 4-Bromofluorobenzene	*97*	*70-130*	%	*2018-12-13*	
Surrogate: 1,4-Dichlorobenzene-d4	*82*	*70-130*	%	*2018-12-13*	

TEST RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
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Sample Qualifiers:

CT5	This sample has been incorrectly preserved for Mercury analysis
F1	The sample was not field-filtered and was therefore filtered through a 0.45 µm membrane in the laboratory and preserved with HNO3 prior to analysis for dissolved metals.
F2	The sample was not field-preserved with HNO3 and was therefore preserved in the laboratory and held for at least 16 hours prior to analysis for total metals.
FILT	The sample has been filtered for DP in the laboratory. Results may not reflect conditions at the time of sampling.
HT1	The sample was prepared and/or analyzed past the recommended holding time.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
PRES	Sample has been preserved for DP in the laboratory and the holding time has been extended.
PRESa	Sample has been preserved for DP, NH3 in the laboratory and the holding time has been extended.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analysis Description	Method Ref.	Technique	Location
Alkalinity in Water	SM 2320 B* (2011)	Titration with H2SO4	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2011)	Automated Colorimetry (Phenate)	Kelowna
Anions in Water	SM 4110 B (2011)	Ion Chromatography	Kelowna
Conductivity in Water	SM 2510 B (2011)	Conductivity Meter	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Hardness in Water	SM 2340 B (2011)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
Mercury, total in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	Richmond
pH in Water	SM 4500-H+ B (2011)	Electrometry	Kelowna
Phosphorus, Total Dissolved in Water	SM 4500-P B.5* (2011) / SM 4500-P F (2011)	Persulfate Digestion / Automated Colorimetry (Ascorbic Acid)	Kelowna
Solids, Total Suspended in Water	SM 2540 D* (2011)	Gravimetry (Dried at 103-105C)	Kelowna
Total Metals in Water	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	Richmond
Turbidity in Water	SM 2130 B (2011)	Nephelometry	Kelowna
Volatile Organic Compounds in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	Richmond

Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method

Glossary of Terms:

RL	Reporting Limit (default)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
>=	Greater than or equal to the specified Result
mg/L	Milligrams per litre
NTU	Nephelometric Turbidity Units
pH units	pH < 7 = acidic, ph > 7 = basic
µg/L	Micrograms per litre
µS/cm	Microsiemens per centimetre
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

General Comments:

The results in this report apply to the samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B8L0575										
Blank (B8L0575-BLK1)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8L0575-BLK2)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Bromide	< 0.10	0.10	mg/L							
Chloride	< 0.10	0.10	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Nitrite (as N)	< 0.010	0.010	mg/L							
Phosphate (as P)	< 0.0050	0.0050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8L0575-BS1)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Bromide	4.17	0.10	mg/L	4.00		104	85-115			
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Fluoride	4.07	0.10	mg/L	4.00		102	88-108			
Nitrate (as N)	4.12	0.010	mg/L	4.00		103	93-108			
Nitrite (as N)	2.10	0.010	mg/L	2.00		105	85-114			
Phosphate (as P)	0.931	0.0050	mg/L	1.00		93	80-120			
Sulfate	16.3	1.0	mg/L	16.0		102	91-109			
Dissolved Metals, Batch B8L0838										
Blank (B8L0838-BLK1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0838, Continued										
Blank (B8L0838-BLK1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B8L0838-BLK2)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0838, Continued										
Blank (B8L0838-BLK2), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B8L0838-BLK3)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B8L0838-BS1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	0.0221	0.0050	mg/L	0.0200		111	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0838, Continued										
LCS (B8L0838-BS1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Antimony, dissolved	0.0188	0.00020	mg/L	0.0200		94	80-120			
Arsenic, dissolved	0.0200	0.00050	mg/L	0.0200		100	80-120			
Barium, dissolved	0.0204	0.0050	mg/L	0.0200		102	80-120			
Beryllium, dissolved	0.0205	0.00010	mg/L	0.0200		103	80-120			
Bismuth, dissolved	0.0207	0.00010	mg/L	0.0200		104	80-120			
Boron, dissolved	0.0212	0.0050	mg/L	0.0200		106	80-120			
Cadmium, dissolved	0.0201	0.000010	mg/L	0.0200		101	80-120			
Calcium, dissolved	2.01	0.20	mg/L	2.00		100	80-120			
Chromium, dissolved	0.0197	0.00050	mg/L	0.0200		99	80-120			
Cobalt, dissolved	0.0205	0.00010	mg/L	0.0200		103	80-120			
Copper, dissolved	0.0208	0.00040	mg/L	0.0200		104	80-120			
Iron, dissolved	1.85	0.010	mg/L	2.00		93	80-120			
Lead, dissolved	0.0205	0.00020	mg/L	0.0200		102	80-120			
Lithium, dissolved	0.0211	0.00010	mg/L	0.0200		105	80-120			
Magnesium, dissolved	2.04	0.010	mg/L	2.00		102	80-120			
Manganese, dissolved	0.0191	0.00020	mg/L	0.0200		96	80-120			
Molybdenum, dissolved	0.0191	0.00010	mg/L	0.0200		96	80-120			
Nickel, dissolved	0.0202	0.00040	mg/L	0.0200		101	80-120			
Phosphorus, dissolved	2.01	0.050	mg/L	2.00		100	80-120			
Potassium, dissolved	1.83	0.10	mg/L	2.00		92	80-120			
Selenium, dissolved	0.0214	0.00050	mg/L	0.0200		107	80-120			
Silicon, dissolved	2.1	1.0	mg/L	2.00		103	80-120			
Silver, dissolved	0.0187	0.000050	mg/L	0.0200		93	80-120			
Sodium, dissolved	2.05	0.10	mg/L	2.00		102	80-120			
Strontium, dissolved	0.0189	0.0010	mg/L	0.0200		94	80-120			
Sulfur, dissolved	4.3	3.0	mg/L	5.00		85	80-120			
Tellurium, dissolved	0.0204	0.00050	mg/L	0.0200		102	80-120			
Thallium, dissolved	0.0206	0.000020	mg/L	0.0200		103	80-120			
Thorium, dissolved	0.0199	0.00010	mg/L	0.0200		100	80-120			
Tin, dissolved	0.0195	0.00020	mg/L	0.0200		98	80-120			
Titanium, dissolved	0.0191	0.0050	mg/L	0.0200		96	80-120			
Tungsten, dissolved	0.0178	0.0010	mg/L	0.0200		89	80-120			
Uranium, dissolved	0.0204	0.000020	mg/L	0.0200		102	80-120			
Vanadium, dissolved	0.0192	0.0010	mg/L	0.0200		96	80-120			
Zinc, dissolved	0.0230	0.0040	mg/L	0.0200		115	80-120			
Zirconium, dissolved	0.0190	0.00010	mg/L	0.0200		95	80-120			
Reference (B8L0838-SRM1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	0.220	0.0050	mg/L	0.233		94	79-114			
Antimony, dissolved	0.0437	0.00020	mg/L	0.0430		102	89-123			
Arsenic, dissolved	0.436	0.00050	mg/L	0.438		100	87-113			
Barium, dissolved	3.04	0.0050	mg/L	3.35		91	85-114			
Beryllium, dissolved	0.214	0.00010	mg/L	0.213		101	79-122			
Boron, dissolved	1.66	0.0050	mg/L	1.74		96	79-117			
Cadmium, dissolved	0.220	0.000010	mg/L	0.224		98	89-112			
Calcium, dissolved	6.96	0.20	mg/L	7.69		91	85-120			
Chromium, dissolved	0.420	0.00050	mg/L	0.437		96	87-113			
Cobalt, dissolved	0.126	0.00010	mg/L	0.128		99	90-117			
Copper, dissolved	0.826	0.00040	mg/L	0.844		98	90-115			
Iron, dissolved	1.20	0.010	mg/L	1.29		93	86-112			
Lead, dissolved	0.111	0.00020	mg/L	0.112		99	90-113			
Lithium, dissolved	0.104	0.00010	mg/L	0.104		100	77-127			
Magnesium, dissolved	6.77	0.010	mg/L	6.92		98	84-116			
Manganese, dissolved	0.319	0.00020	mg/L	0.345		92	85-113			
Molybdenum, dissolved	0.405	0.00010	mg/L	0.426		95	87-112			
Nickel, dissolved	0.835	0.00040	mg/L	0.840		99	90-114			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0838, Continued										
Reference (B8L0838-SRM1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Phosphorus, dissolved	0.500	0.050	mg/L	0.495		101	74-119			
Potassium, dissolved	2.72	0.10	mg/L	3.19		85	78-119			
Selenium, dissolved	0.0353	0.00050	mg/L	0.0331		107	89-123			
Sodium, dissolved	18.1	0.10	mg/L	19.1		95	81-117			
Strontium, dissolved	0.878	0.0010	mg/L	0.916		96	82-111			
Thallium, dissolved	0.0394	0.000020	mg/L	0.0393		100	90-113			
Uranium, dissolved	0.248	0.000020	mg/L	0.266		93	87-113			
Vanadium, dissolved	0.827	0.0010	mg/L	0.869		95	85-110			
Zinc, dissolved	0.897	0.0040	mg/L	0.881		102	88-114			
Dissolved Metals, Batch B8L0847										
Blank (B8L0847-BLK1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B8L0847-BLK2)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B8L0847-SRM1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Mercury, dissolved	0.00468	0.000010	mg/L	0.00489		96	80-120			
Reference (B8L0847-SRM2)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Mercury, dissolved	0.00453	0.000010	mg/L	0.00489		93	80-120			
Dissolved Metals, Batch B8L0888										
Blank (B8L0888-BLK1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Mercury, dissolved	< 0.000040	0.000040	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0888, Continued										
Blank (B8L0888-BLK1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B8L0888-BLK2)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Mercury, dissolved	< 0.000040	0.000040	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
Blank (B8L0888-BLK3)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0888, Continued										
Blank (B8L0888-BLK3), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Beryllium, dissolved	< 0.00010	0.00010	mg/L							
Bismuth, dissolved	< 0.00010	0.00010	mg/L							
Boron, dissolved	< 0.0050	0.0050	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Cobalt, dissolved	< 0.00010	0.00010	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Lithium, dissolved	< 0.00010	0.00010	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Mercury, dissolved	< 0.000040	0.000040	mg/L							
Molybdenum, dissolved	< 0.00010	0.00010	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Phosphorus, dissolved	< 0.050	0.050	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							
Silicon, dissolved	< 1.0	1.0	mg/L							
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Strontium, dissolved	< 0.0010	0.0010	mg/L							
Sulfur, dissolved	< 3.0	3.0	mg/L							
Tellurium, dissolved	< 0.00050	0.00050	mg/L							
Thallium, dissolved	< 0.000020	0.000020	mg/L							
Thorium, dissolved	< 0.00010	0.00010	mg/L							
Tin, dissolved	< 0.00020	0.00020	mg/L							
Titanium, dissolved	< 0.0050	0.0050	mg/L							
Tungsten, dissolved	< 0.0010	0.0010	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Vanadium, dissolved	< 0.0010	0.0010	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
Zirconium, dissolved	< 0.00010	0.00010	mg/L							
LCS (B8L0888-BS1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	0.0220	0.0050	mg/L	0.0200		110	80-120			
Antimony, dissolved	0.0181	0.00020	mg/L	0.0200		91	80-120			
Arsenic, dissolved	0.0205	0.00050	mg/L	0.0200		103	80-120			
Barium, dissolved	0.0192	0.0050	mg/L	0.0200		96	80-120			
Beryllium, dissolved	0.0205	0.00010	mg/L	0.0200		103	80-120			
Bismuth, dissolved	0.0202	0.00010	mg/L	0.0200		101	80-120			
Boron, dissolved	0.0177	0.0050	mg/L	0.0200		88	80-120			
Cadmium, dissolved	0.0196	0.000010	mg/L	0.0200		98	80-120			
Calcium, dissolved	1.98	0.20	mg/L	2.00		99	80-120			
Chromium, dissolved	0.0203	0.00050	mg/L	0.0200		101	80-120			
Cobalt, dissolved	0.0211	0.00010	mg/L	0.0200		106	80-120			
Copper, dissolved	0.0213	0.00040	mg/L	0.0200		107	80-120			
Iron, dissolved	1.92	0.010	mg/L	2.00		96	80-120			
Lead, dissolved	0.0201	0.00020	mg/L	0.0200		100	80-120			
Lithium, dissolved	0.0206	0.00010	mg/L	0.0200		103	80-120			
Magnesium, dissolved	2.04	0.010	mg/L	2.00		102	80-120			
Manganese, dissolved	0.0192	0.00020	mg/L	0.0200		96	80-120			
Mercury, dissolved	0.000799	0.000040	mg/L	0.00100		80	80-120			
Molybdenum, dissolved	0.0190	0.00010	mg/L	0.0200		95	80-120			
Nickel, dissolved	0.0205	0.00040	mg/L	0.0200		103	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0888, Continued										
LCS (B8L0888-BS1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Phosphorus, dissolved	2.04	0.050	mg/L	2.00		102	80-120			
Potassium, dissolved	1.89	0.10	mg/L	2.00		94	80-120			
Selenium, dissolved	0.0211	0.00050	mg/L	0.0200		106	80-120			
Silicon, dissolved	2.2	1.0	mg/L	2.00		108	80-120			
Silver, dissolved	0.0184	0.000050	mg/L	0.0200		92	80-120			
Sodium, dissolved	2.06	0.10	mg/L	2.00		103	80-120			
Strontium, dissolved	0.0193	0.0010	mg/L	0.0200		96	80-120			
Sulfur, dissolved	4.4	3.0	mg/L	5.00		88	80-120			
Tellurium, dissolved	0.0200	0.00050	mg/L	0.0200		100	80-120			
Thallium, dissolved	0.0200	0.000020	mg/L	0.0200		100	80-120			
Thorium, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Tin, dissolved	0.0191	0.00020	mg/L	0.0200		95	80-120			
Titanium, dissolved	0.0206	0.0050	mg/L	0.0200		103	80-120			
Tungsten, dissolved	0.0181	0.0010	mg/L	0.0200		90	80-120			
Uranium, dissolved	0.0194	0.000020	mg/L	0.0200		97	80-120			
Vanadium, dissolved	0.0197	0.0010	mg/L	0.0200		99	80-120			
Zinc, dissolved	0.0213	0.0040	mg/L	0.0200		106	80-120			
Zirconium, dissolved	0.0192	0.00010	mg/L	0.0200		96	80-120			
Duplicate (B8L0888-DUP1)		**Source: 8120636-01**		Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	0.0110	0.0050	mg/L		0.0101				11	
Antimony, dissolved	0.00199	0.00020	mg/L		0.00191			4	20	
Arsenic, dissolved	0.00065	0.00050	mg/L		0.00063				8	
Barium, dissolved	0.0476	0.0050	mg/L		0.0465			2	7	
Beryllium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Boron, dissolved	1.95	0.0050	mg/L		1.95			< 1	13	
Cadmium, dissolved	0.000011	0.000010	mg/L		< 0.000010				20	
Calcium, dissolved	165	0.20	mg/L		164			1	8	
Chromium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				14	
Cobalt, dissolved	0.00168	0.00010	mg/L		0.00164			2	10	
Copper, dissolved	0.00350	0.00040	mg/L		0.00328			6	20	
Iron, dissolved	0.010	0.010	mg/L		0.010				14	
Lead, dissolved	0.00058	0.00020	mg/L		0.00048				20	
Lithium, dissolved	0.0451	0.00010	mg/L		0.0443			2	14	
Magnesium, dissolved	297	0.010	mg/L		297			< 1	6	
Manganese, dissolved	0.00201	0.00020	mg/L		0.00199			1	9	
Mercury, dissolved	< 0.000040	0.000040	mg/L		< 0.000040				20	
Molybdenum, dissolved	0.00049	0.00010	mg/L		0.00047				19	
Nickel, dissolved	0.0122	0.00040	mg/L		0.0120			2	20	
Phosphorus, dissolved	< 0.050	0.050	mg/L		< 0.050				14	
Potassium, dissolved	187	0.10	mg/L		186			< 1	8	
Selenium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Silicon, dissolved	12.6	1.0	mg/L		12.8			< 1	12	
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050				20	
Sodium, dissolved	324	0.10	mg/L		323			< 1	6	
Strontium, dissolved	1.77	0.0010	mg/L		1.75			2	6	
Sulfur, dissolved	295	3.0	mg/L		292			< 1	20	
Tellurium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Thallium, dissolved	0.000057	0.000020	mg/L		0.000048				13	
Thorium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Tin, dissolved	0.00157	0.00020	mg/L		0.00151			4	20	
Titanium, dissolved	< 0.0050	0.0050	mg/L		< 0.0050				20	
Tungsten, dissolved	< 0.0010	0.0010	mg/L		< 0.0010				20	
Uranium, dissolved	0.00802	0.000020	mg/L		0.00793			1	14	
Vanadium, dissolved	< 0.0010	0.0010	mg/L		< 0.0010				20	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8L0888, Continued										
Duplicate (B8L0888-DUP1), Continued		**Source: 8120636-01**		Prepared: 2018-12-13, Analyzed: 2018-12-13						
Zinc, dissolved	0.0056	0.0040	mg/L		0.0057				11	
Zirconium, dissolved	0.00023	0.00010	mg/L		0.00021				20	
Reference (B8L0888-SRM1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Aluminum, dissolved	0.224	0.0050	mg/L	0.233		96	79-114			
Antimony, dissolved	0.0426	0.00020	mg/L	0.0430		99	89-123			
Arsenic, dissolved	0.450	0.00050	mg/L	0.438		103	87-113			
Barium, dissolved	2.93	0.0050	mg/L	3.35		87	85-114			
Beryllium, dissolved	0.217	0.00010	mg/L	0.213		102	79-122			
Boron, dissolved	1.71	0.0050	mg/L	1.74		98	79-117			
Cadmium, dissolved	0.215	0.000010	mg/L	0.224		96	89-112			
Calcium, dissolved	7.27	0.20	mg/L	7.69		95	85-120			
Chromium, dissolved	0.438	0.00050	mg/L	0.437		100	87-113			
Cobalt, dissolved	0.130	0.00010	mg/L	0.128		101	90-117			
Copper, dissolved	0.847	0.00040	mg/L	0.844		100	90-115			
Iron, dissolved	1.23	0.010	mg/L	1.29		95	86-112			
Lead, dissolved	0.109	0.00020	mg/L	0.112		97	90-113			
Lithium, dissolved	0.104	0.00010	mg/L	0.104		100	77-127			
Magnesium, dissolved	6.85	0.010	mg/L	6.92		99	84-116			
Manganese, dissolved	0.321	0.00020	mg/L	0.345		93	85-113			
Molybdenum, dissolved	0.403	0.00010	mg/L	0.426		95	87-112			
Nickel, dissolved	0.861	0.00040	mg/L	0.840		102	90-114			
Phosphorus, dissolved	0.488	0.050	mg/L	0.495		99	74-119			
Potassium, dissolved	2.84	0.10	mg/L	3.19		89	78-119			
Selenium, dissolved	0.0351	0.00050	mg/L	0.0331		106	89-123			
Sodium, dissolved	18.3	0.10	mg/L	19.1		96	81-117			
Strontium, dissolved	0.890	0.0010	mg/L	0.916		97	82-111			
Thallium, dissolved	0.0387	0.000020	mg/L	0.0393		99	90-113			
Uranium, dissolved	0.240	0.000020	mg/L	0.266		90	87-113			
Vanadium, dissolved	0.865	0.0010	mg/L	0.869		99	85-110			
Zinc, dissolved	0.908	0.0040	mg/L	0.881		103	88-114			
General Parameters, Batch B8L0583										
Blank (B8L0583-BLK1)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Turbidity	< 0.10	0.10	NTU							
Blank (B8L0583-BLK2)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Turbidity	< 0.10	0.10	NTU							
LCS (B8L0583-BS1)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Turbidity	40.1	0.10	NTU	40.0		100	90-110			
LCS (B8L0583-BS2)				Prepared: 2018-12-08, Analyzed: 2018-12-08						
Turbidity	40.2	0.10	NTU	40.0		100	90-110			
General Parameters, Batch B8L0628										
Blank (B8L0628-BLK1)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8L0628-BLK2)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8L0628, Continued										
LCS (B8L0628-BS1)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	0.967	0.020	mg/L	1.00		97	90-115			
LCS (B8L0628-BS2)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	1.00	0.020	mg/L	1.00		100	90-115			
Duplicate (B8L0628-DUP1)		**Source: 8120636-06**		Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	0.020	0.020	mg/L		< 0.020				15	
Matrix Spike (B8L0628-MS1)		**Source: 8120636-06**		Prepared: 2018-12-11, Analyzed: 2018-12-11						
Ammonia, Total (as N)	0.265	0.020	mg/L	0.250	< 0.020	99	75-125			
General Parameters, Batch B8L0629										
Reference (B8L0629-SRM1)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
pH	7.00	0.10	pH units	7.01		100	98-102			
Reference (B8L0629-SRM2)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
pH	6.99	0.10	pH units	7.01		100	98-102			
Reference (B8L0629-SRM3)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
pH	6.99	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B8L0632										
Blank (B8L0632-BLK1)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
Solids, Total Suspended	< 2.0	2.0	mg/L							
Blank (B8L0632-BLK2)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
Solids, Total Suspended	< 2.0	2.0	mg/L							
LCS (B8L0632-BS1)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
Solids, Total Suspended	95.0	10.0	mg/L	100		95	91-106			
LCS (B8L0632-BS2)				Prepared: 2018-12-10, Analyzed: 2018-12-10						
Solids, Total Suspended	95.0	10.0	mg/L	100		95	91-106			
Duplicate (B8L0632-DUP2)		**Source: 8120636-03**		Prepared: 2018-12-10, Analyzed: 2018-12-10						
Solids, Total Suspended	3340	2.0	mg/L		3520			5	20	
General Parameters, Batch B8L0730										
Blank (B8L0730-BLK1)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8L0730-BLK2)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8L0730, Continued										
Blank (B8L0730-BLK2), Continued				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8L0730-BLK3)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B8L0730-BS1)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	102	1.0	mg/L	100		102	92-106			
LCS (B8L0730-BS2)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	100		103	92-106			
LCS (B8L0730-BS3)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	100		103	92-106			
LCS (B8L0730-BS4)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Conductivity (EC)	1420	2.0	µS/cm	1410		101	95-104			
LCS (B8L0730-BS5)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Conductivity (EC)	1390	2.0	µS/cm	1410		99	95-104			
LCS (B8L0730-BS6)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Conductivity (EC)	1410	2.0	µS/cm	1410		100	95-104			
General Parameters, Batch B8L0808										
Blank (B8L0808-BLK1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8L0808-BLK2)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Bicarbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L							
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B8L0808-BS1)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	100		103	92-106			
LCS (B8L0808-BS2)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Alkalinity, Total (as CaCO3)	103	1.0	mg/L	100		103	92-106			
LCS (B8L0808-BS3)				Prepared: 2018-12-11, Analyzed: 2018-12-11						
Conductivity (EC)	1430	2.0	µS/cm	1410		101	95-104			
LCS (B8L0808-BS4)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8L0808, Continued										
Duplicate (B8L0808-DUP1)	**Source: 8120636-06**			Prepared: 2018-12-11, Analyzed: 2018-12-11						
Alkalinity, Total (as CaCO3)	187	1.0	mg/L		189			1	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	187	1.0	mg/L		189			1	10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Conductivity (EC)	374	2.0	µS/cm		382			2	5	
pH	8.07	0.10	pH units		8.21			2	4	
Total Metals, Batch B8L0833										
Blank (B8L0833-BLK1)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Mercury, total	< 0.000040	0.000040	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B8L0833-BLK2)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8L0833, Continued										
Blank (B8L0833-BLK2), Continued				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Mercury, total	< 0.000040	0.000040	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B8L0833-BLK3)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Mercury, total	< 0.000040	0.000040	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8L0833, Continued										
Blank (B8L0833-BLK3), Continued				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
Blank (B8L0833-BLK4)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Beryllium, total	< 0.00010	0.00010	mg/L							
Bismuth, total	< 0.00010	0.00010	mg/L							
Boron, total	< 0.0050	0.0050	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Cobalt, total	< 0.00010	0.00010	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Lithium, total	< 0.00010	0.00010	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Mercury, total	< 0.000040	0.000040	mg/L							
Molybdenum, total	< 0.00010	0.00010	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Phosphorus, total	< 0.050	0.050	mg/L							
Potassium, total	< 0.10	0.10	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silicon, total	< 1.0	1.0	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Sodium, total	< 0.10	0.10	mg/L							
Strontium, total	< 0.0010	0.0010	mg/L							
Sulfur, total	< 3.0	3.0	mg/L							
Tellurium, total	< 0.00050	0.00050	mg/L							
Thallium, total	< 0.000020	0.000020	mg/L							
Thorium, total	< 0.00010	0.00010	mg/L							
Tin, total	< 0.00020	0.00020	mg/L							
Titanium, total	< 0.0050	0.0050	mg/L							
Tungsten, total	< 0.0010	0.0010	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Vanadium, total	< 0.0010	0.0010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8L0833, Continued										
Blank (B8L0833-BLK4), Continued				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Zinc, total	< 0.0040	0.0040	mg/L							
Zirconium, total	< 0.00010	0.00010	mg/L							
LCS (B8L0833-BS1)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	0.0225	0.0050	mg/L	0.0200		113	80-120			
Antimony, total	0.0193	0.00020	mg/L	0.0200		97	80-120			
Arsenic, total	0.0214	0.00050	mg/L	0.0200		107	80-120			
Barium, total	0.0193	0.0050	mg/L	0.0200		96	80-120			
Beryllium, total	0.0213	0.00010	mg/L	0.0200		107	80-120			
Bismuth, total	0.0209	0.00010	mg/L	0.0200		104	80-120			
Boron, total	0.0202	0.0050	mg/L	0.0200		101	80-120			
Cadmium, total	0.0203	0.000010	mg/L	0.0200		102	80-120			
Calcium, total	2.02	0.20	mg/L	2.00		101	80-120			
Chromium, total	0.0208	0.00050	mg/L	0.0200		104	80-120			
Cobalt, total	0.0214	0.00010	mg/L	0.0200		107	80-120			
Copper, total	0.0206	0.00040	mg/L	0.0200		103	80-120			
Iron, total	1.97	0.010	mg/L	2.00		99	80-120			
Lead, total	0.0210	0.00020	mg/L	0.0200		105	80-120			
Lithium, total	0.0215	0.00010	mg/L	0.0200		108	80-120			
Magnesium, total	2.14	0.010	mg/L	2.00		107	80-120			
Manganese, total	0.0199	0.00020	mg/L	0.0200		99	80-120			
Mercury, total	0.000890	0.000040	mg/L	0.00100		89	80-120			
Molybdenum, total	0.0197	0.00010	mg/L	0.0200		99	80-120			
Nickel, total	0.0211	0.00040	mg/L	0.0200		106	80-120			
Phosphorus, total	2.08	0.050	mg/L	2.00		104	80-120			
Potassium, total	1.97	0.10	mg/L	2.00		99	80-120			
Selenium, total	0.0216	0.00050	mg/L	0.0200		108	80-120			
Silicon, total	2.3	1.0	mg/L	2.00		113	80-120			
Silver, total	0.0179	0.000050	mg/L	0.0200		89	80-120			
Sodium, total	2.20	0.10	mg/L	2.00		110	80-120			
Strontium, total	0.0199	0.0010	mg/L	0.0200		99	80-120			
Sulfur, total	4.2	3.0	mg/L	5.00		83	80-120			
Tellurium, total	0.0207	0.00050	mg/L	0.0200		104	80-120			
Thallium, total	0.0208	0.000020	mg/L	0.0200		104	80-120			
Thorium, total	0.0198	0.00010	mg/L	0.0200		99	80-120			
Tin, total	0.0198	0.00020	mg/L	0.0200		99	80-120			
Titanium, total	0.0210	0.0050	mg/L	0.0200		105	80-120			
Tungsten, total	0.0180	0.0010	mg/L	0.0200		90	80-120			
Uranium, total	0.0203	0.000020	mg/L	0.0200		102	80-120			
Vanadium, total	0.0207	0.0010	mg/L	0.0200		103	80-120			
Zinc, total	0.0241	0.0040	mg/L	0.0200		120	80-120			
Zirconium, total	0.0197	0.00010	mg/L	0.0200		98	80-120			
Reference (B8L0833-SRM1)				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Aluminum, total	0.297	0.0050	mg/L	0.303		98	82-114			
Antimony, total	0.0497	0.00020	mg/L	0.0511		97	88-115			
Arsenic, total	0.128	0.00050	mg/L	0.118		108	88-111			
Barium, total	0.764	0.0050	mg/L	0.823		93	83-110			
Beryllium, total	0.0523	0.00010	mg/L	0.0496		106	80-119			
Boron, total	3.72	0.0050	mg/L	3.45		108	80-118			
Cadmium, total	0.0494	0.000010	mg/L	0.0495		100	90-110			
Calcium, total	10.6	0.20	mg/L	11.6		91	85-113			
Chromium, total	0.259	0.00050	mg/L	0.250		104	88-111			
Cobalt, total	0.0412	0.00010	mg/L	0.0377		109	90-114			
Copper, total	0.529	0.00040	mg/L	0.486		109	90-117			
Iron, total	0.500	0.010	mg/L	0.488		102	90-116			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B8L0833, Continued										
Reference (B8L0833-SRM1), Continued				Prepared: 2018-12-12, Analyzed: 2018-12-13						
Lead, total	0.207	0.00020	mg/L	0.204		101	90-110			
Lithium, total	0.417	0.00010	mg/L	0.403		104	79-118			
Magnesium, total	4.04	0.010	mg/L	3.79		107	88-116			
Manganese, total	0.104	0.00020	mg/L	0.109		96	88-108			
Mercury, total	0.00426	0.000040	mg/L	0.00489		87	80-120			
Molybdenum, total	0.198	0.00010	mg/L	0.198		100	88-110			
Nickel, total	0.263	0.00040	mg/L	0.249		106	90-112			
Phosphorus, total	0.225	0.050	mg/L	0.227		99	72-118			
Potassium, total	7.20	0.10	mg/L	7.21		100	87-116			
Selenium, total	0.132	0.00050	mg/L	0.121		109	90-122			
Sodium, total	7.82	0.10	mg/L	7.54		104	86-118			
Strontium, total	0.371	0.0010	mg/L	0.375		99	86-110			
Thallium, total	0.0838	0.000020	mg/L	0.0805		104	90-113			
Uranium, total	0.0298	0.000020	mg/L	0.0306		98	88-112			
Vanadium, total	0.395	0.0010	mg/L	0.386		102	87-110			
Zinc, total	2.69	0.0040	mg/L	2.49		108	90-113			
Total Metals, Batch B8L0846										
Blank (B8L0846-BLK1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Mercury, total	< 0.000010	0.000010	mg/L							
Reference (B8L0846-SRM1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Mercury, total	0.00459	0.000010	mg/L	0.00489		94	80-120			
Volatile Organic Compounds (VOC), Batch B8L0857										
Blank (B8L0857-BLK1)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Benzene	< 0.5	0.5	µg/L							
Bromodichloromethane	< 1.0	1.0	µg/L							
Bromoform	< 1.0	1.0	µg/L							
Carbon tetrachloride	< 0.5	0.5	µg/L							
Chlorobenzene	< 1.0	1.0	µg/L							
Chloroethane	< 2.0	2.0	µg/L							
Chloroform	< 1.0	1.0	µg/L							
Dibromochloromethane	< 1.0	1.0	µg/L							
1,2-Dibromoethane	< 0.3	0.3	µg/L							
Dibromomethane	< 1.0	1.0	µg/L							
1,2-Dichlorobenzene	< 0.5	0.5	µg/L							
1,3-Dichlorobenzene	< 1.0	1.0	µg/L							
1,4-Dichlorobenzene	< 1.0	1.0	µg/L							
1,1-Dichloroethane	< 1.0	1.0	µg/L							
1,2-Dichloroethane	< 1.0	1.0	µg/L							
1,1-Dichloroethylene	< 1.0	1.0	µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
Dichloromethane	< 3.0	3.0	µg/L							
1,2-Dichloropropane	< 1.0	1.0	µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L							
Ethylbenzene	< 1.0	1.0	µg/L							
Methyl tert-butyl ether	< 1.0	1.0	µg/L							
Styrene	< 1.0	1.0	µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L							
Tetrachloroethylene	< 1.0	1.0	µg/L							
Toluene	< 1.0	1.0	µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8L0857, Continued										
Blank (B8L0857-BLK1), Continued				Prepared: 2018-12-12, Analyzed: 2018-12-12						
1,1,1-Trichloroethane	< 1.0	1.0	µg/L							
1,1,2-Trichloroethane	< 1.0	1.0	µg/L							
Trichloroethylene	< 1.0	1.0	µg/L							
Trichlorofluoromethane	< 1.0	1.0	µg/L							
Vinyl chloride	< 1.0	1.0	µg/L							
Xylenes (total)	< 2.0	2.0	µg/L							
Surrogate: Toluene-d8	*23.6*		*µg/L*	26.5		*89*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*23.3*		*µg/L*	25.0		*93*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*19.5*		*µg/L*	24.7		*79*	*70-130*			
Blank (B8L0857-BLK2)				Prepared: 2018-12-12, Analyzed: 2018-12-12						
Benzene	< 0.5	0.5	µg/L							
Bromodichloromethane	< 1.0	1.0	µg/L							
Bromoform	< 1.0	1.0	µg/L							
Carbon tetrachloride	< 0.5	0.5	µg/L							
Chlorobenzene	< 1.0	1.0	µg/L							
Chloroethane	< 2.0	2.0	µg/L							
Chloroform	< 1.0	1.0	µg/L							
Dibromochloromethane	< 1.0	1.0	µg/L							
1,2-Dibromoethane	< 0.3	0.3	µg/L							
Dibromomethane	< 1.0	1.0	µg/L							
1,2-Dichlorobenzene	< 0.5	0.5	µg/L							
1,3-Dichlorobenzene	< 1.0	1.0	µg/L							
1,4-Dichlorobenzene	< 1.0	1.0	µg/L							
1,1-Dichloroethane	< 1.0	1.0	µg/L							
1,2-Dichloroethane	< 1.0	1.0	µg/L							
1,1-Dichloroethylene	< 1.0	1.0	µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
Dichloromethane	< 3.0	3.0	µg/L							
1,2-Dichloropropane	< 1.0	1.0	µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L							
Ethylbenzene	< 1.0	1.0	µg/L							
Methyl tert-butyl ether	< 1.0	1.0	µg/L							
Styrene	< 1.0	1.0	µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L							
Tetrachloroethylene	< 1.0	1.0	µg/L							
Toluene	< 1.0	1.0	µg/L							
1,1,1-Trichloroethane	< 1.0	1.0	µg/L							
1,1,2-Trichloroethane	< 1.0	1.0	µg/L							
Trichloroethylene	< 1.0	1.0	µg/L							
Trichlorofluoromethane	< 1.0	1.0	µg/L							
Vinyl chloride	< 1.0	1.0	µg/L							
Xylenes (total)	< 2.0	2.0	µg/L							
Surrogate: Toluene-d8	*24.7*		*µg/L*	26.5		*93*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.9*		*µg/L*	25.0		*100*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*20.9*		*µg/L*	24.7		*85*	*70-130*			
LCS (B8L0857-BS1)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Benzene	18.1	0.5	µg/L	20.1		90	70-130			
Bromodichloromethane	19.2	1.0	µg/L	20.2		95	70-130			
Bromoform	24.6	1.0	µg/L	20.1		122	70-130			
Carbon tetrachloride	17.2	0.5	µg/L	20.1		86	70-130			
Chlorobenzene	19.2	1.0	µg/L	20.2		95	70-130			
Chloroethane	17.2	2.0	µg/L	20.0		86	60-140			
Chloroform	18.7	1.0	µg/L	20.1		93	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8L0857, Continued										
LCS (B8L0857-BS1), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Dibromochloromethane	20.1	1.0	µg/L	20.2		100	70-130			
1,2-Dibromoethane	17.8	0.3	µg/L	20.1		89	70-130			
Dibromomethane	21.8	1.0	µg/L	20.1		109	70-130			
1,2-Dichlorobenzene	19.1	0.5	µg/L	20.1		95	70-130			
1,3-Dichlorobenzene	19.6	1.0	µg/L	20.1		97	70-130			
1,4-Dichlorobenzene	19.5	1.0	µg/L	20.1		97	70-130			
1,1-Dichloroethane	18.7	1.0	µg/L	20.1		93	70-130			
1,2-Dichloroethane	18.1	1.0	µg/L	20.1		90	70-130			
1,1-Dichloroethylene	15.4	1.0	µg/L	20.1		77	70-130			
cis-1,2-Dichloroethylene	17.8	1.0	µg/L	20.1		89	70-130			
trans-1,2-Dichloroethylene	16.7	1.0	µg/L	20.1		83	70-130			
Dichloromethane	18.1	3.0	µg/L	20.1		90	70-130			
1,2-Dichloropropane	17.8	1.0	µg/L	20.1		88	70-130			
1,3-Dichloropropene (cis + trans)	31.2	1.0	µg/L	40.0		78	70-130			
Ethylbenzene	18.7	1.0	µg/L	20.1		93	70-130			
Methyl tert-butyl ether	15.7	1.0	µg/L	20.0		79	70-130			
Styrene	18.8	1.0	µg/L	20.1		93	70-130			
1,1,2,2-Tetrachloroethane	17.0	0.5	µg/L	20.2		84	70-130			
Tetrachloroethylene	24.7	1.0	µg/L	20.1		123	70-130			
Toluene	20.6	1.0	µg/L	20.1		103	70-130			
1,1,1-Trichloroethane	16.8	1.0	µg/L	20.2		83	70-130			
1,1,2-Trichloroethane	18.6	1.0	µg/L	20.1		93	70-130			
Trichloroethylene	21.3	1.0	µg/L	20.1		106	70-130			
Trichlorofluoromethane	17.4	1.0	µg/L	20.0		87	60-140			
Vinyl chloride	19.9	1.0	µg/L	20.0		100	60-140			
Xylenes (total)	56.2	2.0	µg/L	60.1		93	70-130			
Surrogate: Toluene-d8	*24.1*		*µg/L*	26.5		*91*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*34.6*		*µg/L*	25.0		*138*	*70-130*			*S02*
Surrogate: 1,4-Dichlorobenzene-d4	*32.4*		*µg/L*	24.7		*131*	*70-130*			*S02*
LCS (B8L0857-BS3)				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Benzene	18.9	0.5	µg/L	20.1		94	70-130			
Bromodichloromethane	19.6	1.0	µg/L	20.2		97	70-130			
Bromoform	26.2	1.0	µg/L	20.1		130	70-130			
Carbon tetrachloride	18.4	0.5	µg/L	20.1		92	70-130			
Chlorobenzene	19.7	1.0	µg/L	20.2		98	70-130			
Chloroethane	18.4	2.0	µg/L	20.0		92	60-140			
Chloroform	19.4	1.0	µg/L	20.1		97	70-130			
Dibromochloromethane	20.8	1.0	µg/L	20.2		103	70-130			
1,2-Dibromoethane	18.6	0.3	µg/L	20.1		92	70-130			
Dibromomethane	22.8	1.0	µg/L	20.1		113	70-130			
1,2-Dichlorobenzene	19.3	0.5	µg/L	20.1		96	70-130			
1,3-Dichlorobenzene	19.4	1.0	µg/L	20.1		97	70-130			
1,4-Dichlorobenzene	19.0	1.0	µg/L	20.1		95	70-130			
1,1-Dichloroethane	19.7	1.0	µg/L	20.1		98	70-130			
1,2-Dichloroethane	18.6	1.0	µg/L	20.1		93	70-130			
1,1-Dichloroethylene	16.4	1.0	µg/L	20.1		82	70-130			
cis-1,2-Dichloroethylene	18.6	1.0	µg/L	20.1		93	70-130			
trans-1,2-Dichloroethylene	17.1	1.0	µg/L	20.1		85	70-130			
Dichloromethane	18.9	3.0	µg/L	20.1		94	70-130			
1,2-Dichloropropane	18.4	1.0	µg/L	20.1		92	70-130			
1,3-Dichloropropene (cis + trans)	30.1	1.0	µg/L	40.0		75	70-130			
Ethylbenzene	19.5	1.0	µg/L	20.1		97	70-130			
Methyl tert-butyl ether	16.1	1.0	µg/L	20.0		80	70-130			
Styrene	19.1	1.0	µg/L	20.1		95	70-130			
1,1,2,2-Tetrachloroethane	20.1	0.5	µg/L	20.2		99	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8L0857, Continued										
LCS (B8L0857-BS3), Continued				Prepared: 2018-12-13, Analyzed: 2018-12-13						
Tetrachloroethylene	25.9	1.0	µg/L	20.1		129	70-130			
Toluene	21.3	1.0	µg/L	20.1		106	70-130			
1,1,1-Trichloroethane	18.0	1.0	µg/L	20.2		89	70-130			
1,1,2-Trichloroethane	19.2	1.0	µg/L	20.1		95	70-130			
Trichloroethylene	21.6	1.0	µg/L	20.1		108	70-130			
Trichlorofluoromethane	18.8	1.0	µg/L	20.0		94	60-140			
Vinyl chloride	21.6	1.0	µg/L	20.0		108	60-140			
Xylenes (total)	58.8	2.0	µg/L	60.1		98	70-130			
Surrogate: Toluene-d8	*25.4*		*µg/L*	26.5		*96*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*35.5*		*µg/L*	25.0		*142*	*70-130*			*S02*
Surrogate: 1,4-Dichlorobenzene-d4	*31.5*		*µg/L*	24.7		*127*	*70-130*			
Duplicate (B8L0857-DUP1)		**Source: 8120636-02**		Prepared: 2018-12-12, Analyzed: 2018-12-12						
Benzene	< 0.5	0.5	µg/L		< 0.5				22	
Bromodichloromethane	< 1.0	1.0	µg/L		< 1.0				23	
Bromoform	< 1.0	1.0	µg/L		< 1.0				23	
Carbon tetrachloride	< 0.5	0.5	µg/L		< 0.5				30	
Chlorobenzene	< 1.0	1.0	µg/L		< 1.0				26	
Chloroethane	< 2.0	2.0	µg/L		< 2.0				50	
Chloroform	< 1.0	1.0	µg/L		< 1.0				22	
Dibromochloromethane	< 1.0	1.0	µg/L		< 1.0				28	
1,2-Dibromoethane	< 0.3	0.3	µg/L		< 0.3				30	
Dibromomethane	< 1.0	1.0	µg/L		< 1.0				30	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L		< 0.5				27	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L		< 1.0				30	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L		< 1.0				30	
1,1-Dichloroethane	1.0	1.0	µg/L		1.0				24	
1,2-Dichloroethane	< 1.0	1.0	µg/L		< 1.0				24	
1,1-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				30	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				22	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				27	
Dichloromethane	< 3.0	3.0	µg/L		< 3.0				27	
1,2-Dichloropropane	< 1.0	1.0	µg/L		< 1.0				28	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L		< 1.0				30	
Ethylbenzene	< 1.0	1.0	µg/L		< 1.0				30	
Methyl tert-butyl ether	< 1.0	1.0	µg/L		< 1.0				20	
Styrene	< 1.0	1.0	µg/L		< 1.0				30	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L		< 0.5				30	
Tetrachloroethylene	< 1.0	1.0	µg/L		< 1.0				30	
Toluene	16.0	1.0	µg/L		16.2			2	24	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L		< 1.0				30	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L		< 1.0				30	
Trichloroethylene	< 1.0	1.0	µg/L		< 1.0				27	
Trichlorofluoromethane	< 1.0	1.0	µg/L		< 1.0				50	
Vinyl chloride	< 1.0	1.0	µg/L		< 1.0				40	
Xylenes (total)	< 2.0	2.0	µg/L		< 2.0				29	
Surrogate: Toluene-d8	*26.8*		*µg/L*	26.5		*101*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*29.0*		*µg/L*	25.0		*116*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*28.0*		*µg/L*	24.7		*113*	*70-130*			
Duplicate (B8L0857-DUP2)		**Source: 8120636-09**		Prepared: 2018-12-13, Analyzed: 2018-12-13						
Benzene	< 0.5	0.5	µg/L		< 0.5				22	
Bromodichloromethane	< 1.0	1.0	µg/L		< 1.0				23	
Bromoform	< 1.0	1.0	µg/L		< 1.0				23	
Carbon tetrachloride	< 0.5	0.5	µg/L		< 0.5				30	
Chlorobenzene	< 1.0	1.0	µg/L		< 1.0				26	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8L0857, Continued										
Duplicate (B8L0857-DUP2), Continued	**Source: 8120636-09**			Prepared: 2018-12-13, Analyzed: 2018-12-13						
Chloroethane	< 2.0	2.0	µg/L		< 2.0				50	
Chloroform	1.2	1.0	µg/L		1.2				22	
Dibromochloromethane	< 1.0	1.0	µg/L		< 1.0				28	
1,2-Dibromoethane	< 0.3	0.3	µg/L		< 0.3				30	
Dibromomethane	< 1.0	1.0	µg/L		< 1.0				30	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L		< 0.5				27	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L		< 1.0				30	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L		< 1.0				30	
1,1-Dichloroethane	< 1.0	1.0	µg/L		< 1.0				24	
1,2-Dichloroethane	< 1.0	1.0	µg/L		< 1.0				24	
1,1-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				30	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				22	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L		< 1.0				27	
Dichloromethane	< 3.0	3.0	µg/L		< 3.0				27	
1,2-Dichloropropane	< 1.0	1.0	µg/L		< 1.0				28	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L		< 1.0				30	
Ethylbenzene	< 1.0	1.0	µg/L		< 1.0				30	
Methyl tert-butyl ether	< 1.0	1.0	µg/L		< 1.0				20	
Styrene	< 1.0	1.0	µg/L		< 1.0				30	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L		< 0.5				30	
Tetrachloroethylene	< 1.0	1.0	µg/L		< 1.0				30	
Toluene	< 1.0	1.0	µg/L		< 1.0				24	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L		< 1.0				30	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L		< 1.0				30	
Trichloroethylene	< 1.0	1.0	µg/L		< 1.0				27	
Trichlorofluoromethane	< 1.0	1.0	µg/L		< 1.0				50	
Vinyl chloride	< 1.0	1.0	µg/L		< 1.0				40	
Xylenes (total)	< 2.0	2.0	µg/L		< 2.0				29	
Surrogate: Toluene-d8	*23.9*		*µg/L*	26.5		*90*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.2*		*µg/L*	25.0		*97*	*70-130*			
Surrogate: 1,4-Dichlorobenzene-d4	*20.3*		*µg/L*	24.7		*82*	*70-130*			
Matrix Spike (B8L0857-MS1)	**Source: 8120636-02**			Prepared: 2018-12-12, Analyzed: 2018-12-12						
Benzene	18.6	0.5	µg/L	20.1	< 0.5	92	70-130			
Bromodichloromethane	20.2	1.0	µg/L	20.2	< 1.0	100	70-130			
Bromoform	26.0	1.0	µg/L	20.1	< 1.0	130	70-130			
Carbon tetrachloride	16.4	0.5	µg/L	20.1	< 0.5	82	70-130			
Chlorobenzene	20.0	1.0	µg/L	20.2	< 1.0	99	70-130			
Chloroethane	16.5	2.0	µg/L	20.0	< 2.0	82	60-140			
Chloroform	18.4	1.0	µg/L	20.1	< 1.0	91	70-130			
Dibromochloromethane	23.1	1.0	µg/L	20.2	< 1.0	114	70-130			
1,2-Dibromoethane	21.6	0.3	µg/L	20.1	< 0.3	108	70-130			
Dibromomethane	23.5	1.0	µg/L	20.1	< 1.0	117	70-130			
1,2-Dichlorobenzene	20.6	0.5	µg/L	20.1	< 0.5	103	70-130			
1,3-Dichlorobenzene	21.3	1.0	µg/L	20.1	< 1.0	106	70-130			
1,4-Dichlorobenzene	21.6	1.0	µg/L	20.1	< 1.0	107	70-130			
1,1-Dichloroethane	19.0	1.0	µg/L	20.1	1.0	89	70-130			
1,2-Dichloroethane	19.8	1.0	µg/L	20.1	< 1.0	99	70-130			
1,1-Dichloroethylene	14.4	1.0	µg/L	20.1	< 1.0	72	70-130			
cis-1,2-Dichloroethylene	17.3	1.0	µg/L	20.1	< 1.0	86	70-130			
trans-1,2-Dichloroethylene	16.4	1.0	µg/L	20.1	< 1.0	82	70-130			
Dichloromethane	17.8	3.0	µg/L	20.1	< 3.0	87	70-130			
1,2-Dichloropropane	19.3	1.0	µg/L	20.1	< 1.0	96	70-130			
1,3-Dichloropropene (cis + trans)	39.8	1.0	µg/L	40.0	< 1.0	100	70-130			
Ethylbenzene	19.5	1.0	µg/L	20.1	< 1.0	97	70-130			
Methyl tert-butyl ether	16.5	1.0	µg/L	20.0	< 1.0	81	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Western Water Associates Ltd	**WORK ORDER**	8120636
PROJECT	CSRD Refuse Disposal - Golden MR17006	**REPORTED**	2018-12-14 16:15

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B8L0857, Continued										
Matrix Spike (B8L0857-MS1), Continued	**Source: 8120636-02**			Prepared: 2018-12-12, Analyzed: 2018-12-12						
Styrene	19.8	1.0	µg/L	20.1	< 1.0	99	70-130			
Tetrachloroethylene	14.1	1.0	µg/L	20.1	< 1.0	70	70-130			
Toluene	39.4	1.0	µg/L	20.1	16.2	115	70-130			
1,1,1-Trichloroethane	16.7	1.0	µg/L	20.2	< 1.0	81	70-130			
1,1,2-Trichloroethane	22.3	1.0	µg/L	20.1	< 1.0	111	70-130			
Trichloroethylene	15.0	1.0	µg/L	20.1	< 1.0	75	70-130			
Trichlorofluoromethane	16.3	1.0	µg/L	20.0	< 1.0	82	60-140			
Vinyl chloride	18.7	1.0	µg/L	20.0	< 1.0	94	60-140			
Xylenes (total)	60.3	2.0	µg/L	60.1	< 2.0	100	70-130			
Surrogate: Toluene-d8	*27.6*		*µg/L*	26.5		*104*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*37.1*		*µg/L*	25.0		*148*	*70-130*			*S02*
Surrogate: 1,4-Dichlorobenzene-d4	*35.1*		*µg/L*	24.7		*142*	*70-130*			*S02*
Matrix Spike (B8L0857-MS2)	**Source: 8120636-09**			Prepared: 2018-12-12, Analyzed: 2018-12-12						
Benzene	18.9	0.5	µg/L	20.1	< 0.5	94	70-130			
Bromodichloromethane	19.6	1.0	µg/L	20.2	< 1.0	97	70-130			
Bromoform	24.8	1.0	µg/L	20.1	< 1.0	123	70-130			
Carbon tetrachloride	17.2	0.5	µg/L	20.1	< 0.5	85	70-130			
Chlorobenzene	19.8	1.0	µg/L	20.2	< 1.0	98	70-130			
Chloroethane	18.0	2.0	µg/L	20.0	< 2.0	90	60-140			
Chloroform	20.2	1.0	µg/L	20.1	1.2	95	70-130			
Dibromochloromethane	20.5	1.0	µg/L	20.2	< 1.0	102	70-130			
1,2-Dibromoethane	18.6	0.3	µg/L	20.1	< 0.3	92	70-130			
Dibromomethane	22.4	1.0	µg/L	20.1	< 1.0	111	70-130			
1,2-Dichlorobenzene	19.6	0.5	µg/L	20.1	< 0.5	98	70-130			
1,3-Dichlorobenzene	20.2	1.0	µg/L	20.1	< 1.0	100	70-130			
1,4-Dichlorobenzene	20.6	1.0	µg/L	20.1	< 1.0	102	70-130			
1,1-Dichloroethane	19.4	1.0	µg/L	20.1	< 1.0	97	70-130			
1,2-Dichloroethane	19.0	1.0	µg/L	20.1	< 1.0	94	70-130			
1,1-Dichloroethylene	15.8	1.0	µg/L	20.1	< 1.0	78	70-130			
cis-1,2-Dichloroethylene	18.6	1.0	µg/L	20.1	< 1.0	92	70-130			
trans-1,2-Dichloroethylene	17.9	1.0	µg/L	20.1	< 1.0	89	70-130			
Dichloromethane	19.0	3.0	µg/L	20.1	< 3.0	94	70-130			
1,2-Dichloropropane	18.3	1.0	µg/L	20.1	< 1.0	91	70-130			
1,3-Dichloropropene (cis + trans)	34.9	1.0	µg/L	40.0	< 1.0	87	70-130			
Ethylbenzene	18.7	1.0	µg/L	20.1	< 1.0	93	70-130			
Methyl tert-butyl ether	14.4	1.0	µg/L	20.0	< 1.0	72	70-130			
Styrene	19.0	1.0	µg/L	20.1	< 1.0	94	70-130			
Tetrachloroethylene	15.2	1.0	µg/L	20.1	< 1.0	76	70-130			
Toluene	21.1	1.0	µg/L	20.1	< 1.0	103	70-130			
1,1,1-Trichloroethane	17.3	1.0	µg/L	20.2	< 1.0	86	70-130			
1,1,2-Trichloroethane	19.6	1.0	µg/L	20.1	< 1.0	98	70-130			
Trichloroethylene	15.9	1.0	µg/L	20.1	< 1.0	79	70-130			
Trichlorofluoromethane	17.3	1.0	µg/L	20.0	< 1.0	86	60-140			
Vinyl chloride	21.0	1.0	µg/L	20.0	< 1.0	105	60-140			
Xylenes (total)	58.2	2.0	µg/L	60.1	< 2.0	97	70-130			
Surrogate: Toluene-d8	*25.0*		*µg/L*	26.5		*94*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*36.1*		*µg/L*	25.0		*145*	*70-130*			*S02*
Surrogate: 1,4-Dichlorobenzene-d4	*33.4*		*µg/L*	24.7		*135*	*70-130*			*S02*

QC Qualifiers:

S02 Surrogate recovery outside of control limits. Data accepted based on acceptable recovery of other surrogates.

Appendix E

Protocol 17 Notice of Migration

western water ASSOCIATES LTD
Consultants in Hydrogeology and Environmental Science

July 30, 2018 *UPDATED September 17, 2018* 14-024-21

Andrea Weissenborn
747 Golden Donald Upper Rd.
Golden, B.C., V0A 1H1

Via e-mail: **aweissenborn@hotmail.com**

Dear Ms. Weissenborn:

Re: NOTICE OF MIGRATION (NOM) FROM GOLDEN REFUSE AND DISPOSAL FACILITY (350 GOLDEN DONALD UPPER ROAD) TO 220 GOLDEN DONALD UPPER ROAD

This letter is to inform you of the results of soils sampling, which occurred on the Weissenborn family property at 220 Golden Donald Upper Road on June 25, 2018. The Weissenborn property borders the southern edge of the Golden Refuse and Disposal Facility (RDF), located at 350 Golden Donald Upper Road (Figure 1).

Regulatory Setting

The *Contaminated Sites Regulation* (CSR) under the *Environmental Management Act* (EMA) is the principal regulatory document defining requirements for contaminated sites management in British Columbia. The CSR was instituted on April 1, 1997 and has been subject to several amendments, most recently in November 2017. The EMA and CSR have provisions for both numerical standards and risk-based standards approaches to managing site contamination. They outline the procedures for site assessment, remediation and application for environmental closure for a property. Numerical standards are a key component of the requirements in the CSR, as they define whether a site is considered contaminated.

Applicable Soil Standards

Generic Numerical Soil Standards for a variety of inorganic and organic substances are presented in Schedules 3.1 of the CSR. Standards are under eight classes of land use in 3.1: Wildlands Natural (WL_N); Wildlands Reverted (WL_R); Agricultural (AL); Urban Park (PL); Residential Low Density (RL_{LD}); Residential High Density (RL_{HD}); Commercial (CL); and, Industrial (IL).

The 220 Golden Donald Upper Road is used for residential purposes. As such, Residential Low Density (RL_{LD}); numerical standards were applied to onsite soils.

Summary of Site Conditions

Soils were sampled by Bryer Manwell M.Sc. P.Eng. of Western Water Associates Ltd (WWAL) alongside a representative of the Weissenborn property (Karl Weissenborn). Eight samples were collected on the Weissenborn property on June 25, 2018 and two samples were collected on the eastern edge of the Golden RDF property the following day (June 26, 2018) (see Figure 2 for sampled locations).

One sample, LOC-6, located along the mid-section of the property boundary (see attached Figure 2) exceeded one parameter (manganese) when compared to the applicable British Columbia Contaminated Site Regulation

Numerical Soil Standards for Environmental Protection (Toxicity to Soil Invertebrates and Plants). The LOC-6 sample had a manganese value of 2,910 µg/g, which is above the Toxicity to Soil Invertebrates and Plants Soil Standard of 2000 µg/g. No other exceedances were observed during the June 25 and 26, 2018 soil sampling. Table 1 below provides a summary of the manganese levels at the ten soil sample locations and the full soils sampling results are attached.

The site of contamination is bound by soil sample site LOC-5 and LOC-7 located approximately 100 m east and 80 m west of LOC-6, respectively. Manganese values at LOC-5 and LOC-7 were 430 µg/g (Loc-5) and 696 µg/g (Loc-7); both below the Standard of 2,000 µg/g.

Table 1: Summary of Manganese at Soil Sampled Locations

Soil Sample Location Name		LOC-1	LOC-2	LOC-3	LOC-4	LOC-5	LOC-6	LOC-7	LOC-8	LOC-9	LOC-10
Manganese (µg/g)	25-Jun-18	551	579	439	539	430	2,910	696	456	404	428

Note: Site specific applicable Standard from CSR RL-LD Matrix 19 Numerical Soils Standard for Manganese - Environmental Protection (Toxicity to soil invertebrates and plants) (2017 and updates) - 2,000 µg/g.

Delineate Extent of Contamination

The pathway for migration from the Golden RDF to the Weissenborn property was via overland flow with a limited spatial extent. Prior to the spring of 2017, there was no diversion ditching along the south landfill property boundary. Ditching to control runoff from the RDF has since been constructed, and the pathway for contaminant migration is no longer present at the site; however, the runoff which migrated onto the Weissenborn property in the past needs to characterized and remediated.

This Protocol 17 Notice of Migration triggers a delineation of extent of contamination from the source parcel for all pathways of migration. To delineate the extent of contamination of the parameter of concern, we recommend re-sampling at LOC-6 and stepping-out from the LOC-6 at about 10 m increments and characterizing the soils around LOC-6. We recommend a total of 15 more soil samples be taken and assessed for metals as per Figure 2. Depth of soil contamination will be assessed by evaluating manganese from 0 to 0.5 m and from 0.5. to 1 m depth at the samples closest to LOC-6. We believe this exceedance for manganese in the affected soils does not constitute high risk conditions and therefore this sampling event will occur during the Golden RDF annual sampling event in September 2018.

The extent of contamination from the source parcel via groundwater flow is currently being investigated and delineated. Two new wells were drilled at the Golden RDF in June 2018 and four residential wells, located within 1 km of the Golden RDF were tested. Further drilling to delineate off-site migration via groundwater flow will be recommended from the 2018 groundwater investigation.

Remedial Plan for Manganese in Soils at 220 Golden Donald Upper Road

From the soil sampling, which occurred on June 25, 2018, we see that most of soil, located adjacent to the Golden RDF does not exceed the applicable CSR Numerical Soil Standards. Once the extent of manganese

contaminated soils around LOC-6 has been delineated, the affected soil should be excavated and taken to an acceptable location, followed by confirmation sampling of the remaining soil.

Closing

In closing, although there is one location that was shown to be affected by the Golden RDF, the extent of manganese contamination appears to be relatively limited. Your cooperation in further assessment and remediation of the soils is most appreciated.

Yours truly,

WESTERN WATER ASSOCIATES LTD.

Bryer Manwell, M.Sc., P.Eng.
Hydrogeological Engineer

CC: Director of Waste Management c/o Site Information Advisor, Ministry of Environment & Climate Change Strategy
Via e-mail: Advisor.SiteInformation@gov.bc.ca

Enclosed: Notice of Migration Form, Figure 1, Figure 2 and Soil Quality Results (June 25, 2018

Notice of Migration Form

Golden Refuse and Disposal Facility – Notice of Migration (soil)
Manganese at Loc-6
WWAL Ref: 14-024-21

BRITISH COLUMBIA | Ministry of Environment and Climate Change Strategy

NOTIFICATION OF LIKELY OR ACTUAL MIGRATION

Land Remediation Section
PO Box 9342 Stn Prov Govt
Victoria B.C. V8W 9M1
Telephone: (250) 387-4441
Fax: (250) 387-8897

Instructions

Please complete and sign the following notification form and send it to each neighbouring parcel owner whose parcel is likely or actually contaminated by migration of substances from your parcel, with a copy to the province at the contact provided below:

Director of Waste Management
c/o Site Information Advisor
Ministry of Environment & Climate Change Strategy
PO Box 9342 Stn Prov Govt
Victoria, B.C. V8W 9M1

Fax (250) 387-9935

or

Advisor.SiteInformation@gov.bc.ca

Note on meaning of "owner"

As per Section 39 of the *Environmental Management Act*, "**owner**" means a person who

(a) is in possession,
(b) has the right of control, or
(c) occupies or controls the use

of real property, and includes, without limitation, a person who has an estate or interest, legal or equitable, in the real property, but does not include a secured creditor unless the secured creditor is described in section 45 (3).

Examples include: land owners, operators, lessees, tenants, easement holders, utility owners or operators, etc.

Notifications where there is more than one neighbouring parcel owner

In cases where multiple neighbouring parcel owners require notification, you may complete one form per owner or include the names of all owners on one form. In the latter case, please attach additional pages as needed.

Land descriptions

Provide the latitude and longitude of the approximate centre of the source and affected parcels (accurate to ± 0.5 of a second, or approximately ±10 metres using the 1983 North American Datum).

Site plans (may be obtained from some local government websites) and a Land Title record for the source parcel should be included with your submission.

For further information regarding migration of substances, please refer to Fact Sheet 34 (available at: https://www2.gov.bc.ca/gov/content/environment/air-land-water/site-remediation/site-profiles) or e-mail us at site@gov.bc.ca.

Version 6.2

Ministry of Environment and Climate Change Strategy

NOTIFICATION OF LIKELY OR ACTUAL MIGRATION

Land Remediation Section
PO Box 9342 Stn Prov Govt
Victoria B.C. V8W 9M1
Telephone: (250) 387-4441
Fax: (250) 387-8897

Sections 57 and 60.1 of the Environmental Management Act's Contaminated Sites Regulation require a responsible person who carries out independent remediation or a site investigation and who knows that one or more substances has migrated or is likely to have migrated to a neighbouring parcel and is or is likely causing contamination to notify the person or persons who own the neighbouring parcel in writing and submit a copy of the notification to the Director of Waste Management, within 15 days after the responsible person becomes aware of the migration or likely migration to the neighbouring parcel. Note that "affected parcel" is defined as a parcel which is contaminated by the migration of substances from a neighbouring parcel.

Information for Affected and Likely Affected Parcels

Owner Name Akamina Woods Developments with the Weissenborn family as shareholc

Owner's address: Number and Street 747 Golden Donald Upper Rd., Golden

City Province BC

Country Canada Postal Code V0A 1H0

Phone (250) 344-6399 Fax

Parcel Civic Address or Location (i.e., nearest roadway): 220 Golden Donald Upper rd.

Parcel PID or PIN (if applicable): Parcel Site ID number (if applicable):

Latitude and Longitude for Centre of Parcel:

Latitude	Degrees	51	Minutes	18	Seconds 19.6
Longitude	Degrees	116	Minutes	57	Seconds 4.9

Type(s) of utility affected(if applicable, e.g. sewer, telephone, electrical):

Does this parcel have likely or actual high risk conditions (as described under the Act's Protocol 12) associated with the likely or actual migration of substances from the source parcel? ☐ Yes ■ No

Please include a separate sketch plan with this form for this parcel.

Owner Name

Owner's address: Number and Street

City Province

Country Postal Code

Phone Fax

Parcel Civic Address or Location (i.e., nearest roadway):

Parcel PID or PIN (if applicable): Parcel Site ID number (if applicable):

Latitude and Longitude for Centre of Parcel:

Latitude	Degrees		Minutes		Seconds
Longitude	Degrees		Minutes		Seconds

Type(s) of utility affected(if applicable, e.g. sewer, telephone, electrical):

Does this parcel have likely or actual high risk conditions (as described under the Act's Protocol 12) associated with the likely or actual migration of substances from the source parcel? ☐ Yes ☐ No

Please include a separate sketch plan with this form for this parcel.

Please add additional pages if more than two affected or likely affected parcels have been identified.

Section I Notification Trigger

Check the following items as applicable. Likely or actual migration of substances from the source parcel was identified during:

- ☐ Independent remediation (Section 57, Contaminated Sites Regulation)*
- ☑ Site Investigation (Section 60.1, Contaminated Sites Regulation)

* You must also complete and submit a notification of independent remediation. The form is available on the ministry's web site at: https://www2.gov.bc.ca/gov/content/environment/air-land-water/site-remediation/guidance-resources/forms.

Section II Land Description of Source Parcel

Site ID Number (if known)	Golden Refuse and Disposal Facility				
PID		or	PIN		
Legal Description					
Latitude	Degrees 51		Minutes 18	Seconds 34.2	
Longitude	Degrees 116		Minutes 57	Seconds 5.5	
Site Civic Address or Location	Street 350 Golden Donald Upper Road, Golden BC				
(i.e., nearest roadway)	City			Postal Code	

Section III Property Owner and/or Operator (Source Parcel)

Name	Columbia Shuswap Regional District (CSRD) (Ben Van Nostrand)		
Address	Number and Street 555 Harbourfront Dr NE		
	City Salmon Arm	Province/State BC	
	Country Canada	Postal /Zip Code V1E 4P1	
Phone (250) 832-8194		Fax (250) 832-3375	

Include both a site plan and a Land Title record.

Section IV Environmental Consultant / Agent Contact (if applicable)

Name	Western Water Associates Ltd (Bryer Manwell)		
Address	Street # 106 5145 26 st		
	City Vernon	Province/State BC	
	Country Canada	Postal /Zip Code V1T 8G4	
Phone (250) 541-1030		Fax	

Section V Confirmed or Suspected Source of Contamination (e.g. leaking underground storage tank)

Section VI Source Parcel Substances

List the substances which have migrated or likely have migrated to one or more neighbouring parcels and are or are likely causing contamination at the neighbouring parcel(s). Provide the information for each environmental medium (soil, groundwater and surface water, sediment, and vapour). Attach additional information if not there is enough space.

Environmental Medium	Substance	Standard Exceeded (for affected parcel)	Maximum Concentration
Soil	Manganese	CSR - RL	2000 mg/L

Section VII Additional Comments

Section VIII Signature

I confirm that the above information is true based on my knowledge as of the date this notification form was completed.

Signature of person completing form

2018-07-30

Date completed (YYYY-MM-DD)

Bryer Manwell

Printed name

Send the completed form to:

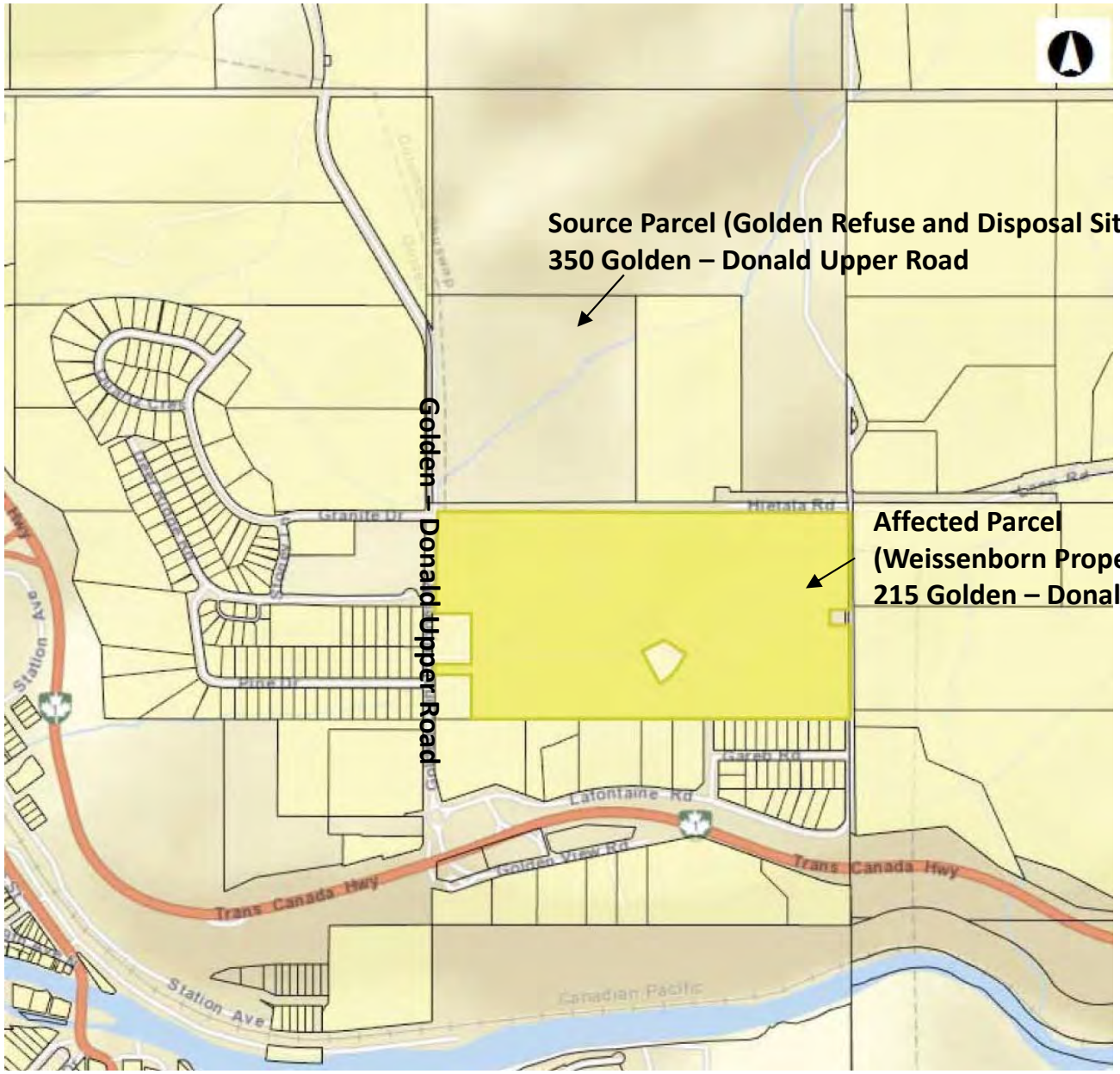
Site Information Advisor
Ministry of Environment and Climate Change Strategy
PO Box 9342 Stn Prov Govt
Victoria B.C. V8W 9M1
Fax (250) 387-9935
E-mail: Advisor.SiteInformation@gov.bc.ca

Reset Form

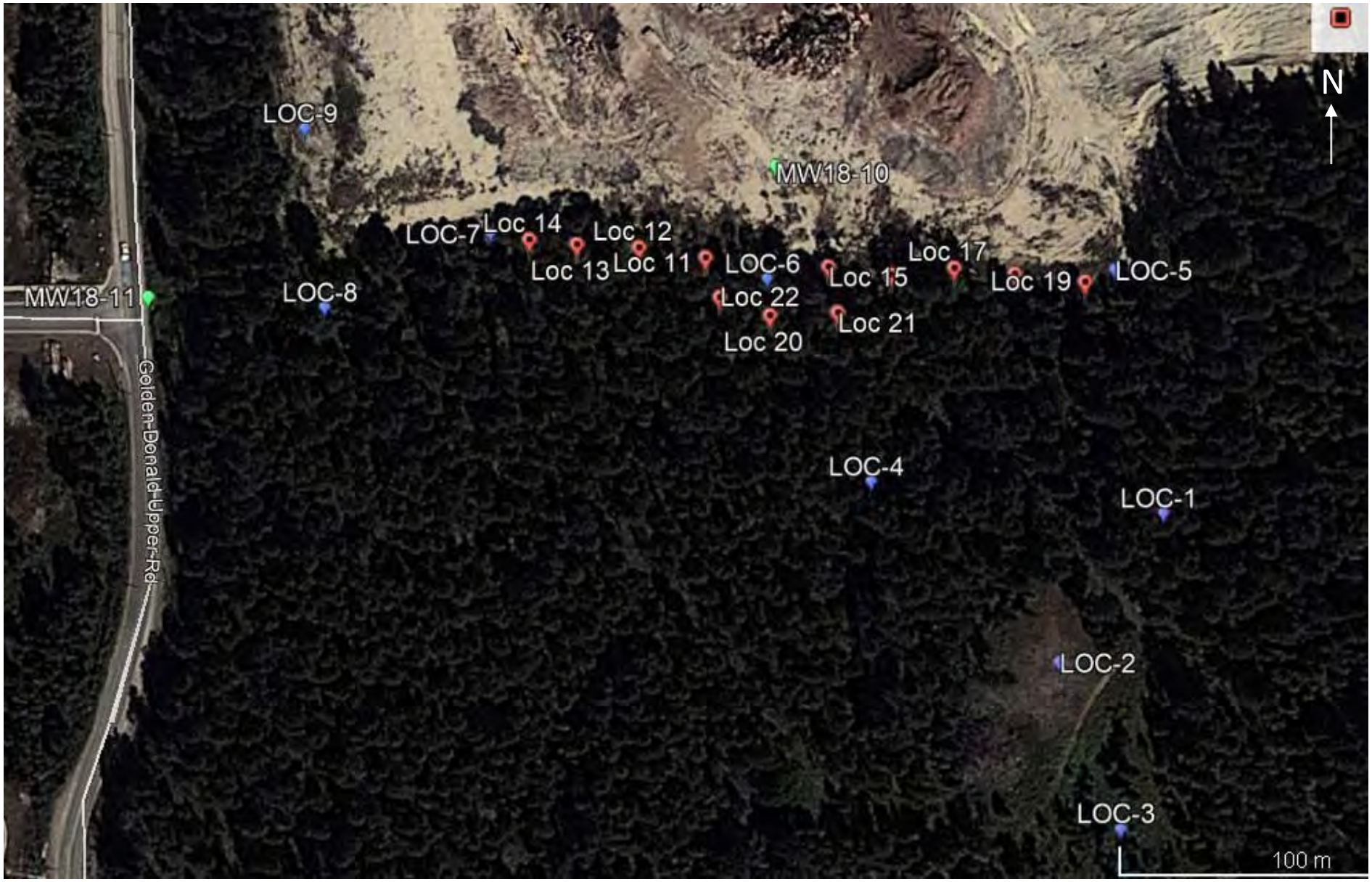
For further information, please refer to the information under our key topic website on migration of substances.

Figures

Golden Refuse and Disposal Facility – Notice of Migration (soil)
Manganese at Loc-6
WWAL Ref: 14-024-21



CSRD Golden RDF	TITLE **Figure 1: Source Parcel and Affected Parcel, Golden, B.C.**				
western water ASSOCIATES LTD	DRAWN	RA	DATE	July 2018	PROJECT NO. 14-024-21
	CHECKED	BRM	SCALE	See figure	DWG. NO. na
	REVIEWED		FILE NO.		FIGURE VERSION NO. 1



CSRD Golden RDF	TITLE **Figure 2: June 25, 2018 Sampled Locations (blue) and recommended future "step-out" soil sampling (red) locations at the Affected Parcel (216 Golden-Upper Road – Weissenborn Property).**				
western water ASSOCIATES LTD	DRAWN	RA	DATE	July 2018	PROJECT NO. 14-024-21
	CHECKED	BRM	SCALE	See figure	DWG. NO. na
	REVIEWED		FILE NO.		FIGURE VERSION NO. 1

Soil Quality Results (June 25, 2018)

Golden Refuse and Disposal Facility – Notice of Migration (soil)

Manganese at Loc-6
WWAL Ref: 14-024-21

| #106 – 5145 26th Street, Vernon, B.C. V1T 8G4 | P:1.250.541.1030 | Prince George | Victoria | www.westernwater.ca |

Golden Refuse Disposal Site

Soil Quality Results

Analyte	Unit	Guideline CSR RL-LD	LOC-1	LOC-2	LOC-3	LOC-4	LOC-5	LOC-6	LOC-8	LOC-9	LOC-10	LOC-11
Sampling Location			LOC-1	LOC-2	LOC-3	LOC-4	LOC-5	LOC-6	LOC-8	LOC-9	LOC-10	LOC-11
Date Sampled			25-Jun-18	25-Jun-18	25-Jun-18	25-Jun-18	25-Jun-18	25-Jun-18	25-Jun-18	25-Jun-18	27-Jun-18	27-Jun-18
Lab Sample ID			8062810-01	8062810-02	8062810-03	8062810-04	8062810-05	8062810-06	8062810-08	8062810-09	8062810-10	8062810-11
Sample Type												
Lab Results												
General												
Water-soluble bromide (mass/mass)	µg/g	NG										
Water-soluble chloride (mass/mass)	µg/g	NG										
Chloride (in saturated paste)	mg/L	NG	23.6	315	15.3	33.7	13.2	13.8	20.4	12.7	30.6	17.1
Chloride ion	µg/g	350 [1.1]	<25	302.4	<25	94.7	<25	<25	<25	<25	<25	<25
Conductivity (in 5:1 water:soil mixture)	µS/cm	NG	409	206	311	158	133	300	115	215	193	132
Water-soluble fluoride (mass/mass)	µg/g	NG										
Moisture	% wet	NG										
Water-soluble nitrate (as N) (mass/mass)	µg/g	NG										
Water-soluble nitrite (as N) (mass/mass)	µg/g	NG										
pH (in 2:1 water:soil mixture)		NG	6.57	6.9	7.25	5.68	7.97	6.58	6.06	6.84	7.18	7.38
Total phosphorus (as P, SM 4500-P)	µg/g	NG										
Percent saturation	%	NG	86	96	69	281	46.5	142	56.7	81.4	50	48.6
Water-soluble sulphate (mass/mass)	µg/g	NG										
Metals												
Aluminum	µg/g	40000	13100	14500	15800	5160	10900	12300	25100	10400	11700	7390
Antimony	µg/g	20 [1.2]	0.16	0.18	0.27	0.46	0.34	0.48	0.19	0.4	0.46	0.2
Arsenic	µg/g	10 [1.3]	2.12	2.4	4.46	1.36	5.28	2.81	3.63	3.52	4.34	3.46
Barium	µg/g	700 [1.4]	190	174	165	178	77.9	406	258	105	111	75.1
Beryllium	µg/g	Calc [1.5]	0.36	0.44	0.53	0.14	0.41	0.33	0.68	0.39	0.43	0.31
Bismuth	µg/g	NG	0.15	0.14	0.15	0.13	0.12	0.21	0.17	0.11	0.13	0.1
Boron	µg/g	8500	2.8	4.7	5.8	4.6	6.3	6.9	3.5	4.6	4.9	3.8
Cadmium	µg/g	Calc [1.6]	0.075	0.139	0.062	0.168	0.06	0.346	0.062	0.187	0.067	0.068
Calcium	µg/g	NG	7820	19000	49100	15600	124000	18000	6250	88900	81900	116000
Chromium	µg/g	60 [1.7]	9.4	10.1	14.6	4.6	15.6	9.2	14.3	11.1	12.6	11.2
Cobalt	µg/g	25 [1.8]	4.08	5.16	8.06	1.97	9.23	5.22	6.3	6.07	7.16	6.05
Copper	µg/g	Calc [1.9]	4	8.28	13.1	5.4	14	7.4	6.93	15.3	12.8	12
Iron	µg/g	35000	15300	18100	21800	5980	22500	14300	22500	18300	19900	17400
Lead	µg/g	120 [1.10]	15.8	18.8	14.5	25.4	15	35.9	15.6	34.3	14.1	14.2
Lithium	µg/g	30	12.1	13	18.9	4.72	19.3	11.4	18.4	12.3	15.5	10.9
Magnesium	µg/g	NG	3410	4690	9690	2170	18800	3630	4230	14400	13900	20100
Manganese	µg/g	2000 [1.11]	551	579	439	539	430	2910	696	456	404	428
Mercury	µg/g	10 [1.12]	0.075	0.086	0.079	0.158	0.07	0.133	0.094	0.086	0.112	0.073
Molybdenum	µg/g	3 [1.13]	0.78	0.6	0.82	1.05	0.53	1.06	0.73	0.49	0.59	0.61
Nickel	µg/g	Calc [1.14]	9.78	13	18.4	5.14	20.4	12.2	16.7	13.4	16.2	13.6
Phosphorus	µg/g	NG	554	437	571	505	573	784	828	619	551	612
Potassium	µg/g	NG	1140	1420	1940	700	1620	1020	1140	991	1270	780
Selenium	µg/g	1 [1.15]	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Silver	µg/g	20 [1.16]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Sodium	µg/g	NG	131	102	143	73	123	154	188	143	119	97
Strontium	µg/g	9500	28	43.9	110	54.5	267	61.4	25.6	153	162	215
Sulphur	µg/g	NG	2000	2650	3990	3990	3660	2950	<1000	3920	3650	3860
Tellurium	µg/g	NG	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Thallium	µg/g	9 [1.17]	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Thorium	µg/g	NG	2.48	3.22	4.4	1.07	6.05	2.53	4.4	3.02	3.73	3
Tin	µg/g	50 [1.18]	0.47	0.43	0.39	0.66	0.29	0.79	0.68	0.75	0.52	0.3
Titanium	µg/g	NG	218	192	184	114	50.3	256	509	148	109	67.5
Tungsten	µg/g	15	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Uranium	µg/g	15 [1.19]	0.181	0.171	0.311	0.104	0.358	0.194	0.32	0.237	0.317	0.258
Vanadium	µg/g	100 [1.20]	11.1	9.4	11.7	4.7	9.7	11.3	15.5	9	10.3	7.8
Zinc	µg/g	Calc [1.21]	55.3	51.1	59.3	27.2	56.1	70.8	45.5	94.8	51.7	44.8
Zirconium	µg/g	NG	4.4	8.5	4.8	3.2	<2.0	3.9	14.1	3	<2.0	<2.0

Legend for Reports for CSRD Refuse Disposal Sites Soil Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
CSR RL-LD	BC Contaminated Sites Regulation, Numerical Soil Standards for Residential (Low Density) Land Use; Human Health Protection (Intake of contaminated soils) and Environmental Protection (Toxicity to soil invertebrates and plants) (2017 and updates). Note, Groundwater for drinking water does not apply here, as there is no surficial aquifer and the bedrock aquifer is not likely hydraulically connected to the surface.
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
CSR RL-LD (F)	Highlighted value exceeds CSR RL-LD (F)
SL Criteria Override	Highlighted value exceeds sampling location criteria override

Guideline Notes for Reports for CSRD Refuse Disposal Sites Soil Quality Results

1. Notes for BC Contaminated Sites Regulation, Soil Standards for Residential (Low Density) Land Use; Environmental Protection, Toxicity to soil invertebrates and plants (2017 and updates) (CSR RL-LD (F))
General Notes:
Soil Standards from Schedule 3.1 for residential (low density) land use have been applied.
Schedule 3.1 includes three parts: Part 1 – Matrix numerical soil standards; Part 2 – Generic numerical soil standards to protect human health; and Part 3 – Generic numerical soil standards to protect environmental health.
The most stringent standards in Schedule 3.1, including consideration for freshwater aquatic life (but not marine aquatic life), were used. This means that the Part 1 standards for "Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life" were considered. The Part 1 standards for "Environmental Protection, Groundwater flow to surface water used by marine aquatic life" were not considered.
The Schedule 3.1 – Part 1 standards that were used, along with the site-specific factor, are included in the notes for the relevant analytes. For generic numerical soil standards, the Schedule 3.1 – Part 2 generic numerical soil standards were used unless noted otherwise in the notes for the relevant analytes.

Note 1.1 for Chloride ion:
Contaminated Site Regulation Schedule 3.1, Part 1, Matrix 8 Numerical Soil Standards for Environmental Protection
Note 1.2 for Antimony:
Schedule 3.1, Part 3, Standard to Protect Ecological Health.
Note 1.3 for Arsenic:
Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 10 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 10 µg/g
Environmental Protection, Groundwater used for irrigation: 10 µg/g
Note 1.4 for Barium:
Schedule 3.1, Part 1, Environmental Protection (Toxicity to Soil Invertebrates and Plants).
Note 1.5 for Beryllium:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for Beryllium varies with the pH of the soil at a site, as follows.
Human Health Protection, Intake of contaminated soil: 85 µg/g
Human Health Protection, Groundwater used for drinking water:
1 µg/g if pH < 5.5
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
1 µg/g if pH < 6.5;
4 µg/g if 6.5 ≤ pH < 7.0;
30 µg/g if 7.0 ≤ pH < 7.5.
Note 1.6 for Cadmium:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows.
The standard for cadmium varies with the pH of the soil at a site, as follows.
Human Health Protection, Intake of contaminated soil: 20 µg/g
Human Health Protection, Groundwater used for drinking water:
1 µg/g if pH < 7.0
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
1 µg/g if pH < 7.0;
3 µg/g if 7.0 ≤ pH < 7.5;
20 µg/g if 7.5 ≤ pH < 8.0;
Standard varies with receiving water hardness (H). H = 150 to < 210 mg/L as CaCO3 is assumed. Consult a director for further advice.
Environmental Protection, Groundwater used for irrigation:
1 µg/g if pH < 7.0
Note 1.7 for Chromium:
Schedule 3.1, Part 1, Matrix 9 - Chromium provides standards for chromium, hexavalent; chromium, trivalent; and chromium (all species).
The most stringent standards for chromium, hexavalent are:
Human Health Protection, Groundwater used for drinking water: 60 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 60 µg/g
Environmental Protection, Groundwater used for irrigation: 60 µg/g
The most stringent standard for chromium, trivalent is:
Human Health Protection, Intake of contaminated soil: 100 µg/g
The standard of 60 µg/g was used for chromium in this report to demonstrate compliance with the standards of this matrix.
Note 1.8 for Cobalt:

Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Intake of contaminated soil: 25 µg/g
Human Health Protection, Groundwater used for drinking water: 25 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 25 µg/g
Environmental Protection, Groundwater used for irrigation: 25 µg/g

Note 1.9 for Copper:

Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for copper varies with the pH of the soil at a site, as follows.
Environmental protection, Toxicity to soil invertebrates and plants:
150 µg/g
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
75 µg/g if pH < 5.5;
100 µg/g if 5.5 ≤ pH < 6.0;
Standard varies with receiving water hardness (H). H ≥ 200 mg/L as $CaCO_3$ is assumed. Consult a director for further advice.
Environmental Protection, Groundwater used for irrigation:
75 µg/g if pH < 5.5

Note 1.10 for Lead:

Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
Human Health Protection, Intake of contaminated soil:
120 µg/g
Human Health Protection, Groundwater used for drinking water:
120 µg/g if pH < 5.5;

Note 1.11 for Manganese:

Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 2,000 µg/g.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as (a) item B1, or (b) item C1, C3 or C4, (c) item D2, D3, D5 or D6, (d) item E4, or (e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20 but only if the site was used for that purpose or activity in conjunction with or as a result of the site being used for at least one of the purposes or activities set out in the above note.
Environmental Protection, Toxicity to soil invertebrates and plants: 2,000 µg/g
Environmental Protection, Groundwater used for irrigation: 2,000 µg/g

Note 1.12 for Mercury:

Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil

Note 1.13 for Molybdenum:

Schedule 3.1, Part 1, Environmental Protection, Groundwater used for irrigation

Note 1.14 for Nickel:

Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for nickel varies with the pH of the soil at a site, as follows.
Human Health Protection, Groundwater used for drinking water:
70 µg/g if pH < 7.5;
Environmental Protection, Toxicity to soil invertebrates and plants:
150 µg/g
Environmental Protection, Groundwater used for irrigation:
70 µg/g if pH < 7.0

Note 1.15 for Selenium:

Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 1 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 1 µg/g
Environmental Protection, Groundwater used for irrigation: 1 µg/g

Note 1.16 for Silver:

Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.17 for Thallium:

Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.18 for Tin:

Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.19 for Uranium:

Schedule 3.1, Part 1, EP, Groundwater used for irrigation.

Note 1.20 for Vanadium:

Schedule 3.1, Part 1, Human Health Protection, Groundwater used for drinking water.

Note 1.21 for Zinc:

Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for zinc varies with the pH of the soil at a site, as follows.
Environmental Protection, Toxicity to soil invertebrates and plants:
450 µg/g
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
150 µg/g if pH < 6.0;
250 µg/g if 6.0 ≤ pH < 6.5;
350 µg/g if 6.5 ≤ pH < 7.0;
Standard varies with receiving water hardness (H). H = 200 to < 300 mg/L as $CaCO_3$ is assumed. Consult director for further advice.
Environmental Protection, Groundwater used for irrigation: 150 µg/g if pH < 6.0

western water
ASSOCIATES LTD
Consultants in Hydrogeology and Environmental Science

October 11, 2018 14-024-21

Andrea Weissenborn
747 Golden Donald Upper Rd.
Golden, B.C., V0A 1H1

Via e-mail: **aweissenborn@hotmail.com**

Dear Ms. Weissenborn:

Re: CONFIRMATORY SAMPLING RESULTS FURTHER TO THE NOTICE OF MIGRATION (NOM) FROM GOLDEN REFUSE AND DISPOSAL FACILITY (350 GOLDEN DONALD UPPER ROAD) TO 220 GOLDEN DONALD UPPER ROAD

This letter provides the results of the confirmatory soils sampling, which occurred on the Akamina Woods Developments (Weissenborn family) property at 220 Golden Donald Upper Road. The initial soil sampling event occurred on June 25, 2018 and the confirmatory event occurred on Sept 10, 2018. The Weissenborn property borders the southern edge of the Golden Refuse and Disposal Facility (RDF), located at 350 Golden Donald Upper Road (Figure 1).

Regulatory Setting

The *Contaminated Sites Regulation* (CSR) under the *Environmental Management Act* (EMA) is the principal regulatory document defining requirements for contaminated sites management in British Columbia. The CSR was instituted on April 1, 1997 and has been subject to several amendments, most recently in November 2017. The EMA and CSR have provisions for both numerical standards and risk-based standards approaches to managing site contamination. They outline the procedures for site assessment, remediation and application for environmental closure for a property. Numerical standards are a key component of the requirements in the CSR, as they define whether a site is considered contaminated.

Applicable Soil Standards

Generic Numerical Soil Standards for a variety of inorganic and organic substances are presented in Schedules 3.1 of the CSR. Standards are under eight classes of land use in 3.1: Wildlands Natural (WL_N); Wildlands Reverted (WL_R); Agricultural (AL); Urban Park (PL); Residential Low Density (RL_{LD}); Residential High Density (RL_{HD}); Commercial (CL); and, Industrial (IL).

The 220 Golden Donald Upper Road is used for residential purposes. As such, Residential Low Density (RL_{LD}); numerical standards were applied to onsite soils.

Summary of Site Conditions

During the June 20, 2018 sampling soils were sampled by Bryer Manwell M.Sc. P.Eng. of Western Water Associates Ltd (WWAL) alongside a representative of the Weissenborn property (Karl Weissenborn). Eight

samples were collected on the Weissenborn property on June 25, 2018 and two samples were collected on the eastern edge of the Golden RDF property the following day (June 26, 2018) (see Figure 1 for sampled locations).

One sample, LOC-6, located along the mid-section of the property boundary (see attached Figure 2) exceeded one parameter (manganese) when compared to the applicable British Columbia Contaminated Site Regulation Numerical Soil Standards for Environmental Protection (Toxicity to Soil Invertebrates and Plants). The LOC-6 sample had a manganese value of 2,910 µg/g, which is above the Toxicity to Soil Invertebrates and Plants Soil Standard of 2000 µg/g. No other exceedances were observed during the June 25 and 26, 2018 soil sampling. Table 1 below provides a summary of the manganese levels at the ten-soil sample locations and the full soil sampling results are attached.

LOC-6 is bound by soil sample sites LOC-5 and LOC-7; located approximately 100 m east and 80 m west of LOC-6, respectively. Manganese values at LOC-5 and LOC-7 were 430 µg/g (Loc-5) and 696 µg/g (Loc-7); both below the Standard of 2,000 µg/g.

Table 1: Summary of Manganese at Soils Sampled Locations (June 25, 2018)

Soil Sample Location Name	Manganese (µg/g) 25-Jun-18
LOC-1	551
LOC-2	579
LOC-3	439
LOC-4	539
LOC-5	430
LOC-6	**2,910**
LOC-7	696
LOC-8	456
LOC-9	404
LOC-10	428

Note: Site specific applicable Standard from CSR RL-LD Matrix 19 Numerical Soils Standard for Manganese - Environmental Protection (Toxicity to soil invertebrates and plants) (2017 and updates) - 2,000 µg/g.

The confirmatory soil sampling event was completed on September 10, 2018. WWAL staff, Rachel Arychuk sampled the soils alongside a representative of the Weissenborn property (Karl Weissenborn). LOC-6 was resampled for a surface sample as well as samples from depths of approximately 0.5 m (1.5 ft) and 0.9 m (3 ft) were collected.

Six additional soil sample locations (LOC-11 – 17) were sampled in 10 m intervals in the west direction from LOC-6 towards sample site LOC-7. Eight soil sample locations (LOC-18 -24) were sampled at 10 m intervals from LOC-6 in the east direction towards LOC-5 (see attached Figure 1). Ten of the additional soil samples collected at the 10 m increments from LOC-6 were collected from surface and analyzed for the metal parameter manganese only.

Surface and composite samples were collected from seven samples (LOC-11, LOC-18, LOC-25, LOC-26, LOC-27, LOC-28 and LOC-29) located within a 10 m perimeter of LOC-6. The composite samples were collected from approximate depths of 0.5 m (1.5 ft) and 0.9 m (3 ft) and mixed into a composite sample and placed in clean laboratory supplied jars. Table 2 below provides a summary of the manganese levels at the surface

confirmatory soil sample locations. Table 3 provides a summary of the manganese levels at the composite confirmatory soil sample locations, and the full soils sampling results are attached.

Table 2. Summary of Manganese at Surface Confirmatory Soils Sampled (September 10, 2018)

Soil Sampling Location Name	Manganese (ug/g)
LOC-6	460
LOC-11	381
LOC-12	728
LOC-13	548
LOC-14	641
LOC-15	658
LOC-16	702
LOC-18 (Surface)	593
LOC-19	931
LOC-20	327
LOC-21	398
LOC-22	429
LOC-23	409
LOC-24	902
LOC-25 (Surface)	1210
LOC-26 (Surface)	1790
LOC-27 (Surface)	706
LOC-28 (Surface)	885
LOC-29 (Surface)	155

Table 3. Summary of Manganese at Composite Confirmatory Soil Sampled (September 10, 2018)

Soil Sampling Location Name	Manganese (ug/g)
LOC-6 (1.5 ft)	353
LOC-11 (1.5 ft)	607
LOC-18 (1.5 ft)	832
LOC-25 (1-3 ft)	775
LOC-26 (1-3 ft)	655
LOC-27 (1-3 ft)	832
LOC-28 (1-3 ft)	610
LOC-29 (1-3 ft)	568

Delineate Extent of Contamination

The pathway for migration from the Golden RDF to the Weissenborn property was via overland flow with a limited spatial extent. Prior to the spring of 2017, there was no diversion ditching along the south landfill property boundary. Ditching to control runoff from the RDF has since been constructed, and the pathway for contaminant migration is no longer present at the site.

The extent of contamination from the source parcel via groundwater flow is currently being investigated and delineated. Two new wells were drilled at the Golden RDF in June 2018 and four residential wells, located within 1 km of the Golden RDF were tested. Further drilling to delineate off-site migration via groundwater flow will be recommended from the 2018 groundwater investigation.

Remedial Plan for Manganese in Soils at 220 Golden Donald Upper Road

From the confirmatory soil sampling, which occurred on September 10, 2018 we see that the soil, located adjacent to the Golden RDF does not exceed the applicable CSR Numerical Soil Standards or Upper Cap Concentrations at location LOC-6 or any of the other additional eighteen sites sampled.

Closing

In closing, although there was one location which was above the applicable manganese Standard, confirmatory sampling showed no indication of contamination.

Yours truly,

WESTERN WATER ASSOCIATES LTD.

Bryer Manwell, M.Sc., P.Eng.
Hydrogeological Engineer

CC: Director of Waste Management c/o Site Information Advisor, Ministry of Environment & Climate Change Strategy
Via e-mail: Advisor.SiteInformation@gov.bc.ca

Enclosed: Figure 1 and Soil Quality Results (June and September Results 2018)

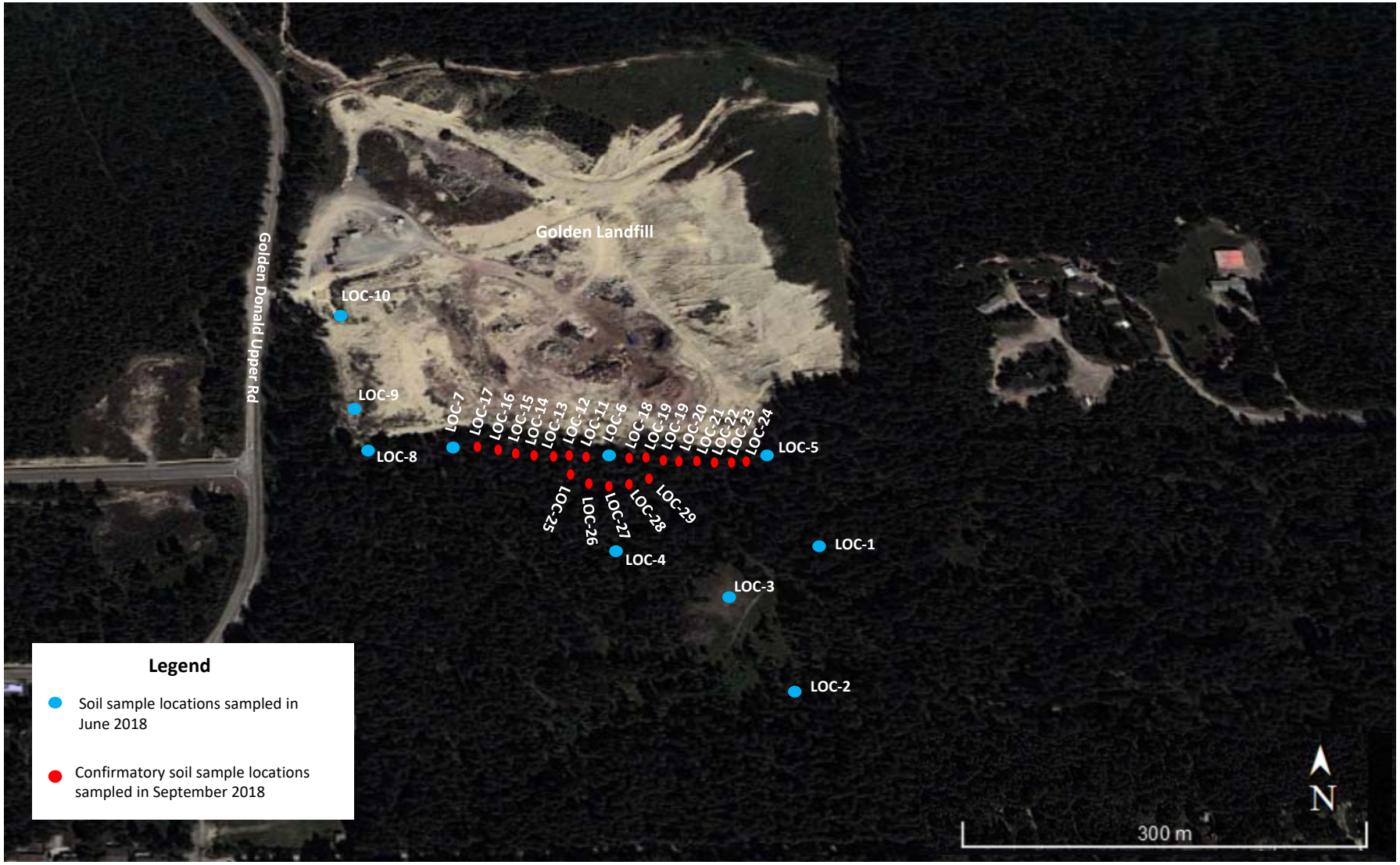


Image Source: Google Earth Pro, 2018

CSRD Golden RDF Hydrogeological Assessment

TITLE

Figure 1: Soil Sample Locations on Weissenborne Property

western water ASSOCIATES LTD

DRAWN	RA	DATE	September 2018	PROJECT NO.	14-024-21
CHECKED	BRM	SCALE	See figure	DWG. NO.	na
REVIEWED	DG	FILE NO.		FIGURE VERSION NO.	1

Legend for Reports for CSRD Refuse Disposal Sites Soil Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
CSR RL-LD (F)	BC Contaminated Sites Regulation, Numerical Soil Standards for Residential (Low Density) Land Use; Human Health Protection (Intake of contaminated soils) and Environmental Protection (Toxicity to soil invertebrates and plants) (2017 and updates). Note, Groundwater for drinking water does not apply here, as there is no surficial aquifer and the bedrock aquifer is not likely hydraulically connected to the surface.
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count
	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
CSR RL-LD (F)	Highlighted value exceeds CSR RL-LD (F)
SL Criteria Override	Highlighted value exceeds sampling location criteria override

Golden Refuse Disposal Site
Soil Quality Results

Analyte	Unit	Guideline CSR RL-LD (F)	Sampling Location	LOC-1	LOC-10	LOC-11	LOC-11	LOC-12	LOC-13	LOC-14	LOC-15	LOC-16	LOC-18 (1.5 ft)	LOC-18 (1.5 ft)	LOC-18 (Surface)	LOC-19	LOC-2	LOC-20	LOC-21	LOC-22	LOC-23
			Date Sampled	25-Jun-18	27-Jun-18	27-Jun-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18	25-Jun-18	10-Sep-18	10-Sep-18	10-Sep-18	10-Sep-18
			Lab Sample ID	8062810-01	8062810-10	8062810-11	8091272-04	8091272-05	8091272-06	8091272-07	8091272-08	8091272-09	8091272-10	8091272-11	8091272-12	8091272-13	8062810-02	8091272-14	8091272-15	8091272-16	8091272-17
			Sample Type																		
Lab Results																					
General																					
Water-soluble bromide (mass/mass)	µg/g	NG																			
Water-soluble chloride (mass/mass)	µg/g	NG																			
Chloride (in saturated paste)	mg/L	NG		23.6	30.6	17.1											315				
Chloride ion	µg/g	350 [1.1]		<25	<25	<25											302.4				
Conductivity (in 5:1 water:soil mixture)	µS/cm	NG		409	193	132											206				
Water-soluble fluoride (mass/mass)	µg/g	NG																			
Moisture	% wet	NG																			
Water-soluble nitrate (as N) (mass/mass)	µg/g	NG																			
Water-soluble nitrite (as N) (mass/mass)	µg/g	NG																			
pH (in 2:1 water:soil mixture)		NG		6.57	7.18	7.38											6.90				
Total phosphorus (as P, SM 4500-P)	µg/g	NG																			
Percent saturation	%	NG		86.0	50.0	48.6											96.0				
Water-soluble sulphate (mass/mass)	µg/g	NG																			
Metals																					
Aluminum	µg/g	40000		13100	11700	7390								20500	17500		14500				
Antimony	µg/g	20 [1.2]		0.16	0.46	0.20								0.16	0.19		0.18				
Arsenic	µg/g	10 [1.3]		2.12	4.34	3.46								3.53	2.64		2.40				
Barium	µg/g	700 [1.4]		190	111	75.1								238	215		174				
Beryllium	µg/g	Calc [1.5]		0.36	0.43	0.31								0.57	0.47		0.44				
Bismuth	µg/g	NG		0.15	0.13	0.10								0.15	0.15		0.14				
Boron	µg/g	8500		2.8	4.9	3.8								2.5	5.3		4.7				
Cadmium	µg/g	Calc [1.6]		0.075	0.067	0.068								0.049	0.088		0.139				
Calcium	µg/g	NG		7820	81900	116000								13200	12700		19000				
Chromium	µg/g	60 [1.7]		9.4	12.6	11.2								12.9	16.6		10.1				
Cobalt	µg/g	25 [1.8]		4.08	7.16	6.05								5.43	3.97		5.16				
Copper	µg/g	Calc [1.9]		4.00	12.8	12.0								8.37	7.79		8.28				
Iron	µg/g	35000		15300	19900	17400								22700	15200		18100				
Lead	µg/g	120 [1.10]		15.8	14.1	14.2								14.7	38.3		18.8				
Lithium	µg/g	30		12.1	15.5	10.9								18.3	14.0		13.0				
Magnesium	µg/g	NG		3410	13900	20100								6320	3580		4690				
Manganese	µg/g	2000 [1.11]		551	404	428	381	728	548	641	658	702	607	832	593	931	579	327	398	429	409
Mercury	µg/g	10 [1.12]		0.075	0.112	0.073								<0.040	<0.040		0.086				
Molybdenum	µg/g	3 [1.13]		0.78	0.59	0.61								0.54	0.84		0.60				
Nickel	µg/g	Calc [1.14]		9.78	16.2	13.6								15.4	11.4		13.0				
Phosphorus	µg/g	NG		554	551	612								407	1020		437				
Potassium	µg/g	NG		1140	1270	780								758	1060		1420				
Selenium	µg/g	1 [1.15]		<0.20	<0.20	<0.20								<0.20	<0.20		<0.20				
Silver	µg/g	20 [1.16]		<0.10	<0.10	<0.10								<0.10	<0.10		<0.10				
Sodium	µg/g	NG		131	119	97								293	290		102				
Strontium	µg/g	9500		28.0	162	215								32.7	33.0		43.9				
Sulphur	µg/g	NG		2000	3650	3860								<1000	<1000		2650				
Tellurium	µg/g	NG		<0.10	<0.10	<0.10								<0.10	<0.10		<0.10				
Thallium	µg/g	9 [1.17]		<0.10	<0.10	<0.10								<0.10	<0.10		<0.10				
Thorium	µg/g	NG		2.48	3.73	3.00								4.47	2.48		3.22				
Tin	µg/g	50 [1.18]		0.47	0.52	0.30								0.50	0.73		0.43				
Titanium	µg/g	NG		218	109	67.5								279	290		192				
Tungsten	µg/g	15		<0.20	<0.20	<0.20								<0.20	<0.20		<0.20				
Uranium	µg/g	15 [1.19]		0.181	0.317	0.258								0.195	0.160		0.171				
Vanadium	µg/g	100 [1.20]		11.1	10.3	7.8								12.4	10.0		9.4				
Zinc	µg/g	Calc [1.21]		55.3	51.7	44.8								47.1	60.6		51.1				
Zirconium	µg/g	NG		4.4	<2.0	<2.0								10.7	6.0		8.5				

Golden Refuse Disposal Site
Soil Quality Results

Analyte	Unit	Sa	LOC-24 10-Sep-18 8091272-18	LOC-25 (1-3 ft) 10-Sep-18 8091272-20	LOC-25 (Surface) 10-Sep-18 8091272-19	LOC-26 (1-3 ft) 10-Sep-18 8091272-22	LOC-26 (Surface) 10-Sep-18 8091272-21	LOC-27 (1-3 ft) 10-Sep-18 8091272-24	LOC-27 (Surface) 10-Sep-18 8091272-23	LOC-28 (1-3 ft) 10-Sep-18 8091272-26	LOC-28 (Surface) 10-Sep-18 8091272-25	LOC-29 (1-3 ft) 10-Sep-18 8091272-28	LOC-29 (Surface) 10-Sep-18 8091272-27	LOC-3 25-Jun-18 8062810-03	LOC-4 25-Jun-18 8062810-04	LOC-5 25-Jun-18 8062810-05	LOC-6 25-Jun-18 8062810-06	LOC-6 10-Sep-18 8091272-01	LOC-6 (1.5 ft) 10-Sep-18 8091272-02	LOC-6 (3 ft) 10-Sep-18 8091272-03	LOC-8 25-Jun-18 8062810-08
Lab Results																					
General																					
Water-soluble bromide (mass/mass)	µg/g																				
Water-soluble chloride (mass/mass)	µg/g																				
Chloride (in saturated paste)	mg/L													15.3	33.7	13.2	13.8				20.4
Chloride ion	µg/g													<25	94.7	<25	<25				<25
Conductivity (in 5:1 water:soil mixture)	µS/cm													311	158	133	300				115
Water-soluble fluoride (mass/mass)	µg/g																				
Moisture	% wet																				
Water-soluble nitrate (as N) (mass/mass)	µg/g																				
Water-soluble nitrite (as N) (mass/mass)	µg/g																				
pH (in 2:1 water:soil mixture)														7.25	5.68	7.97	6.58				6.06
Total phosphorus (as P, SM 4500-P)	µg/g																				
Percent saturation	%													69.0	281	46.5	142				56.7
Water-soluble sulphate (mass/mass)	µg/g																				
Metals																					
Aluminum	µg/g			23200	13900	20800	13800	22200	22300	22500	3890	26200	1420	15800	5160	10900	12300	22200	6780	2890	25100
Antimony	µg/g			0.14	0.37	0.17	0.30	0.24	0.21	0.22	0.55	0.16	0.42	0.27	0.46	0.34	0.48	0.21	0.14	0.12	0.19
Arsenic	µg/g			3.42	2.57	3.20	2.06	4.01	2.88	3.45	1.65	3.31	1.38	4.46	1.36	5.28	2.81	2.32	2.34	1.71	3.63
Barium	µg/g			231	274	192	249	233	227	207	227	290	109	165	178	77.9	406	227	70.6	38.5	258
Beryllium	µg/g			0.63	0.34	0.65	0.36	0.72	0.66	0.68	0.14	0.72	<0.10	0.53	0.14	0.41	0.33	0.56	0.37	0.24	0.68
Bismuth	µg/g			0.18	0.20	0.18	0.19	0.19	0.20	0.18	0.12	0.19	<0.10	0.15	0.13	0.12	0.21	0.19	<0.10	<0.10	0.17
Boron	µg/g			2.4	5.4	2.9	4.9	2.5	2.9	2.8	14.0	2.2	5.1	5.8	4.6	6.3	6.9	2.6	<2.0	<2.0	3.5
Cadmium	µg/g			0.057	0.189	0.068	0.224	0.076	0.081	0.053	0.280	0.046	0.087	0.062	0.168	0.060	0.346	0.059	0.057	<0.040	0.062
Calcium	µg/g			11300	15400	12000	14500	22200	9170	11200	31000	4800	17600	49100	15600	124000	18000	7210	130000	154000	6250
Chromium	µg/g			14.8	10.2	15.3	10.3	15.7	15.2	14.5	5.9	14.6	3.1	14.6	4.6	15.6	9.2	10.6	8.9	4.2	14.3
Cobalt	µg/g			6.34	4.19	6.78	4.64	7.39	6.85	6.59	2.17	6.18	0.93	8.06	1.97	9.23	5.22	4.72	4.50	3.02	6.30
Copper	µg/g			8.44	7.08	10.9	6.16	10.9	8.89	10.1	10.4	9.78	5.12	13.1	5.40	14.0	7.40	5.64	10.7	10.3	6.93
Iron	µg/g			24800	14200	26700	15000	26500	24500	24400	5960	22400	2580	21800	5980	22500	14300	17200	15900	10000	22500
Lead	µg/g			16.1	31.8	17.7	31.9	18.0	19.3	15.3	27.5	14.2	30.2	14.5	25.4	15.0	35.9	14.2	8.85	4.89	15.6
Lithium	µg/g			21.2	12.7	21.0	13.0	20.3	20.3	19.2	5.00	20.3	1.49	18.9	4.72	19.3	11.4	16.1	10.6	4.91	18.4
Magnesium	µg/g			5750	3570	8210	3780	8900	5680	5360	3800	4850	1870	9690	2170	18800	3630	3300	21300	13700	4230
Manganese	µg/g	902	775	1210	655	1790	832	706	610	885	568	155	439	539	430	2910	460	353	448	696	
Mercury	µg/g		<0.040	0.083	<0.040	0.070	<0.040	<0.040	<0.040	0.109	<0.040	0.083	0.079	0.158	0.070	0.133	<0.040	<0.040	<0.040	0.094	
Molybdenum	µg/g		0.68	1.10	0.60	1.03	0.64	0.52	0.66	0.91	0.47	0.54	0.82	1.05	0.53	1.06	0.54	0.37	0.19	0.73	
Nickel	µg/g		17.5	10.8	18.7	11.9	19.2	17.9	17.6	6.12	17.4	2.58	18.4	5.14	20.4	12.2	12.3	12.8	6.89	16.7	
Phosphorus	µg/g		335	614	362	493	340	307	467	904	447	454	571	505	573	784	288	256	277	828	
Potassium	µg/g		905	1030	982	1060	809	1070	871	1020	768	536	1940	700	1620	1020	830	342	216	1140	
Selenium	µg/g		<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Silver	µg/g		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Sodium	µg/g		316	283	263	258	288	301	346	236	341	222	143	73	123	154	329	227	201	188	
Strontium	µg/g		27.5	45.1	23.5	38.7	38.2	23.9	30.0	84.4	21.7	47.7	110	54.5	267	61.4	24.3	169	203	25.6	
Sulphur	µg/g		<1000	1320	<1000	<1000	<1000	<1000	<1000	1720	<1000	1120	3990	3990	3660	2950	<1000	1050	1230	<1000	
Tellurium	µg/g		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Thallium	µg/g		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	
Thorium	µg/g		5.42	2.25	5.93	2.46	6.13	5.75	5.36	0.72	5.23	<0.50	4.40	1.07	6.05	2.53	3.19	3.24	1.24	4.40	
Tin	µg/g		0.85	1.10	0.58	1.08	0.68	0.67	0.60	1.22	0.66	0.85	0.39	0.66	0.29	0.79	0.70	<0.20	<0.20	0.68	
Titanium	µg/g		367	221	305	239	325	367	360	54.1	477	26.0	184	114	50.3	256	385	70.2	26.0	509	
Tungsten	µg/g		<0.20	0.34	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Uranium	µg/g		0.290	0.163	0.299	0.176	0.358	0.296	0.317	0.110	0.377	0.058	0.311	0.104	0.358	0.194	0.240	0.230	0.188	0.320	
Vanadium	µg/g		15.2	10.8	14.2	10.4	15.8	15.6	16.1	3.8	15.2	2.0	11.7	4.7	9.7	11.3	11.3	8.6	4.5	15.5	
Zinc	µg/g		48.2	62.8	46.3	59.4	48.5	51.4	46.8	93.9	52.6	38.3	59.3	27.2	56.1	70.8	39.0	23.5	14.1	45.5	
Zirconium	µg/g		15.8	4.3	14.4	4.0	18.2	14.5	19.8	2.3	26.4	<2.0	4.8	3.2	<2.0	3.9	12.5	4.3	<2.0	14.1	

Sa		LOC-9 25-Jun-18 8062810-09	MW18-11 360 ft (soil) 27-Jun-18 8062805-04 Normal
Analyte	**Unit**		
Lab Results			
General			
Water-soluble bromide (mass/mass)	µg/g		<5.00
Water-soluble chloride (mass/mass)	µg/g		15.6
Chloride (in saturated paste)	mg/L	12.7	
Chloride ion	µg/g	<25	
Conductivity (in 5:1 water:soil mixture)	µS/cm	215	
Water-soluble fluoride (mass/mass)	µg/g		<5.00
Moisture	% wet		17.1
Water-soluble nitrate (as N) (mass/mass)	µg/g		<0.500
Water-soluble nitrite (as N) (mass/mass)	µg/g		<0.500
pH (in 2:1 water:soil mixture)		6.84	
Total phosphorus (as P, SM 4500-P)	µg/g		48.9
Percent saturation	%	81.4	
Water-soluble sulphate (mass/mass)	µg/g		69.3
Metals			
Aluminum	µg/g	10400	16300
Antimony	µg/g	0.40	0.41
Arsenic	µg/g	3.52	4.77
Barium	µg/g	105	104
Beryllium	µg/g	0.39	0.37
Bismuth	µg/g	0.11	0.15
Boron	µg/g	4.6	2.2
Cadmium	µg/g	0.187	0.050
Calcium	µg/g	88900	123000
Chromium	µg/g	11.1	20.1
Cobalt	µg/g	6.07	10.2
Copper	µg/g	15.3	40.2
Iron	µg/g	18300	27100
Lead	µg/g	34.3	14.4
Lithium	µg/g	12.3	21.9
Magnesium	µg/g	14400	29600
Manganese	µg/g	456	509
Mercury	µg/g	0.086	0.084
Molybdenum	µg/g	0.49	2.02
Nickel	µg/g	13.4	22.5
Phosphorus	µg/g	619	571
Potassium	µg/g	991	963
Selenium	µg/g	<0.20	<0.20
Silver	µg/g	<0.10	<0.10
Sodium	µg/g	143	183
Strontium	µg/g	153	277
Sulphur	µg/g	3920	4180
Tellurium	µg/g	<0.10	<0.10
Thallium	µg/g	<0.10	<0.10
Thorium	µg/g	3.02	7.55
Tin	µg/g	0.75	0.26
Titanium	µg/g	148	109
Tungsten	µg/g	<0.20	0.23
Uranium	µg/g	0.237	0.567
Vanadium	µg/g	9.0	12.0
Zinc	µg/g	94.8	63.2
Zirconium	µg/g	3.0	4.3

Guideline Notes for Reports for CSRD Refuse Disposal Sites Soil Quality Results

1. Notes for BC Contaminated Sites Regulation, Soil Standards for Residential (Low Density) Land Use; Environmental Protection, Toxicity to soil invertebrates and plants (2017 and updates) (CSR RL-LD (F))
General Notes:
Soil Standards from Schedule 3.1 for residential (low density) land use have been applied.
Schedule 3.1 includes three parts: Part 1 – Matrix numerical soil standards; Part 2 – Generic numerical soil standards to protect human health; and Part 3 – Generic numerical soil standards to protect environmental health.
The most stringent standards in Schedule 3.1, including consideration for freshwater aquatic life (but not marine aquatic life), were used. This means that the Part 1 standards for "Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life" were considered. The Part 1 standards for "Environmental Protection, Groundwater flow to surface water used by marine aquatic life" were not considered.
The Schedule 3.1 – Part 1 standards that were used, along with the site-specific factor, are included in the notes for the relevant analytes. For generic numerical soil standards, the Schedule 3.1 – Part 2 generic numerical soil standards were used unless noted otherwise in the notes for the relevant analytes.

Note 1.1 for Chloride ion:
Contaminated Site Regulation Schedule 3.1, Part 1, Matrix 8 Numerical Soil Standards for Environmental Protection
Note 1.2 for Antimony:
Schedule 3.1, Part 3, Standard to Protect Ecological Health.
Note 1.3 for Arsenic:
Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 10 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 10 µg/g
Environmental Protection, Groundwater used for irrigation: 10 µg/g

Note 1.4 for Barium:
Schedule 3.1, Part 1, Environmental Protection (Toxicity to Soil Invertebrates and Plants).
Note 1.5 for Beryllium:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for Beryllium varies with the pH of the soil at a site, as follows.
Human Health Protection, Intake of contaminated soil: 85 µg/g
Human Health Protection, Groundwater used for drinking water:
1 µg/g if pH < 5.5
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
1 µg/g if pH < 6.5;
4 µg/g if 6.5 ≤ pH < 7.0;
30 µg/g if 7.0 ≤ pH < 7.5;

Note 1.6 for Cadmium:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows.
The standard for cadmium varies with the pH of the soil at a site, as follows.
Human Health Protection, Intake of contaminated soil: 20 µg/g
Human Health Protection, Groundwater used for drinking water:
1 µg/g if pH < 7.0
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
1 µg/g if pH < 7.0;
3 µg/g if 7.0 ≤ pH < 7.5;
20 µg/g if 7.5 ≤ pH < 8.0;
Standard varies with receiving water hardness (H). H = 150 to < 210 mg/L as $CaCO_3$ is assumed. Consult a director for further advice.
Environmental Protection, Groundwater used for irrigation:
1 µg/g if pH < 7.0

Note 1.7 for Chromium:
Schedule 3.1, Part 1, Matrix 9 - Chromium provides standards for chromium, hexavalent; chromium, trivalent; and chromium (all species).
The most stringent standards for chromium, hexavalent are:
Human Health Protection, Groundwater used for drinking water: 60 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 60 µg/g
Environmental Protection, Groundwater used for irrigation: 60 µg/g
The most stringent standard for chromium, trivalent is:
Human Health Protection, Intake of contaminated soil: 100 µg/g
The standard of 60 µg/g was used for chromium in this report to demonstrate compliance with the standards of this matrix.

Note 1.8 for Cobalt:

Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Intake of contaminated soil: 25 µg/g
Human Health Protection, Groundwater used for drinking water: 25 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 25 µg/g
Environmental Protection, Groundwater used for irrigation: 25 µg/g

Note 1.9 for Copper:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for copper varies with the pH of the soil at a site, as follows.
Environmental protection, Toxicity to soil invertebrates and plants:
150 µg/g
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
75 µg/g if pH < 5.5;
100 µg/g if 5.5 ≤ pH < 6.0;
Standard varies with receiving water hardness (H). H ≥ 200 mg/L as CaCO3 is assumed. Consult a director for further advice.
Environmental Protection, Groundwater used for irrigation:
75 µg/g if pH < 5.5

Note 1.10 for Lead:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
Human Health Protection, Intake of contaminated soil:
120 µg/g
Human Health Protection, Groundwater used for drinking water:
120 µg/g if pH < 5.5;

Note 1.11 for Manganese:
Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 2,000 µg/g.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as (a) item B1, or (b) item C1, C3 or C4, (c) item D2, D3, D5 or D6, (d) item E4, or (e) item H3 or H14.
Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20 but only if the site was used for that purpose or activity in conjunction with or as a result of the site being used for at least one of the purposes or activities set out in the above note.
Environmental Protection, Toxicity to soil invertebrates and plants: 2,000 µg/g
Environmental Protection, Groundwater used for irrigation: 2,000 µg/g

Note 1.12 for Mercury:
Schedule 3.1, Part 1, Human Health Protection, Intake of contaminated soil

Note 1.13 for Molybdenum:
Schedule 3.1, Part 1, Environmental Protection, Groundwater used for irrigation

Note 1.14 for Nickel:
Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for nickel varies with the pH of the soil at a site, as follows.
Human Health Protection, Groundwater used for drinking water:
70 µg/g if pH < 7.5;
Environmental Protection, Toxicity to soil invertebrates and plants:
150 µg/g
Environmental Protection, Groundwater used for irrigation:
70 µg/g if pH < 7.0

Note 1.15 for Selenium:
Schedule 3.1, Part 1. The most stringent standards are as follows:
Human Health Protection, Groundwater used for drinking water: 1 µg/g
Environmental Protection, Groundwater flow to surface water used by aquatic life: 1 µg/g
Environmental Protection, Groundwater used for irrigation: 1 µg/g

Note 1.16 for Silver:
Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.17 for Thallium:
Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.18 for Tin:
Schedule 3.1, Part 3, Standard to Protect Ecological Health.

Note 1.19 for Uranium:
Schedule 3.1, Part 1, EP, Groundwater used for irrigation.

Note 1.20 for Vanadium:
Schedule 3.1, Part 1, Human Health Protection, Groundwater used for drinking water.

Note 1.21 for Zinc:

Schedule 3.1, Part 1. The most stringent combination of standards is as follows:
The standard for zinc varies with the pH of the soil at a site, as follows.
Environmental Protection, Toxicity to soil invertebrates and plants:
450 µg/g
Environmental Protection, Groundwater flow to surface water used by freshwater aquatic life:
150 µg/g if pH < 6.0;
250 µg/g if 6.0 ≤ pH < 6.5;
350 µg/g if 6.5 ≤ pH < 7.0;
Standard varies with receiving water hardness (H). H = 200 to < 300 mg/L as $CaCO_3$ is assumed. Consult director for further advice.
Environmental Protection, Groundwater used for irrigation: 150 µg/g if pH < 6.0

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