REPORT

2018 Monitoring Report

Westside Landfill, West Kelowna, BC

Submitted to:

Regional District of Central Okanagan
1450 KLO Road
Kelowna, BC
V1W 3Z7

Attention: Clarke Kruiswyk

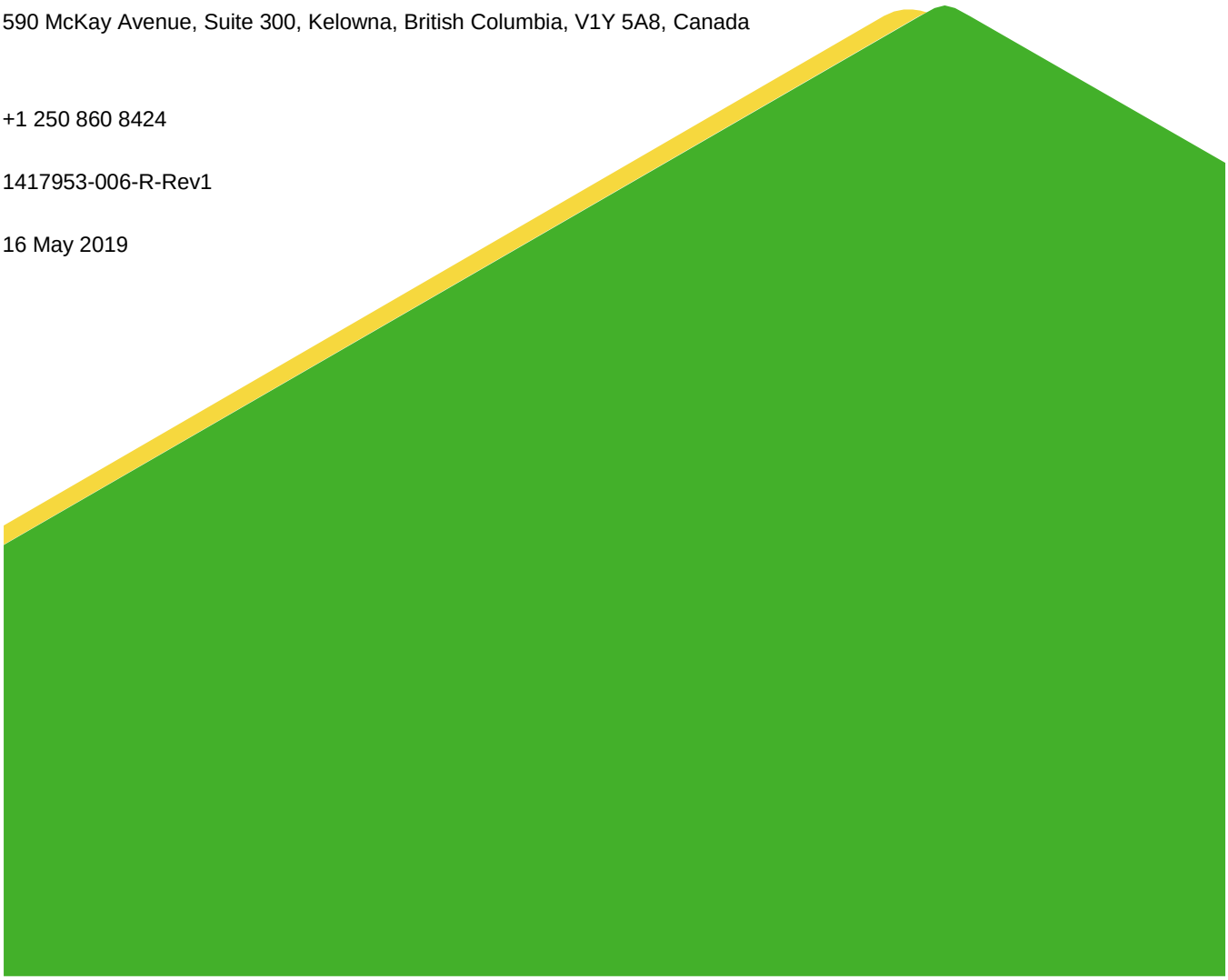
Submitted by:

Golder Associates Ltd.
590 McKay Avenue, Suite 300, Kelowna, British Columbia, V1Y 5A8, Canada

+1 250 860 8424

1417953-006-R-Rev1

16 May 2019



Distribution List

1 Copy - Regional District Central Okanagan

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) was retained by the Regional District of Central Okanagan (RDCO) to provide support services for the 2018 annual monitoring program at the Westside Landfill (the Site), located in West Kelowna, BC (Figure 1). Westside Landfill was operated as a municipal solid waste landfill under Operational Certificate (OC) PR#12217 (Appendix A) issued by British Columbia Ministry of Environment and Climate Change Strategy (MoE). Westside Landfill ceased receiving waste in 2010 and was partially covered. A Closure Plan was developed (Golder, 2015), and has been accepted by the MoE, as confirmed in a letter dated 6 September 2017 (Appendix A). Golder has been provided with construction diagrams for the closure works, which included earthworks, drainage works and the placement of topsoil, all of which were completed in 2018 under the supervision of Urban System Ltd. (USL); the USL construction drawings are provided in Appendix E.

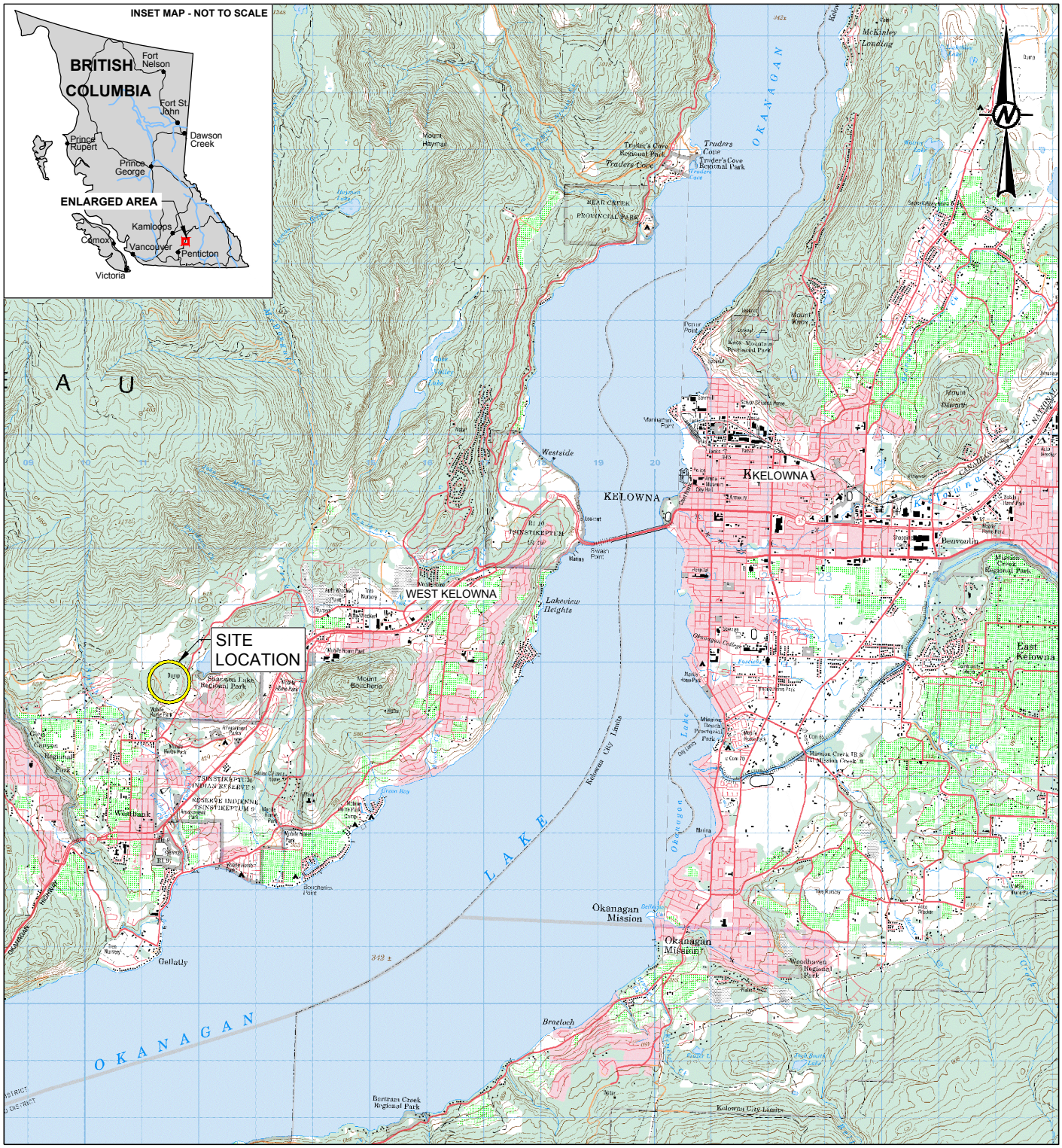
Monitoring of the Site was carried out as initially outlined in OC PR PR#12217, with modifications over the years. The current monitoring program follows recommendations outlined in the Closure Plan (Golder, 2015), but with some modifications, including removal of some landfill gas monitors located on the property to the north of, and adjacent to, the Site were removed during development work on that adjacent property, as will be discussed further in Sections 4.0 and 7.0.

The annual monitoring program includes groundwater sampling and analysis, groundwater elevation monitoring, landfill gas sampling and analysis and an annual landfill inspection. RDCO staff completed the groundwater sampling, groundwater elevation and landfill gas monitoring components of the program in 2018. Golder completed an inspection of the Site and also reviewed results from each landfill gas monitoring round within 24 hours of data collection, as outlined in the Landfill Gas Management Plan (Golder, 2013a) and the Closure Plan (Golder, 2015). This report summarizes the results of these inspection and monitoring activities, and provides recommendations for adjustments.

2.0 APPLICABLE REGULATORY FRAMEWORK

Westside Landfill was initially permitted under PR#12217. The regulatory environment has evolved since initial permitting. In British Columbia, environmental matters pertaining to contaminated sites generally fall under the jurisdiction of the MoE, pursuant to the Environmental Management Act (“EMA”; SBC 2003, Chapter 53 assented 23 October 2003, current to 26 December 2018). Exceptions include federal lands and waters with migratory fish that fall under the jurisdiction of Environment Canada. The two key regulations under the EMA relating to the assessment and remediation of contaminated sites is the Contaminated Sites Regulation (“CSR”; BC MoE Reg. 375/96, O.C. 1480/96, including amendments up to BC Reg. 116/2018, effective 14 June 2018), and the Hazardous Waste Regulation (“HWR”; BC Reg. 63/88, O.C. 268/88, including amendments up to BC Reg. 243/2016, 1 November 2017). The standards listed in the CSR provide numerical concentrations for the evaluation of soil, sediment, soil vapour, and water quality.

The BC Ground Water Protection Regulation (including amendments up to B.C. Reg. 152/2016, June 10, 2016), under the Water Sustainability Act ([SBC 2014], Chapter 15), establishes standards to protect groundwater supplies by requiring wells, including environmental boreholes, test pits and monitoring wells, to be adequately constructed, maintained and, at the end of their service, adequately deactivated and ultimately closed. Additional regulations and guidance specific to landfills include Landfill Criteria for Municipal Solid Waste, Second Edition (2016) and the Landfill Gas Management Regulation (current to 15 January 2019).



REFERENCE

TOPOGRAPHIC MAPS 82E/13 AND /14 © 2001 AND 1999 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD83
COORDINATE SYSTEM: UTM ZONE 10

0 2,500 5,000
1:100,000 METRES

CLIENT
REGIONAL DISTRICT OF CENTRAL OKANAGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-03-13
PREPARED	J. FARAH
DESIGN	G. BARRETT
REVIEW	G. BARRETT
APPROVED	J. FOLEY

PROJECT
2018 LANDFILL MONITORING
WESTSIDE LANDFILL
WEST KELOWNA, BC

TITLE
KEY PLAN

PROJECT No.	PHASE	Rev.	FIGURE
1417953	4000	0	1

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With the acceptance of the Closure Plan (Golder, 2015) by the MoE in September 2017 (see Appendix A) the monitoring and inspection requirements outlined in that document became effective. As outlined in the Closure Plan, monitoring results will be used as part of the assessment of effectiveness of closure works at Westside Landfill, in particular the use of an evapotranspiration cover at this Site. Periodic (annually, at present) inspections by a qualified professional are also part of this assessment of the effectiveness of closure works. If assessment of monitoring data and inspections suggest potential adverse impacts to the environment or risks to human health, then additional works or mitigation measures may be required.

The standards used for comparison in this report are from Schedule 3.2, Generic Numerical Water Standards, Schedule 3.2 included in Environmental Management Act, Contaminated Sites Regulation (effective 1 November 2017). The standards for Drinking Water (CSR-DW) are considered the most applicable since there are aquifers underlying the Site. Although Shannon Lake is located approximately 300 m to the east/northeast of the Site, previous investigations have ruled out Shannon Lake as a receptor of groundwater from the Site. As such, the CSR freshwater aquatic life (AW) standards do not apply. Although the AW standards do not apply, the freshwater limits are included in some summary tables for reference purposes.

The RDCO has confirmed that the closure works recommended in the Closure Plan (Golder, 2015) were completed in 2018 under the monitoring of USL; the record drawings are included in Appendix E. In 2018, a number of off-Site landfill gas monitors were removed during development works to the north side of the Site, as will be discussed further in Sections 5.0 and 7.0.

3.0 HYDROLOGY AND HYDROGEOLOGY

Based on available information and previous reports, the regional direction of groundwater flow is inferred to be towards the south to southeast (Figure 2).

Surface ponding consisting of two small transient surface water bodies located along the northwest side of the landfill was first observed during Site visits conducted in early 2013. The surface ponding, referred to as North and South Ponds in Golder's *2013 Annual Operations and Monitoring Report* (Golder, 2014) was monitored in 2013 and 2015 for possible changes in groundwater conditions or surface water inflow. The results suggested that the surface water was not being impacted with leachate from the landfill. The surface water appeared to be collecting in an excavated area from groundwater seepage located on the west side of the landfill. Golder believes that the ponds appeared primarily as a result of flow from groundwater seepage into the excavation. Remedial works were proposed in the Closure Plan, and were undertaken in 2018. No ponding in this area was observed during the Site inspection of 21 September 2018, as discussed further in Section 5.1.

According to the MoE's BC Water Resources Atlas, two aquifers underlie the Site:

- Aquifer No. 0301 (also referred to as the Shannon Lake Aquifer), is a sand and gravel aquifer with domestic water uses. It is classified as having a moderate demand, productivity, and vulnerability. It is also locally known as the Shannon Lake Aquifer.
- Aquifer No. 0305 is a bedrock aquifer with domestic water uses. It is classified as having a moderate demand and vulnerability, and low productivity.

LEGEND

- APPROXIMATE LANDFILL BOUNDARY
- GROUNDWATER MONITORING WELL LOCATION
- DOMESTIC WATER WELL LOCATION
- 458.3 — MONITORING WELL GROUNDWATER ELEVATION (MEASURED ON AUG. 12, 2015)
- INFERRED DIRECTION OF GROUNDWATER FLOW
- 470 — INFERRED GROUNDWATER CONTOUR (10m INTERVAL)

REFERENCE

ORTHOPHOTO OBTAINED FROM RDCO. IMAGERY DATE: 2009

0 100 200
1:6,000 METRES

CLIENT
REGIONAL DISTRICT OF CENTRAL OKANAGAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-03-13
PREPARED	J. FARAH
DESIGN	G. BARRETT
REVIEW	G. BARRETT
APPROVED	J. FOLEY

PROJECT
2018 LANDFILL MONITORING
WESTSIDE LANDFILL
WEST KELOWNA, BC

TITLE
GROUNDWATER MONITOR LOCATIONS

PROJECT No.	PHASE	Rev.	FIGURE
1417953	4000	0	2

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According to MoE's BC Water Resource Atlas, several wells are present in Aquifers No. 301 and 305. The majority of the wells are completed in Aquifer 301, and are located to the east and south of the Site. The wells are reportedly used for private domestic, commercial and industrial purposes. Generally, the depth to groundwater ranged between 2.1 m to 4.6 m below ground surface (m bgs).

There was one well registered within (Well Tag Number [WTN] 61675), and one well immediately adjacent to (WTN 56228), the Site boundary. According to the detailed well reports, WTN 61675, referred to as Gartner Lee in the detailed well report, corresponds to BH-6 in Golder borehole records. It is located along the western boundary and within the landfill. It was reportedly constructed in 1994 for commercial and industrial use, drilled to a total depth of 12.2 m bgs, and terminated in bedrock.

WTN 56228, also known as Dobbin's Well, is located immediately adjacent and outside the landfill, along the northwestern boundary (Figure 2). It was reportedly constructed in 1986 for private domestic use, terminated in bedrock at a total depth of 54.7 m below ground surface. The well was disconnected in 2006 due to a pipeline rupture and is no longer accessible. Given the depth of Dobbin's Well and the fact that it is in bedrock, it is inferred that Dobbin's Well is likely associated with Aquifer Tag No. 0305. Golder also infers that the monitor locations outside the Site boundary, including monitor wells BH-3, BH-4, BH-5, BH-7 and BH-8 are likely associated with Aquifer Tag No. 0305. The other monitors on Site are likely completed in shallower groundwater zones that are more likely to discharge to the sand and gravel "Shannon Lake" aquifer rather than the deeper bedrock aquifer.

4.0 METHODS

4.1 Groundwater Monitoring

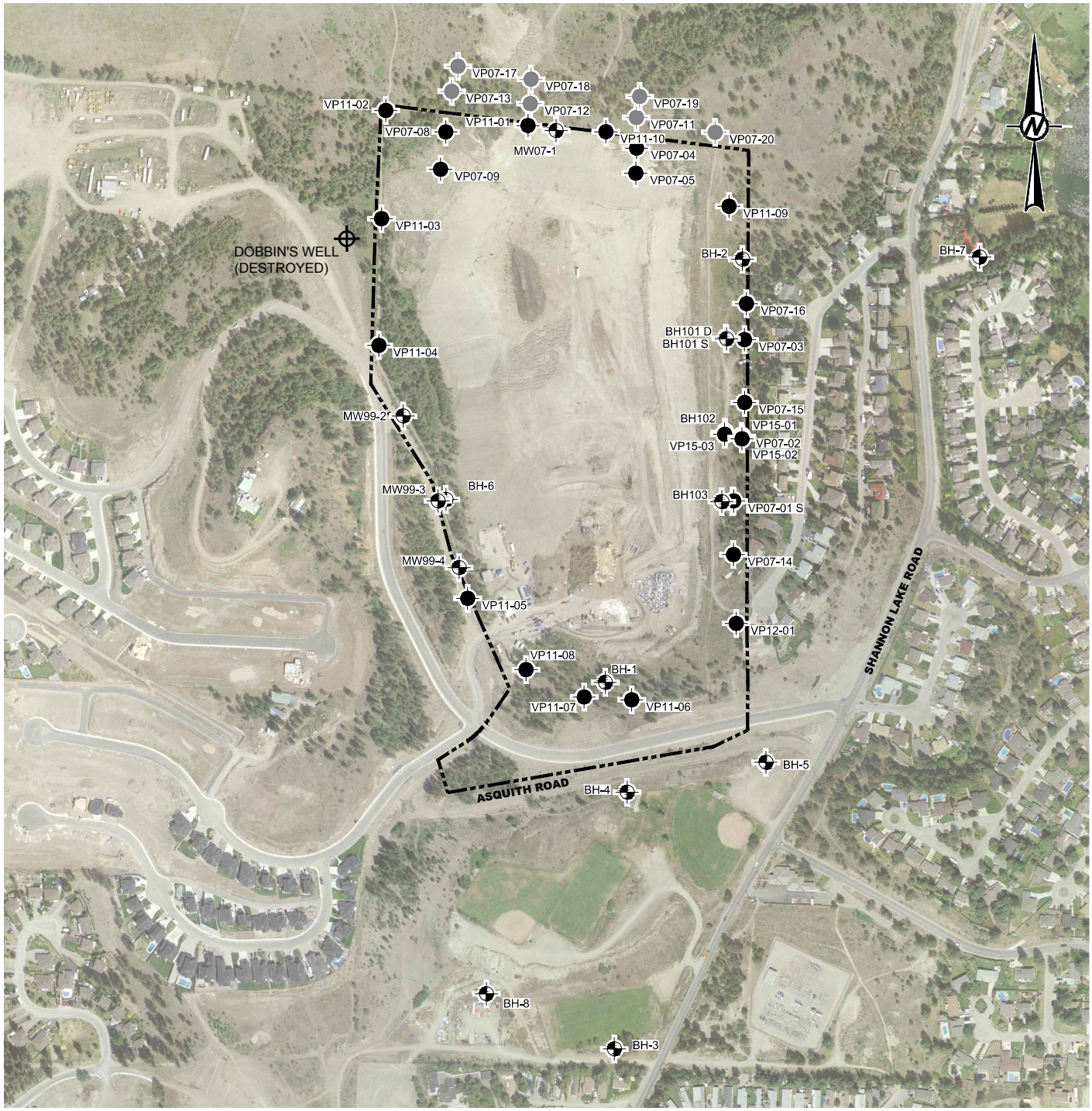
The groundwater quality sampling program for the Westside Landfill was carried out by RDCO staff in May and November 2018. Water level measurements for January, February, April, May, August, November and December are summarised in Table B-3, Appendix B. The borehole locations used for water quality and level monitoring are shown on Figure 3.

Groundwater samples collected from the wells during the 2018 monitoring program were submitted to CARO Environmental Services of Kelowna, BC (CARO) for chemical analyses. As outlined in the Closure Plan (Golder, 2015) and the groundwater monitoring requirements based on the MoE OC, the samples were analyzed for the following parameters: pH, conductivity, total dissolved solids, hardness, alkalinity, chloride, sulphate, ammonia nitrogen, nitrate nitrogen and dissolved metals for samples collected from monitoring wells BH-1, BH-2, BH-3, BH-4, BH-5, BH-7 and MW99-2.

In the Closure Plan (Golder, 2015) it was noted that a well formerly used for background monitoring (referred to as Dobbin's Well) was destroyed. Golder considered options for replacing this monitoring well and suggested that an existing monitoring well, MW99-2 (prior to 2016 used for landfill gas monitoring only), may be suitable as a background monitoring well. Golder recommended including monitoring MW99-2 for a period of one year, and then assessing whether or not to use it to serve as a background monitoring well, subject to MoE approval.
In 2016, MW99-2 was included in the groundwater monitoring program and sampled by RDCO staff. Based on assessment of the results from 2016, MW99-2 has been included in the monitoring program.

4.2 Landfill Gas Monitoring

The 2018 landfill gas monitoring program was conducted by RDCO staff. Monitoring events were completed in January, February, March, April, May, August, November and December 2018. Partial sampling events in key locations were completed in June, July, September and October. The vapour monitoring locations are shown on Figure 3.



LEGEND

- APPROXIMATE LANDFILL BOUNDARY
- MONITORING WELL LOCATION
- SOIL VAPOUR WELL LOCATION
- MONITORING LOCATION DECOMMISSIONED IN JUNE 2018
- APPROXIMATE FORMER LOCATION OF DOMESTIC WATER WELL

REFERENCE

ORTHOPHOTO OBTAINED FROM RDCO. IMAGERY DATE: 2009

0 100 200

1:6,000 METRES

CLIENT

REGIONAL DISTRICT OF CENTRAL OKANAGAN

CONSULTANT

GOLDER

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PREPARED	J. FARAH
DESIGN	G. BARRETT
REVIEW	G. BARRETT
APPROVED	J. FOLEY

PROJECT

2018 LANDFILL MONITORING
WESTSIDE LANDFILL
WEST KELOWNA, BC

TITLE

GROUNDWATER MONITORING AND SOIL VAPOUR WELL LOCATIONS

PROJECT No.	PHASE	Rev.	FIGURE
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4.3 Groundwater Elevation Data

Groundwater depths were measured for selected monitors in January, February, March, April, May, August, November and December 2018. Additional water level measurements were made, or attempted, for the groundwater monitors: BH-1, BH-2, BH-3, BH-4, BH-5, BH-7, BH-8, and MW99-2.

4.4 Monitoring Well Survey

A survey of both vapour and groundwater monitoring locations and elevations was completed by AllTerra Land Surveying Ltd. in January 2015. This information was used to adjust historical groundwater elevation data. The information from this survey was incorporated into the assessment of groundwater elevations and flow directions presented in the 2015 Monitoring Report (Golder, 2015b), subsequent reports (Golder, 2016 and Golder, 2017) and this (current) report.

5.0 RESULTS

The 2018 Site inspection, groundwater quality, landfill gas monitoring and water level results are discussed in this section.

5.1 Site Inspection

The Westside Landfill is inspected annually by a qualified professional, as part of the monitoring program. Some of the earthworks and drainage works recommended in the Closure Plan (Golder, 2015) were completed as of the date of the Site inspection completed by Dr. Gary Barrett on 21 September 2018. The remainder of the closure works are understood to have been completed after the Site inspection.

It was apparent that some filling and grading had been completed. The stockpiles of fill observed in 2017 were gone, as was the stockpile of compost. Golder understands that further incorporation of compost or topsoil was to take place by the end of the year. Surface ponding following rain that occurred before the Site visit was noted in the northwest portion of the Site, which presumably is one of the areas where additional mixing of material, including topsoil or compost will take place. Fill had clearly been placed on a portion of the west slope in an area that was over-steepened previously and drainage works appear to have been undertaken in the northwest. Both of these activities were recommended in the Closure Plan.

There were no signs of significant surface erosion, slope failure or local subsidence in the portion of the Site that were not subject to closure works in 2018.

5.2 Groundwater Quality

The analytical results for samples collected in 2018 are presented in Appendix B, Table B-1 (General Groundwater Chemistry). The Caro laboratory reports are included as Appendix C. Groundwater sampling and submission to laboratories was completed by RDCO staff in 2018. The analytical results were provided to Golder for preparation of this report.

5.2.1 Monitoring Results Relative to Standards

As noted in Section 2.0, the results of the groundwater analyses were compared with CSR-DW (drinking water) and CSR-AW-F (freshwater aquatic life) standards that were updated in 2017. The changes in standards included the addition of drinking water standards for some parameters that previously did not have any. Some of the 2018 results exceed these drinking water standards. There were no results in 2018 that exceeded CSR-AW standards for freshwater.

The analytes for which there are CSR-DW criteria are summarised for results from May and November of 2018, in Figures 4 and 5 respectively. The results are presented for monitors located up-gradient of the landfill, within the landfill footprint, downgradient within 50 metre of the site boundary and downgradient more than 50 metres from the site boundary to facilitate interpretation of the results. The analytes are arranged in ascending order of concentration (approximately) to make reading of the figures easier.

For both the May and November results:

- Zirconium concentrations exceed the drinking water standard in monitors location up-gradient, within the landfill footprint, and in one (BH4) of the monitors located downgradient of the landfill, within 50 m from the Site boundary. Zirconium levels are below the criteria for monitors located down-gradient, more than 50 m from the Site boundary.
- Cobalt concentrations exceed the drinking water standard at monitors located within the landfill footprint and in one (BH4) of the monitors located downgradient of the landfill, within 50 m from the site boundary.

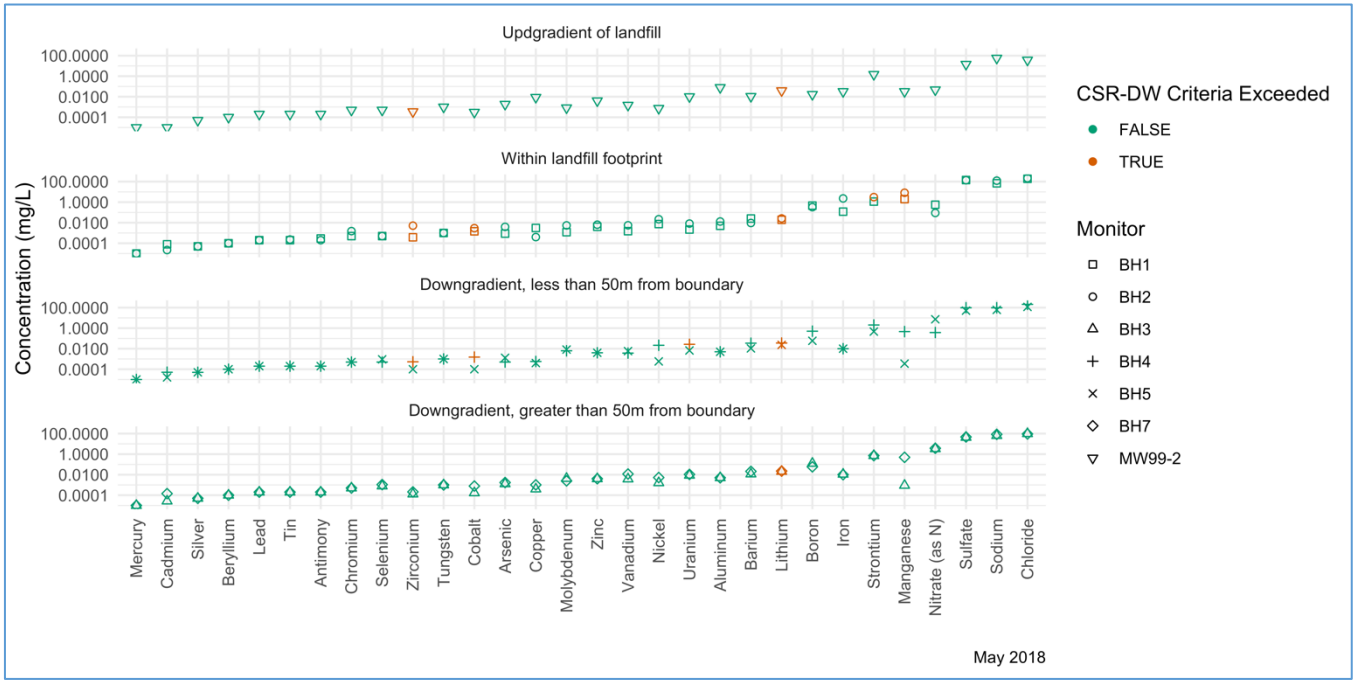

Figure 4: Drinking Water CSR Exceedances, May 2018

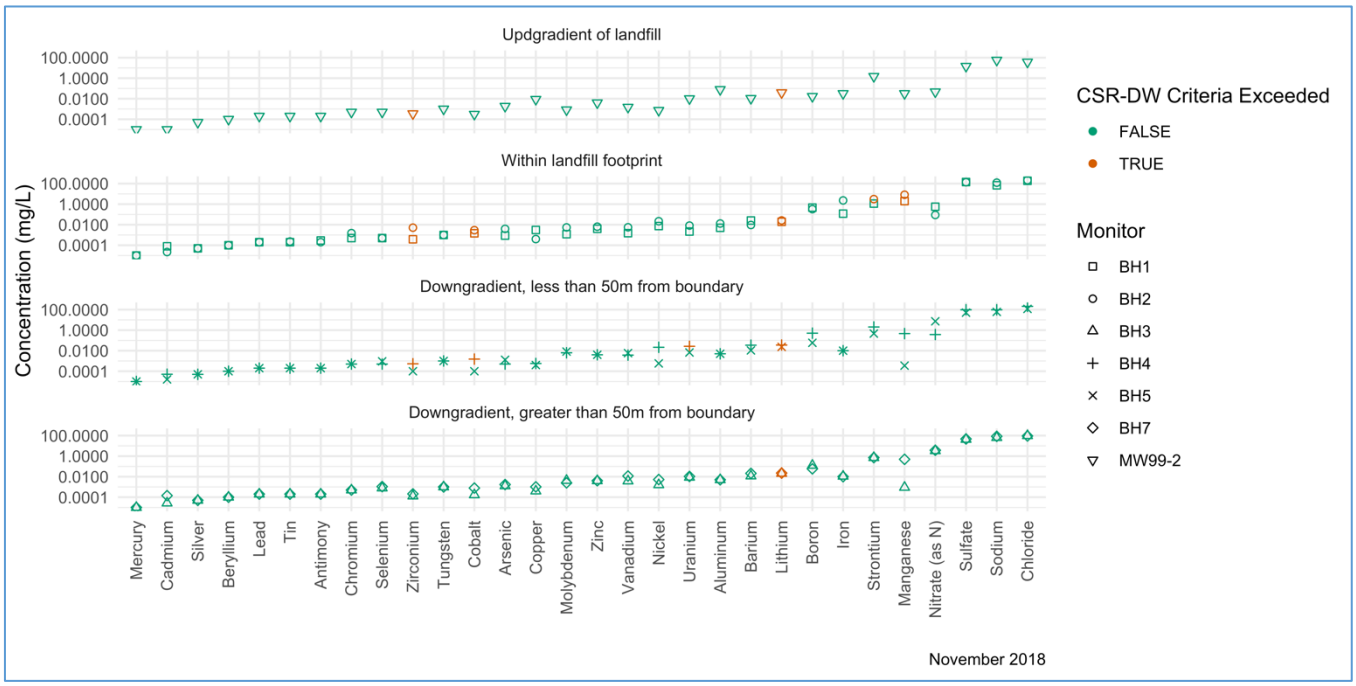

Figure 5: Drinking Water CSR Exceedances, November 2018

- Uranium exceeds the drinking water standard at BH4, which is located downgradient of the landfill, within 50 m of the Site boundary. Uranium has been above the drinking water standard in the past. Uranium is not expected to be part of municipal waste and this, coupled with the fact that there are no exceedances at other monitoring well locations for uranium, suggests that the uranium exceedance is not likely leaching from the landfill.
- Lithium exceeds the drinking water standard at all monitors for both the May and November results, including the background monitor (MW99-2); it is inferred that the lithium exceedances are associated with background concentrations. The CSR-DW standard for lithium was set in 2017, based on 2015 US EPA “Regional Screening Levels” for tap water; there had been no standard previously.
- Strontium – The current CSR-DW standard for strontium was set in 2017, based on 2015 US EPA “Regional Screening Levels” for tap water; there had been no standard previously. The new standard was exceeded in BH-2 in May and November.
- The CSR-DW standard for manganese, which does not apply at the Westside Landfill (see Section 5.2.2) was exceeded at the monitors within the landfill, BH1 and BH2, in both May and November.

The results summarized above suggest that any impacts of the landfill on groundwater sufficient to cause exceedances of CRS-DW are confined to within the landfill footprint and a limited distance (i.e. 50 m) downgradient, with select parameter exceedances a representative of background concentrations.

5.2.2 Monitoring Results Relative to Historical Data (Trend Analyses)

Analyses of some key parameters that may be indicative of impacts from landfill leachate are presented in this section. These parameters are: chloride, ammonia, nitrate plus nitrite, iron and manganese. Note that in cases where a result was below the analytical detection limit, the result was plotted as being equal to the detection limit.

The times series of values for the key parameters listed above are provided in Figure 6 for the groundwater monitor. The results are separated according to monitor location: up-gradient, within the landfill footprint, downgradient less than 50 m from the Site boundary and downgradient greater than 50 m from the Site boundary. A dotted vertical line is placed at 2010, the year that the landfill stopped receiving waste. The shapes used to represent monitors are the same as used in Figures 4 and 5, and are listed in order of the location class, from up-gradient to downgradient greater than 50 m from the Site boundary, and by descending elevation within the location class. If the concentration is above the current CSR-DW standard for a parameter, the colour of the result is in dark orange, if it is less or there is no standard, the result is green.

As shown in Figure 6, the values of the selected parameters are relatively low in the up-gradient location, highest at the locations within the landfill, less in the downgradient locations less than 50 m from the Site boundary, and low in the downgradient locations greater than 50 m from the Site boundary, which have no exceedances for these key parameters. With the exception of nitrate, the concentrations of these indicators have been declining after the cessation of filing in 2010 in monitors within the landfill and monitors in downgradient locations less than 50 m from the Site boundary. It should be noted that the Site was partially covered after filling ceased, which may have limited infiltration and thereby further reduced leaching.

Individual discussion for each of these parameters follows.

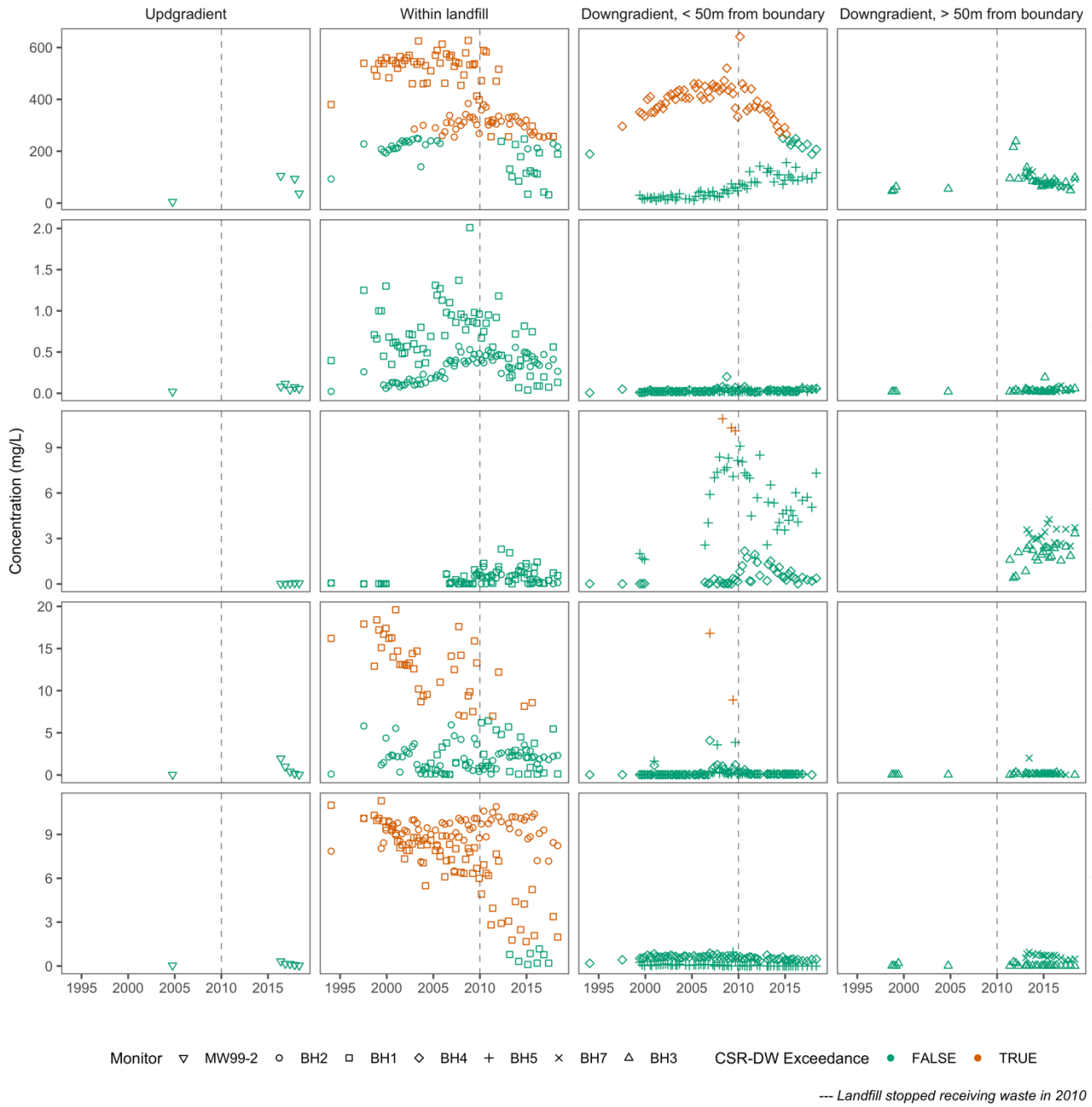

Figure 6: Values of key parameters over time

5.2.2.1 Chloride

Chloride concentrations can become elevated from leachate impacts; however, chloride occurs naturally in groundwater and there are other sources of this parameter, including road salt and septic influences. Higher concentrations of chloride in groundwater downgradient of a landfill do not definitively indicate an impact from the landfill. However, chloride can move through groundwater more quickly than some other parameters, which are subject to processes that slow their movement, and is therefore potentially an indicator that impacts from other parameters may appear at a later time.

Chloride levels are generally highest in the monitors located within the landfill (see Figure 6), and also elevated in the downgradient monitors within 50 m of the Site boundary, and lowest in the upgradient monitor and the downgradient monitors located more than 50 m from the Site boundary. Both monitors (BH1 and BH2) located within the landfill limits show a decline after filling ceases in 2010, as do levels in BH4, located downgradient, within 50 m of the Site boundary. The concentrations in BH5, located downgradient within 50 m of the Site boundary, showed a slow increase from before the cessation of filling in 2010 to a few years after, and in recent years has been roughly steady at a level well below the CSR-DW standard of 250 mg/L. These observations are consistent with there being some impact on chloride levels in groundwater, which have been decreasing since filling ceases in 2010, and also with increasing distance from the landfill.

The expectation is that with the cessation of landfilling, and with the closure works limiting infiltration, any elevation of chloride concentrations due to landfilling will gradually approach pre-landfill levels over time (assuming no other source impacts). The results so far are consistent with that expectation. In 2018, none of the downgradient monitors had chloride concentrations above the CSR-DW standard.

5.2.2.2 Ammonia and Nitrate

Decomposition of waste can lead to consumption of oxygen and therefore result in the anaerobic conditions that favour ammonia production. After closure of a landfill, it is expected that decomposition rates will decline over time as organic matter decomposes, and thus ammonia is expected to generally decline over time.

As the results presented in Figure 6 show, ammonia concentrations are elevated at within landfill monitors (BH1 and BH2). Levels are low both upgradient and downgradient of the landfill. This is consistent with ammonia being released due to composition of organic matter under low oxygen conditions. Ammonia may be oxidized, at least in part, to nitrate. As shown in Figure 6, nitrate levels are relatively low at the monitors located within the landfill, and higher in down-gradient monitors, particularly those located within 50 m of the Site boundary. This pattern is consistent with ammonia being released from decomposition of waste and then being oxidized to nitrate downgradient from the landfill.

Ammonia levels in the monitors within the landfill have been generally declining since 2010. The trends in concentrations of nitrate after 2010 in downgradient monitors is less clear than for ammonia, but do not appear to be increasing.

It should be noted that there is no CSR-DW standard for ammonia, and also that nitrate levels have not exceeded in any monitor from 2010 to the present.

5.2.2.3 Iron and Manganese

Iron and manganese can sometimes be direct indicators of landfill impacts, in that decomposition of waste can result in anaerobic conditions that tend to mobilize iron from naturally (and sometimes unnaturally) occurring sources. The solubility of iron, though, depends on other factors, such as pH. In 2018, iron levels were below the CSR-DW standard of 6.5 mg/L for all monitors.

Iron and manganese levels are clearly elevated in the monitors within the landfill, relative to other locations, especially after 2010. This pattern is consistent with iron and manganese being mobilized in the reducing conditions present in groundwater impacted by anaerobic conditions within the landfill, with levels being lower in more oxidizing conditions downgradient of the landfill. None of the monitors located downgradient of the Site had levels above CSR-DW standards for iron and manganese. Note that the manganese standard listed for CSR-DW applies only in relation to specified land uses; the standard does not apply to Westside Landfill.

5.3 Landfill Gas Monitoring

A landfill gas management plan (LGMP) was developed in consultation with representatives of the MoE (Golder, 2013). Modifications to refine and extend the program were proposed in the Closure Plan (Golder, 2015), most of which have been put into action since they are consistent with the program outlined in the LGMP. Additional vapour monitors (VP15-01, VP15-02 and VP15-03) were installed in 2015, with two of these (VP15-01 and VP15-02) located near the edge of the area of filling along the eastern boundary to serve as additional “step-out monitors” to the existing VP07-02, to better assess methane levels near the property boundary. VP15-03 was located near BH102 to provide additional information on landfill gas composition variation with depth. Golder understands that in 2018, seven monitors that were located north of the Site boundary on the north side were removed as part of earthworks being completed on that property; the monitors removed included: VP07-11, VP07-12, VP07-13, VP07-17, VP07-18, VP07-19 and VP07-20.

The landfill gas monitoring at the Site has been conducted by RDCO staff since 2016, rather than using contractors as was previously the case. Results are provided to Golder on the same day that landfill gas monitoring is completed so that exceedances of criteria can be identified within 24 hours of the receipt of results, and additional actions as required in the LGMP (Golder, 2013) and as extended in the Closure Plan (Golder, 2015) could be initiated. In 2018, no additional actions were required based on the monitoring results.

The 2018 landfill gas monitoring events were completed in January, February, March, April, May, June, July, August, September, October, November and December. Note that the June, July, September and October rounds are partial rounds that include specified monitors. The results for 2018 are presented in Appendix B, Table B-2.

Methane results are the most critical at this Site since they pose the greatest potential risk in that methane is explosive over a range of concentrations that might be expected in the subsurface at a landfill. Methane was the main focus of the LGMP (Golder, 2013) and was discussed further in the Closure Plan (Golder, 2015). The results for methane are discussed further in the following Section. The other landfill gas results measured include carbon monoxide, hydrogen sulphide, carbon dioxide and oxygen; the results for these gases are discussed in Section 5.3.2.

5.3.1 Methane

The recommendations included in the *Landfill Gas Management Plan [LGMP]* (Golder, 2013) and the Closure Plan (Golder, 2015) were put into effect as of May 2013. Landfill gas measurements have been made by RDCO staff since 2016. The results of the monitoring events are submitted in digital form to a qualified professional for assessment within 24 hours in order to better meet the timelines for further action, if needed, outlined in the LGMP.

In the LGMP, action levels were set relative to the location of monitoring wells, which were classified as Mid-Boundary for monitoring wells within the landfill boundary that are no closer than 5 m to the landfill boundary, Near-Boundary for monitoring wells, which are within the landfill boundary and are within 5 m of the landfill boundary and Outside-Boundary for monitoring wells that are outside of the landfill boundary. The action level for Mid-Boundary monitoring wells is 25% LEL, while the action level for the Near-Boundary and Outside-Boundary monitoring wells is 10%. The exceedances of these actions levels within monitoring wells are summarized in Table 1, by location.

Table 1: Exceedances of Methane Action Levels, by Side

Location	Number of Exceedances of Methane Action Level by Side		
	Inner-Boundary (>25% LEL)	Near-Boundary (>10% LEL)	Outside-Boundary (>10% LEL)
East	8 (BH102)	0	0
North	0	0	2 (VP07-11 - removed in June)
South	0	-	-
West	0	0	0

"-" Indicates no associated monitoring wells.

As can be seen from Table 1, there were eight exceedances at Inner-Boundary monitoring well BH102 on the east side of the landfill in 2018 and two at an Outside-Boundary monitoring well VP07-11. There were no exceedances recorded at Near-Boundary locations. The dates and locations of the exceedances are summarized in Table 2, along with associated carbon dioxide and oxygen readings.

Table 2: Exceedances of Action Levels, by Monitor

Monitor ID	Month	Action Level (%LEL)	Methane (%LEL)	CO2 (%)	O2 (%)
BH102 (MB)	Jan	25	48.5	10.9	1.1
BH102 (MB)	Feb	25	>= 100	27.1	0
BH102 (MB)	Mar	25	>= 100	7.9	12.4
BH102 (MB)	Apr	25	>= 100	37.0	0.0
BH102 (MB)	May	25	>= 100	34.5	0.0
BH102 (MB)	Jun	25	31.0	3.5	20.1
BH 102 (MB)	Nov	25	82.0	11.4	5
BH 102 (MB)	Dec	25	76.0	21.4	0
VP07-11 (OB)	Feb	10	24.5	1.3	16.5
VP07-11 (OB)	Mar	10	47.0	1.5	14.7

MB – Mid-Boundary, OB – Outside-Boundary
Note: VP07-11 decommissioned in June 2018

The prescribed action in the case of exceedances at a monitor is to check the instrument calibration and resample if there was a calibration issue. In cases where there is an associated “step-out” monitor, which is a monitor located further from the landfill in a direction approximately perpendicular to the closest landfill boundary, then readings are taken there and compared with the associated action level for that monitor. If the step-out monitor readings are less than the associated action level, then no additional action is required. If there is no associated step-out monitor or if levels in the step-out monitor exceed the associated action level, then the MoE needs to be notified and an action plan developed.

As noted, action levels were exceeded at only BH102 and VP07-11 during 2018. These are both locations were elevated methane levels have been detected in the past, and where “step-out” monitors have been installed. In the case of BH102, there are three associated step-out monitors (i.e., VP07-02, VP15-01, VP15-02), although RDCO have frequently encountered difficulty in collecting samples from VP15-02. VP07-11 had an associated step-out monitor, VP07-19. The exceedances of action levels in 2018 and the methane levels recorded in associated step-out monitors are summarized in Table 3.

As can be seen from the results recorded in Table 3, except for June results for BH102, in every case of an exceedance of an action level, the methane levels in the associated step-out monitors were well below their associated action level. Methane levels for BH102 had not exceeded the associated standard later than May, prior to 2018, in which sampling on June 6, 2018 indicated methane at 31%, down from May, but still above the standard. Based on past results, the step-out monitor VP07-02 was not included on the planned round for June. Golder recommended that BH102 and all associated step-out monitors be resampled later in June, and made a recommendation that in the future if the action level is exceeded at any monitor, all associated step-out monitors be resampled automatically, whether or not they were scheduled to be monitored at the round

Table 3: Summary of 2018 exceedances and step-out monitor results

	Monitor	Associated Step-out Monitors	
Month	**BH102 (IB)**	**VP07-02 (NB)**	**VP15-01 (NB)**
Jan	**48%**	0.10%	0.08%
Feb	**>100%**	0.05%	0.10%
Mar	**>100%**	0.00%	0.14%
Apr	**>100%**	0.08%	0.13%
May	**>100%**	0.03%	0.15%
Jun (regular 4th)	**31.0 %**	NA	0.08
Jun (extra 19th)	**0.82 %**	0%	0.32%
Nov	**82.0 %**	0.00	0.17
Dec	**76.0 %**	0.11	0.14
Criteria	*>=25%*	*>=10%*	*>=10%*
Month	**VP07-11 (OB)**	**VP07-19 (OB)**	
Feb	24.5 %	0.03	
Mar	47.0 %	1.02	
Criteria	*>=10%*	*>=10%*	

IB – Inner Boundary, NB – Near Boundary, OB – Outside Boundary

The maximum value of methane recorded by monitor and year is illustrated in Figure 7 for monitors included in the LGMP. Note that all of the “Outside-Boundary” monitors were removed in mid-2018 as part of development work on the property to the north of landfill. As can been seen from Figure 7, LGMP criteria have only been exceeded at two monitors: BH102 and VP07-11.

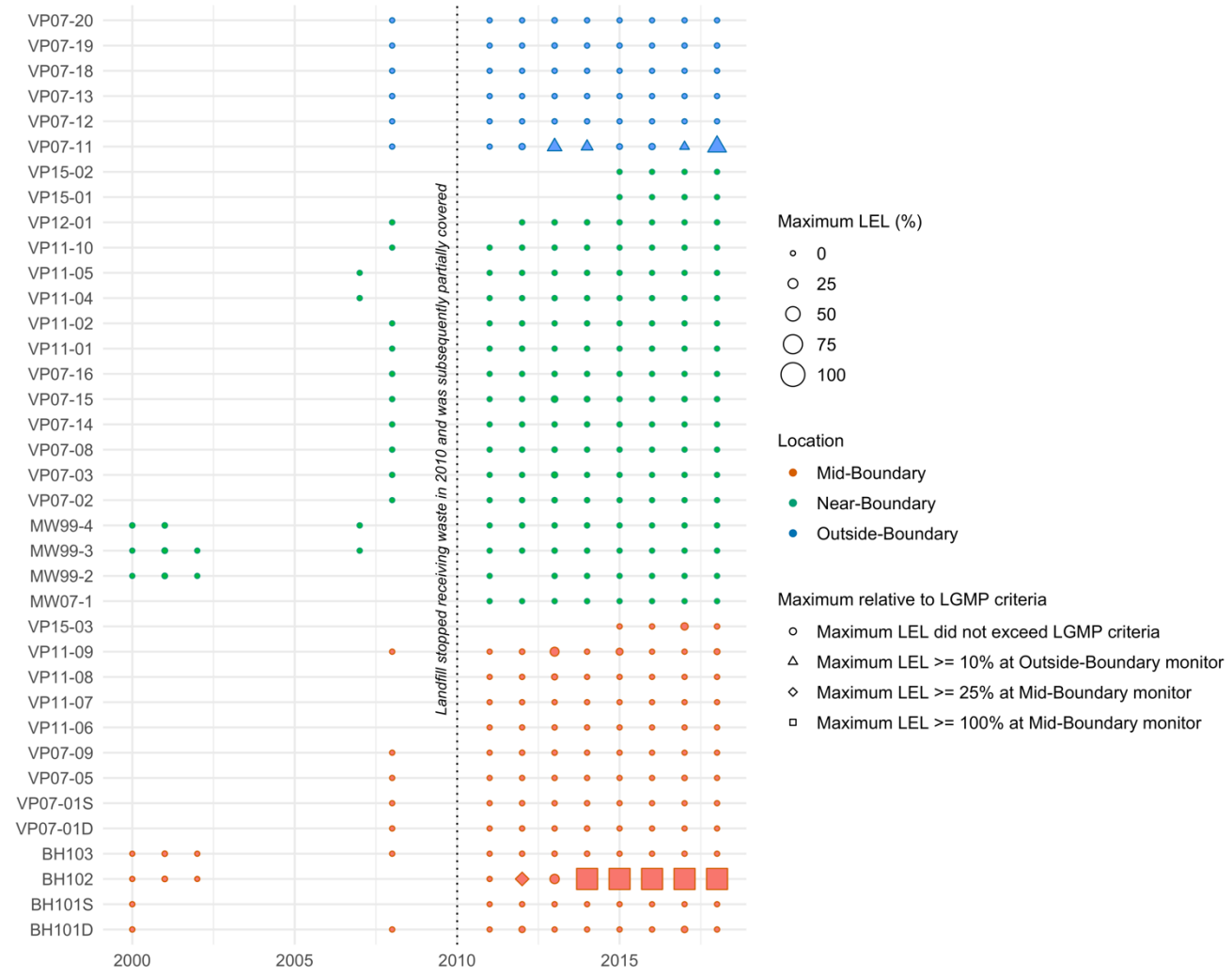

Figure 7: Historical maximum methane levels, by monitor and year

5.3.2 Other Landfill Gases

Hydrogen sulphide measurements were below the detection limit at all monitoring locations and all sampling events in 2018, as has been the case in most years. Carbon monoxide were also all below the detection limit in 2018.

Oxygen and carbon dioxide levels vary considerably between monitors, and also vary over time at a given monitor. Oxygen levels have historically varied from essentially atmospheric levels of just under 21% down to undetectable levels. Carbon dioxide has historically varied from the lower detection limit of the instrument up to about 37% up to the end of 2018. In 2018, the carbon dioxide level at BH102 in April was 37%, matching the peak value previously recorded.

5.4 Groundwater Elevations

The groundwater levels recorded in 2018 are similar to those recorded in the past, as illustrated in Figure 8. The range of elevations at a given monitor are small compared with the differences between monitors, hence the pattern of groundwater flow beneath the landfill is expected to fairly consistent from year to year.

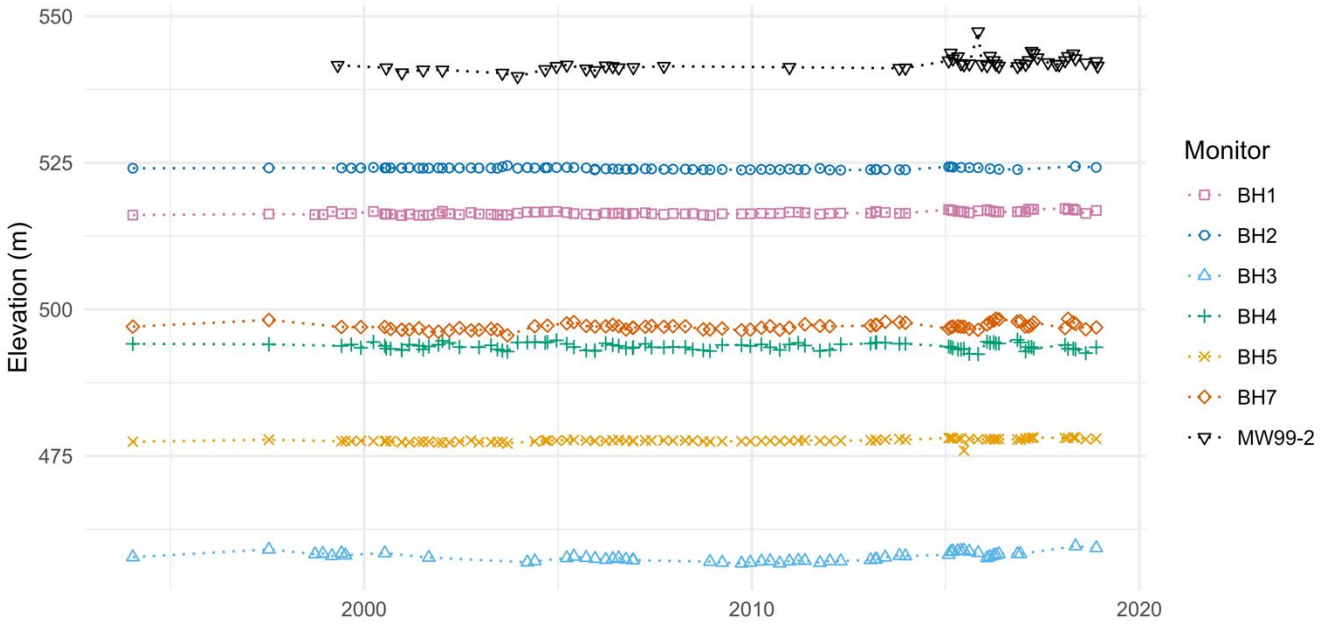

Figure 8: Historical groundwater elevations, by monitor

The approximate groundwater elevations and inferred contours were included in Figure 2. Based on historical groundwater elevation measurements, as well as the general topography of the area, the inferred groundwater flow is in a southeasterly direction at the Site, as shown on Figure 2. Groundwater results are sufficiently consistent that Figure 2 has not been updated with 2018 data; it would not make any appreciable difference to the shape of the groundwater contours or to the inferred flow direction.

6.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

The results of the Quality Assurance / Quality Control (QA/QC) program are provided in Appendix D, with QA/QC results presented in Table D-1. No issues that would adversely affect interpretation of the data or identifying exceedances of relevant standards were identified.

7.0 DISCUSSION OF GROUNDWATER AND LANDFILL GAS MONITORING

There are two main components to the current monitoring program, groundwater monitoring and landfill gas monitoring. The key results from each program component are summarized below.

7.1 Groundwater

As discussed in Section 5.2, groundwater quality for parameters selected as potential indicators of contamination (including chloride, ammonia, nitrate/nitrite, iron and manganese) appears to be generally improving in the downgradient monitors. The trend to lower values started around 2011, following cessation of waste disposal at Westside Landfill in 2010, and placement of cover soils over a significant portion of the formerly active area. This general decline is what would be expected.

With the addition of new CSR drinking water standards for some parameters in November 2017, there were exceedances for cobalt, lithium and strontium, none of which previously had drinking water standards in the CSR. However, the levels in downgradient monitors were similar to those in upgradient monitors. There were exceedances in some monitors for chloride and uranium, but there is no evidence of any systematic increase in either of these parameters. As already noted, chloride levels in downgradient monitors are generally declining. Since there were no uranium exceedances in wells located within the landfill, and since sources of uranium are not generally expected to be disposed in landfills, it is unlikely that the landfill is the source of the uranium exceedance noted at BH-4.

7.2 Landfill Gas

Under the LGMP methane measurements are to be compared to criteria specific to the monitoring location, based on the location of the monitor relative to the property boundary. BH102 and VP07-11 were the only monitors in 2018 where methane exceeded the associated action level. In both cases, there are one or more associated “step-out” monitors: monitors located further from the landfill along a line approximately perpendicular to the closest limit of landfilling. The methane readings in these step-out monitors were below the action levels outlined in the LGMP, such that no further action or reporting was required.

The concentrations of carbon monoxide and hydrogen sulphide were below the detection limit for readings in 2018. The levels of carbon dioxide and oxygen varied considerably from monitoring well to monitoring well and from reading to reading.

8.0 RECOMMENDATIONS

Recommendations for changes to the monitoring and inspection plan outlined in the Closure Plan were formally accepted by the MoE as of September 2017. No changes in the monitoring and inspection plan were anticipated until sufficient post-closure monitoring has been conducted to determine if the closure works affected methane (or other potentially problematic landfill gases) adversely. However, some landfill gas monitors located off Site on the north side of the landfill have been removed, as discussed in Section 5.0 of this report.

Methane levels at one of these former monitors, VP07-11, have historically, including in 2018, exceeded the criteria for methane as specified in the Closure Plan (Golder, 2015). It is inferred that a Near-Boundary monitor, VP07-03, located near the former location of VP07-11 does not intercept the same landfill gas pathway that VP07-11 did. It has previously been noted that the methane levels that exceed criteria at both BH102 and VP07-11 both occur in winter and in spring when near surface soils are expected to be saturated or nearly saturated and where there is a greater chance of near surface ice and snow cover; all of which can reduce vertical venting of gas, thus promoting lateral migration of landfill gas.

Golder recommends that the landfill gas monitoring program be reviewed and updated to take into consideration the removal of the decommissioned monitors. The data from the landfill gas monitors installed in 2015 near BH102 should be reviewed to determine if additional investigation or mitigation measures are required in the vicinity of BH102.

9.0 LIMITATIONS AND USE OF REPORT

This report was prepared for the exclusive use of Regional District of the Central Okanagan. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it are the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

The report, which includes all appendices and attachments, is based on data and information collected during the investigation conducted by Golder Associates Ltd.'s personnel. It provides a level of assurance commensurate with the level of study. The report is based solely on the Site conditions at the time of the Site investigation conducted in 2018, as described in this report.

In evaluating the Site, Golder has relied in good faith on information provided by the individuals and agencies noted in this report. We accept no responsibility for any deficiency, misstatements, or inaccuracies contained in this report as a result of omissions, misinterpretations of fraudulent acts of the persons or agencies interviewed.

The assessment of environmental conditions and possible hazards at this Site has been made using the results of chemical analysis of discrete groundwater samples from a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at borehole, monitoring well, and test pit locations. Subsurface conditions may vary from these sample locations. Additional study, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of study. However, it is never possible, even with exhaustive sampling and testing, to dismiss the possibility that part of a Site may be contaminated and remain undetected.

This investigation was performed according to current professional standards and practices in the environmental field. If new information is discovered during future work, including excavations, borings, or other activities or studies, Golder should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

10.0 CLOSURE

We trust that this report provides you with the information that you require at this time. Should you require additional information or have any questions, please feel free to contact the undersigned at your earliest convenience.

Golder Associates Ltd.

Gary Barrett

May 16, 2019
Association of Professional Engineers and Geoscientists of the Province of British Columbia
J. D. FOLEY
GEOSCIENTIST
LICENSEE
Limited Licence
130752

Gary Barrett, Ph.D., P.Geo,
Senior Consultant

Jacqueline Foley, M.Sc., GeoL
Associate, Senior Hyrogeologist

GB/JF/lih

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https://golderassociates.sharepoint.com/sites/18793g/deliverables/final deliverables/1417953-006-r-rev1/1417953-006-r-rev1 annual monitoring rpt 16may_19.docx

APPENDIX A

Westside Landfill Operational Certificate Letter

Environmental Management Act Approval of Closure Plan for Westside Landfill (Authorization 122217), 6 September 2017

POLLUTION
PREVENTION

Suite 201
3547 Skaha Lake Road
Penticton
British Columbia V2A 7K2
Telephone: (250) 490-8200
Fax: (250) 492-1314

BRITISH COLUMBIA

MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

OPERATIONAL CERTIFICATE
PR 12217

Under the provisions of the Waste Management Act and in accordance with the Approved Regional District of Central Okanagan Solid Waste Management Plan,

Regional District of Central Okanagan

1450 KLO Road

Kelowna, British Columbia

V1W 3Z4

is authorized to manage recyclable materials and to discharge refuse to the ground at a landfill facility located approximately 2.5 km north of Westbank, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Waste Management Act* and may result in prosecution.

1 AUTHORIZED DISCHARGES

1.1 The discharge of refuse to which this Sub-Section is applicable is shown on the attached Site Plan A. The reference number for this discharge is E223888.

1.1.1. The maximum rate at which refuse may be discharged to the landfill is 20,000 tonnes per year.

1.1.2 The type of refuse which may be discharged is municipal solid waste and other wastes as authorized by the Regional Waste Manager.

1.1.3 The works authorized are a sanitary landfill and related appurtenances.

1.1.4 The location from which the discharge originates is generally the area on the west side of Okanagan Lake within the boundaries of the Regional District of Central Okanagan.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Date Issued: May 28, 1997
Amendment Date:
(most recent)

09/10/2008 07:50 FAX 1 250 762 7011 RDCO-PLANNING/ENG 002/018

1.1.5 The location of the approximate area of discharge is that Part of District Lot 3794 ODYD shown on Plan C11135 Except Plan KAP46607 as shown on Site Plan A.

2 GENERAL REQUIREMENTS

2.1 Maintenance of Works and Emergency Procedures

The holder of the Operational Certificate shall inspect the landfill, any related pollution control works and designated areas for managing recyclable or reusable materials regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the holder of the Operational Certificate which prevents continuing operation of the authorized method of pollution control, the holder of the Operational Certificate shall immediately notify the Regional Waste Manager and take appropriate remedial action.

2.2 Process Modifications

The holder of the Operational Certificate shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.

2.3 Plans - New Works

Plans and specifications of any new works related to this facility shall be submitted to the Regional Waste Manager and his consent obtained before construction commences. The works shall be constructed in accordance with such plans. Review of the submitted plans and specifications is for the purpose of administration of the Operational Certificate and only implies that the works specified therein meet the appropriate guidelines, criteria or standards.

2.4 Operational and Closure Plan

2.4.1 An *Operational and Closure Plan*, prepared by a suitably qualified professional shall be submitted for authorization by the Regional Waste Manager, on or before July 31, 1997.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

09/10/2008 07:30 FAX 1 250 162 7011 ROCO-PLANNING/ENG 008/018

2.4.2 The *Operational and Closure Plan* shall include the following:

- Anticipated total waste volumes and tonnage, and life of the landfill (ie: closure date);
- A topographic plan showing the final elevation contours of the landfill and surface water diversion and drainage controls;
- Design of the final cover including the thickness and permeability of barrier layers and drainage layers, and information on topsoil, vegetative cover and erosion prevention controls;
- Procedures for notifying the public about the closure and about alternative waste disposal facilities;
- Rodent and nuisance wildlife control procedures;
- Proposed end use of the property after closure;
- A plan for monitoring groundwater, surface water and landfill gas, erosion and settlement for a minimum post-closure period of 25 years;
- A plan and accompanying design for the collection, storage and treatment/use of landfill gas for a minimum of 25 years;
- A plan for operation of any required pollution abatement engineering works such as leachate collection and treatment systems, for a minimum post-closure period of 25 years;
- A schedule of reserve funds or security to be collected each year until closure; to cover estimated costs of closure, post-closure and a contingency for remediation;
- A screening plan, ie: vegetative or berm, designed by a landscape architect with particular focus on the east side of the landfill;
- A detailed fill plan for the east side of the landfill;
- A perimeter and electric bear control fencing design;
- Litter and odour control measures;
- Design of gas monitoring wells for lateral migration and the proposed gas monitoring program;
- Final cover design and a schedule to cover previously filled areas that are no longer going to receive waste, particularly on the east side of the landfill;
- Contingency plan & notification procedures in the event of an emergency;
- Training procedures for operators; and
- Any other site specific concerns as identified by the Regional Waste Manager.

2.4.3 Terms of reference for the Operational and Closure Plan are subject to authorization by the Regional Waste Manager.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Date Issued: May 28, 1997
Amendment Date:

09/10/2008 07:50 FAX 1 250 762 7011 ROCO-PLANNING/ENG 004/018

2.4.4 The Regional Waste Manager may request revisions to the *Operational and Closure Plan*. Terms of reference for the revisions to the *Operational and Closure Plan* are subject to authorization by the Regional Waste Manager.

2.4.5 Operation of this landfill is to be in substantial accordance with the authorized *Operational and Closure Plan*.

2.4.6 If there is an inconsistency between this Operational Certificate and the authorized *Operational and Closure Plan*, the Operational Certificate shall take precedence.

2.5 Ground and Surface Water Quality Impairment

2.5.1 Landfills must not be operated in a manner such that ground or surface water quality decreases beyond that allowed by the *Approved and Working Criteria for Water Quality* dated 1995 prepared by the Water Quality Branch of the Ministry of Environment, Lands and Parks at or beyond the landfill property boundary. The appropriate water quality criteria will be specified by the Regional Waste Manager after reviewing uses of the ground and surface water resources.

2.5.2 If excursions result to the specified water quality criteria, the Regional Waste Manager may require that leachate management control measures or works be undertaken. Terms of reference for any leachate management study and/or design work is subject to the authorization of the Regional Waste Manager.

2.6 Landfill Gas Management

2.6.1 An assessment of the emissions of non-methane organic compounds (NMOCs) is required for landfills exceeding a total capacity of 100,000 tonnes. If NMOCs are determined to exceed 150 tonnes/year, landfill gas recovery and management systems will be required to be designed, installed and operational within 3 years. If NMOCs are projected to be less than 150 tonnes/year for the operating life of the landfill, an assessment for the need of passive gas venting will be required. Terms of reference for any landfill gas study or design is subject to the authorization of the Regional Waste Manager.

2.6.2 The gas monitoring wells, designed by a suitably qualified professional, are to be installed on or before August 31, 1998.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Date Issued: May 28, 1997
Amendment Date:
(most recent)

09/10/2008 07:50 FAX 1 250 762 7011 ROCO-PLANNING/ENG 003/018

2.7 Property Boundary

The buffer zone between any municipal solid waste discharged after the issuance of this Operational Certificate and the property boundary is to be at least 50 metres of which the 15 metres closest to the property boundary must be reserved for natural or landscaped screening (berms or vegetative screens). Depending on adjacent land use and environmental factors, buffer zones of less than 50 metres but not less than 15 metres may be authorized by the Regional Waste Manager.

2.8 Other Facilities

The distance between the discharged municipal solid waste and the nearest residence, water supply intake, hotel, restaurant, food processing facility, school, church or public park is to be a minimum of 300 metres. Greater or lesser separation distances may be authorized where justified. For those landfills designed to collect and recover methane gas generated, the issue of potential on-site or off-site users of the energy should be addressed in siting the landfill, consistent with the preceding regarding public places. An exemption is granted to discharge municipal solid waste closer than 300 m to the existing residences located in the subdivision to the east of the landfill.

2.9 Natural Control Landfill

2.9.1 The bottommost solid waste cell is to be at least 1.2 metres above the seasonal high water table. Greater or lesser separation depths may be authorized based on soil permeability and the leachate renovation capability of the soil.

2.9.2 There is to be at least a 2 metres thick layer of low permeability soil with a hydraulic conductivity of 1 x 10-6 cm/s or less (i.e. silt or clay), below each of the bottommost waste cells. Lesser thicknesses or no layer of low permeability soil may be authorized based on the potential for leachate generation and the unsaturated depth, permeability and leachate renovation capability of the existing soil.

2.10 Water

The disposal of municipal solid waste into water is unacceptable. Surface water diversion to restrict storm water runoff from contacting the wastes is required.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

Date Issued: May 28, 1997
Amendment Date:

09/10/2008 07:30 FAX 1 250 787 6011 ABCO-FLAMMING/ENG 010/010

2.11 Final Cover

Final cover for landfill sites is to consist of a minimum of 1 metre of low permeability (<1 x 10-5 cm/s) compacted soil plus a minimum of 0.15 metre of topsoil with authorized vegetation established. The depth of the topsoil layer should be related to the type of vegetation proposed (ie rooting depth). Soils of higher permeability may be authorized based on leachate generation potential at the landfill site. Final cover is to be constructed with slopes between 4% and 33% with appropriate run-on/run-off drainage controls and erosion controls. An assessment of the need for gas collection and recovery systems shall be made so that, in the event such systems are required, cover can be appropriately designed and constructed. Final cover is to be installed within 90 days of landfill closure or on any areas of the landfill which will not receive any more refuse within the next 12 months. Completed portions of the landfill are to progressively receive final cover during the active life of the landfill.

Additional layers of natural materials including earth and aggregate and/or synthetic materials may be necessary for inclusion in the final cover design due to site specific conditions and the presence of management systems for leachate and landfill gas.

2.12 Access Road

An appropriately constructed and maintained access road to, and a road system within the landfill site capable of supporting all vehicles hauling waste, are required during the operating life of the landfill.

2.13 Fencing and Access

2.13.1 Fencing is required to be installed around the perimeter of the landfill on or before April 1, 1998. The type and extent of fencing will depend on the existing natural vegetation and topographic features and is to be authorized by the Regional Waste Manager. All access points are to have locking gates.

2.13.2 Bears shall be prevented from accessing any and all putrescible refuse from April to November inclusive through the use of electric fencing. Electric fencing is to be installed on or before April 1, 1998 and maintained thereafter.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

09/10/2008 07:50 FAX 1 250 782 7011 RDCO-PLANNING/ENG 001/010

2.13.3 The holder of the Operational Certificate is to conduct a public relations campaign 3 months prior to the installation of electric fencing. The purpose of the campaign is to inform the public of the impacts of installing electric fencing around the landfill. The Conservation Officer Service is to be consulted in the development of the public relations campaign.

2.13.4 Signage is to be attached to the electric fence at regular intervals with an appropriate safety warning indicating that the fence is electrified.

2.14 Design by Qualified Persons

All landfills are to be designed by persons qualified in landfill site selection, design and operation. All plans, specifications, and reports are to be sealed by a professional engineer or geoscientist licensed to practice in the province of British Columbia.

2.15 Prohibited Wastes

The co-disposal of the following wastes with the rest of the municipal solid waste is prohibited unless specifically authorized by the Regional Waste Manager:

- Special Wastes other than those specifically authorized in the *Special Waste Regulation*
- Bulk liquids and semisolid sludges which contain free liquid;
- Liquid or semisolid wastes including septage, black water, sewage treatment sludge, etc.;
- Automobiles, white goods, other large metallic objects and tires;
- Biomedical waste as defined in the document *Guidelines for the Management of Biomedical Waste in Canada* (CCME, February 1992); and
- Dead animals and slaughter house, fish hatchery and farming wastes or cannery wastes and byproducts.

Burial of these wastes in dedicated locations (i.e. avoiding co-disposal) at a landfill site may be authorized by the Regional Waste Manager only if there is no other viable alternative such as treatment/disposal, recycling, reprocessing or composting. The viability of alternatives is to be determined by the Regional Waste Manager based on submission of cost data by the holder of the Operational Certificate. For those cases in which the dedicated disposal of otherwise prohibited wastes is authorized, the specific on-site location of the disposal shall be recorded to allow ready access to the waste should corrective or further action pertaining to the management of these wastes be required by the Ministry at some time in the future.

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2.16 Hydrocarbon Contaminated Soils

The deposit of hydrocarbon contaminated soils below the *Special Waste Regulation* criteria is authorized at this landfill subject to the following conditions:

- Soil contaminated with hydrocarbons shall be deposited in layers less than 0.3 meters; and

- Soil contaminated with hydrocarbons shall be deposited a minimum of 1.2 meters above the seasonal high groundwater level and a minimum of 2.0 meters below the final grade of the landfill to prevent the impact on groundwater and any future vegetation on the site.

2.17 Designated Areas

Maintain areas for the separation, handling and storage of recyclable or reusable materials where applicable.

When a separated recyclable material is a special waste it is to be stored and managed in accordance with the *Special Waste Regulation*.

Composting of yard waste is to be in accordance with the *Production and Use of Compost Regulation*.

2.18 Signs

A sign is to be posted at each entrance of the landfill with the following current information:

- Site name
- Owner and operator
- Contact phone number and address for owner and operator
- Phone number in case of emergency (such as fire)
- Hours of operation (if applicable)
- Materials/wastes accepted for landfill and recycling
- Materials/wastes banned
- Tipping fees (if applicable)

Additional signs which clearly indicate the directions to the active tipping face, public disposal area, recycling and waste separation areas, etc. should also be displayed.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

09/10/2008 07:51 FAX 1 250 782 7011 RDCO-PLANNING/ENG 003/018

2.19 Supervision

Fulltime, trained operators on-site are required at this landfill during operating hours. The gates are to be locked to prevent unauthorized access during non-operating hours. Properly designed and maintained public waste disposal and/or recyclable material bins situated outside the main gate may be provided for after hours use. The operator is required to be familiar with the Operational Certificate, inspection records, the authorized *Operations and Closure Plan* and all annual reports.

2.20 Scavenging

Scavenging of waste is to be prevented. The salvaging of wastes should be encouraged by providing areas and facilities for separation of recyclable or reusable materials.

2.21 Dust Control

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

2.22 Waste Compaction and Covering

2.22.1 Wastes are to be spread in thin layers (0.6 m or less) on the working face and compacted. The working face area should be minimized as much as possible. A compacted layer of cover material of at least 0.15 metre of soil or functionally equivalent depth of other cover material, as authorized by the Regional Waste Manager, is to be placed on all exposed solid waste at the end of each day of operation. If the landfill should operate continuously 24 hours per day, 0.15 m of cover material is to be applied at a frequency authorized by the Regional Waste Manager. Under specific circumstances, such as during bear season, the Regional Waste Manager may specify more stringent cover requirements. During periods of extreme weather conditions, such as those that cause the ground to freeze, an exemption to the normal cover requirements may be authorized at a frequency authorized by the Regional Waste Manager.

2.22.2 An intermediate cover consisting of a compacted layer of at least 0.30 metre of soil or functionally equivalent depth of other cover material is to be placed where no additional solid waste has been deposited or will be deposited within a period of 30 days.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

09/10/2008 07:51 FAX 1 250 782 7011 ROCO-PLANNING/ENG 010/018

2.23 Litter Control

Litter is to be controlled by compacting the waste, minimizing the working face area, applying cover, providing litter control fences and instituting a regular litter pickup and general good housekeeping program or any other measures required by the Regional Waste Manager.

2.24 Vectors

Vectors are to be controlled by the application of cover material at a specified frequency or by other control measures as required and authorized by the Regional Waste Manager.

2.25 Wildlife

The landfill is to 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. Further control measures, such as bear control fences, and bird control devices, may be specified by the Regional Waste Manager.

2.26 Fire Protection

Adequate fire fighting equipment is to be available to extinguish surface or underground fires. Recyclables and reusable materials are to be stored in such a manner to not constitute a fire hazard.

3 MONITORING AND REPORTING REQUIREMENTS

3.1 Municipal Solid Waste Measurement

3.1.1 Provide and maintain a weigh scale and record the weight of refuse discharged to the landfill over a 24-hour period.

3.1.2 Record the weight of recyclable and reusable materials not being discharged and that are being separated, stored or processed at the landfill over a 24-hour period.

3.1.3 Density tests are to be performed utilizing a known scaled volume of representative compacted refuse at a frequency of at least once per year and reported in kg per m3.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

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3.2 Water Levels

Measure the water level and determine the elevation, on a quarterly basis, in monitoring wells BH1 (E224611), BH2 (E224612), BH4 (E224617), BH5 (E224618), BH6 (E224620), BH7 (E224621), BH8 (E224623) and Dobbin's Well (E224624) as shown on Site Plan B.

3.3 Water Quality

3.3.1 Install a suitable sampling facility and obtain a grab sample on a quarterly basis, of the groundwater, in monitoring wells BH1 (E224611), BH2 (E224612), BH4 (E224617), BH5 (E224618) and Dobbin's Well (E224624) as shown on Site Plan B.

3.3.2 Obtain analyses of the samples in section 3.3.1 for the following:

conductivity, total alkalinity ($CaCO_3$), chloride, sulphate, ammonia nitrogen, nitrate nitrogen, aluminum, antimony, arsenic, barium, beryllium, bismuth, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, phosphorous, potassium, selenium, strontium, thallium, tin, titanium, tungsten, vanadium, and zinc.

3.3.3 Obtain grab samples, every two years, of the groundwater in monitoring wells BH1 (E224611) and BH4 (E224617) as shown on Site Plan B.

3.3.4 Obtain analyses of the samples in section 3.3.3 for the following:

total dissolved solids, boron, total purgeable hydrocarbons, total extractable hydrocarbons, volatile organics (EPA 624) and acid and base/neutral extractable organics (EPA 625) , BOD, COD, and phenolics.

3.3.5 Obtain suitable grab samples, on an annual basis, of the groundwater in all domestic water wells being used for drinking water purposes within 1000m down-gradient of the landfill subject to obtaining permission from the water well owner.

3.3.6 Obtain analyses of the samples in section 3.3.5 for conductivity and chloride.

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Amendment Date:

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3.4 Vegetation Monitoring

Inspect vegetation during the growing season in the vicinity of the landfill at least once per year to determine if any environmental impacts are occurring.

3.5 Sampling and Analytical Requirements

3.5.1 The sampling and monitoring requirements specified above shall be carried out in accordance with the appropriate procedures listed in the table below. Alternative test methods may be used provided that the alternative test methods are authorized by the Regional Waste Manager prior to performing the actual source testing. Test methods for parameters not listed below require the consent of the Regional Waste Manager.

DISCHARGES TO AIR, AMBIENT AIR:		
Parameter	Source Testing Procedure	Analytical Procedure
Particulate Matter Rate of Discharge (flow rate) Gaseous emissions	Stationary Emission Testing Code - contained in British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 1996 Permittee Edition	A Laboratory Manual for the Chemical Analysis of Ambient Air, Emissions, Precipitation, Soil and Vegetation, 3rd edition, April, 1983, 253 pp.
LIQUID EFFLUENTS, SURFACE WATER, GROUND WATER, SOILS, SEDIMENTS, VEGETATIVE MATTER:		
Parameter	Source Testing Procedure	Analytical Procedure
Metals Nutrients Organics Toxicity	British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 1996 Permittee Edition	British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials, March, 1994, Permittee Edition

The above manuals are available from Queen's Printer Publications Centre, P.O. Box 9452, Stn. Prov. Govt, Victoria, BC, V8W 9V7 (1-800-663-6105 or (250) 387-4609). The above manuals are also available for inspection at all Pollution Prevention offices.

3.5.2 Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination and breakage.

3.5.3 Maintain the groundwater monitoring wells including provisions to ensure protection from damage due to vehicles or vandalism.

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Amendment Date:
(most recent)

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3.5.4 Groundwater monitoring wells are to be covered with lockable caps, fitted with locks all keyed alike, and a key is to be provided to the Regional Waste Manager.

3.5.5 Three well bore volumes are to be pumped from each monitoring well prior to sample collection.

3.6 Changes to Sampling and Monitoring Program

On the basis of findings during routine inspections and any other information related to the effect of the discharge on the receiving environment, the Regional Waste Manager may allow reductions or require additional sampling and monitoring of the discharge and receiving environment.

3.7 Annual Report

An annual operations and monitoring report is to be submitted to the Regional Waste Manager within 60 days of the end of the calendar year. The first annual report is due on March 1, 1998. These reports are to contain at least the following information:

- Total volume and/or weight of waste discharged into the landfill for the year;
- Service population and waste discharge rate for the year (in tonnes per capita per year) and a trend analysis with a comparison to the 1990 baseline waste discharge rate of 1.20 tonnes per capita per year ;
- Authorized design volume;
- Remaining site life and capacity;
- Operational plan for next 12 months;
- Operation and maintenance expenditures;
- Monitoring data compilation, interpretation and trend analysis prepared by a suitably qualified professional regarding landfill gas, vegetation and leachate/water quality including a review of groundwater elevations and flow direction and a comparison made to the drinking water parameters found in the *Approved and Working Criteria for Water Quality* dated April 1995.;
- Amounts of leachate collected, treated and disposed;
- Any changes from authorized reports, plans and specifications;
- any changes to the contingency plan;
- Amount of landfill gas collected and its disposition;
- Review of the closure plan and associated estimated costs, including an update of the schedule of reserve funds or security to be collected each year until closure;. to cover estimated costs of closure, the 25 year post-closure period and a contingency for remediation; and
- Any other data relevant to this Operational Certificate

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3.8 Format of Submission

Monitoring and/or reporting information shall be submitted in an electronic and/or printed format which is suitable for review by the public and/or other government agencies and is satisfactory to the Regional Waste Manager.

3.9 Financial Security

Provide a future financial security of the operations at and beyond closure by establishing a Closure Fund in a form acceptable to the Regional Waste Manager, such as upfront security or a fund financed on a charge per tonne of waste disposed basis. Such a fund would be analogous to the provincial Waste Management Trust Fund which the Minister may establish under Section 53 of the *Waste Management Act*. The ultimate amount of the financial security shall meet or exceed the currently estimated closure and post-closure costs as outlined in the closure plan plus a reasonable contingency for any remediation which may be required. For municipally owned landfills, the financial security can be built up over time according to a schedule authorized by the Regional Waste Manager.

3.10 Legal Survey

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.

3.11 Buildings and Structures

The construction of buildings and other structures on landfills containing putrescible wastes is not recommended for a minimum period of 25 years after closure due to concerns about combustible gas and excessive settlement. Such activity will only be considered and /or authorized after an investigation and report by qualified persons. The report is to be submitted for authorization to the Regional Waste Manager prior to initiating construction activities.

3.12 Operation of Gas Recovery and Management System

Where landfill gas recovery and management is required, operation of the system should be considered an integral part of overall landfill management. The system should be planned for from the early design stage of the landfill and arrangements made for its operation for a minimum 25 year life after closure.

T.R. Forty, P.Eng.
Assistant Regional Waste Manager

3.13 Operation of Other Control Systems

Operation of other environmental control systems for leachate and run-off as well as monitoring of leachate, groundwater and surface water must be continued during the entire post-closure period unless the early suspension of such operations or monitoring is authorized by the Regional Waste Manager.

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Assistant Regional Waste Manager

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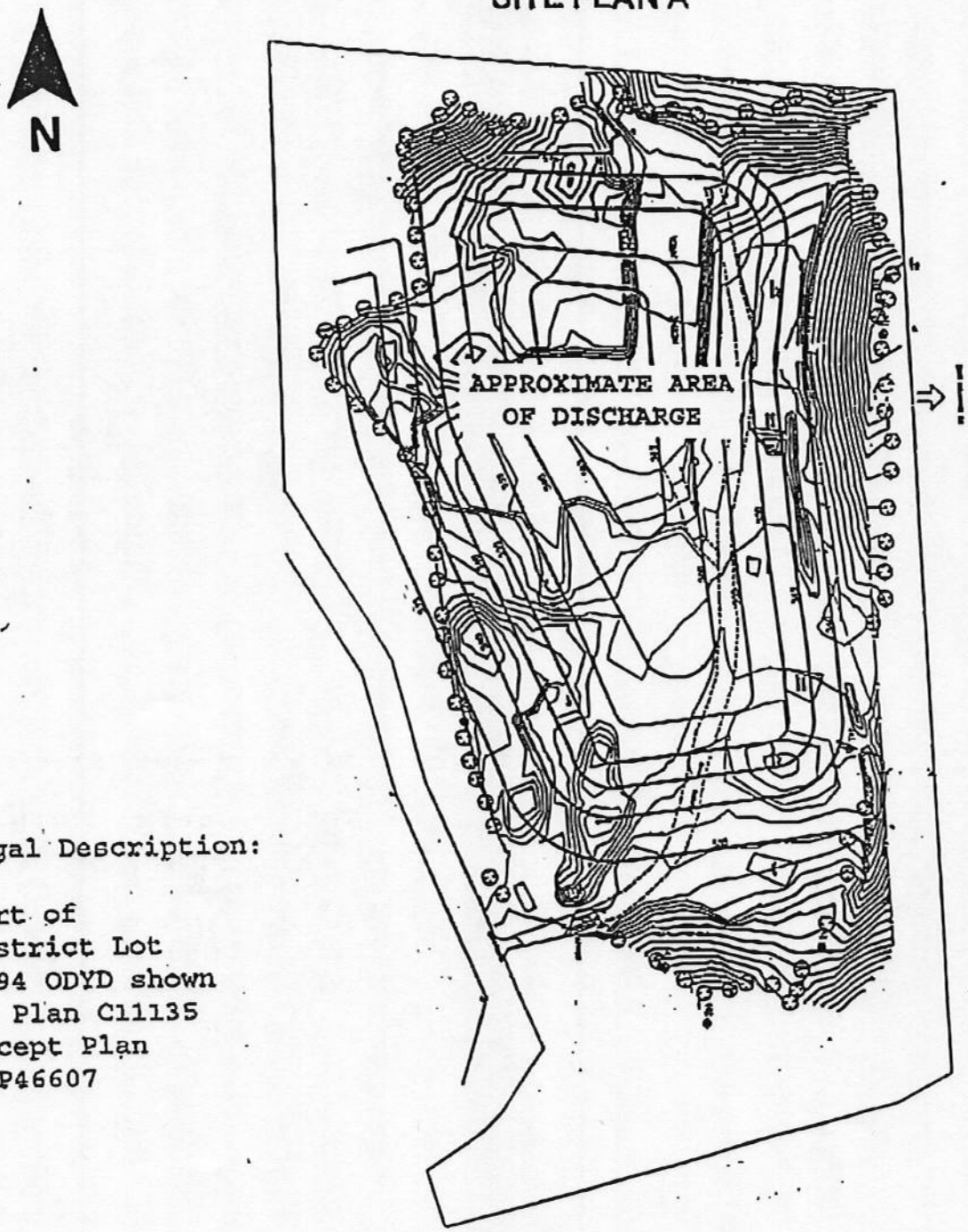
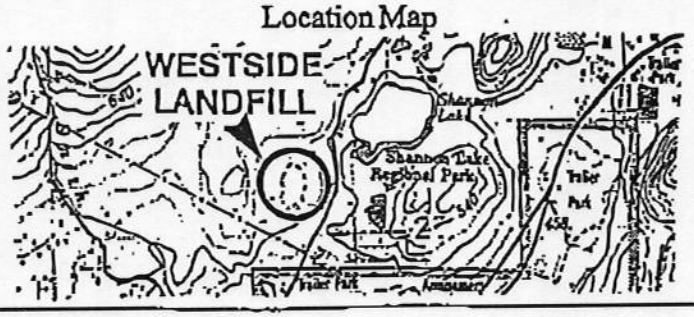
SITE PLAN A



Legal Description:

Part of
District Lot
3794 ODYD shown
on Plan C11135
Except Plan
KAP46607

Location Map



OPERATIONAL CERTIFICATE: PR-12217

Date: May 28, 1997

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Assistant Regional Waste Manager

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PROVINCE OF
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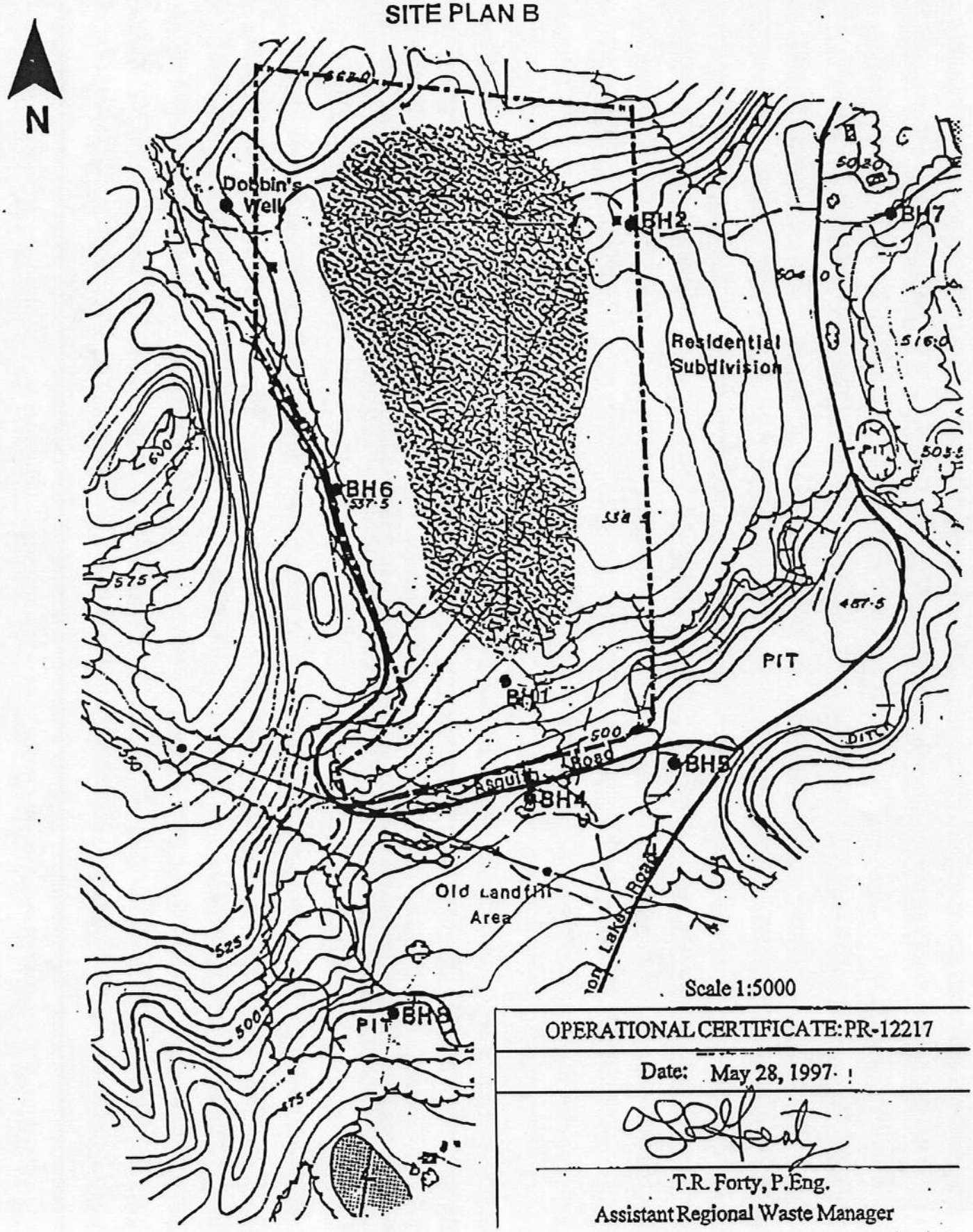
Pollution Prevention

SITE PLAN B



Scale 1:5000

OPERATIONAL CERTIFICATE: PR-12217

Date: May 28, 1997

T.R. Forty, P.Eng.

Assistant Regional Waste Manager

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September 6, 2017 Authorization Number: 12217

VIA EMAIL: clarke.kruiswyk@cord.bc.ca

Clarke Kruiswyk
Environmental Services Analyst
Regional District of Central Okanagan
1450 KLO Road, Kelowna, BC, V1W 3Z4

Dear Mr. Clarke Kruiswyk:

Re: *Environmental Management Act* approval of Closure Plan for Westside Landfill (Authorization 122217).

Thank you for your email dated March 10, 2016 and submission of the Westside Landfill Closure Plan dated May 12, 2015 by Golder Associates (Report Number 1406505-003-R-Rev0-5000) (the "Closure Plan"). Ministry review of the Closure Plan indicates that it conforms with current ministry policy (Landfill Criteria, 2nd Edition – 2016), and with respect to final cover, it meets the intent of clause 2.11 (Final Cover) of Operational Certificate (OC) 12217. As such, the Closure Plan is hereby approved in accordance with clause 2.4 of the OC, and the detailed final cover requirements included in clause 2.11 are replaced by those contained in the Closure Plan.

The Ministry further acknowledges that OC 12217 should now be updated to reflect the closed status of the site. The Regional District of Central Okanagan is requested to submit an application to amend the current OC to remove requirements that are no longer relevant, and instead incorporate requirements related to ongoing closure and post-closure activities. For reference, the 2016 Landfill Criteria describe the ministry's expectations pertaining to post closure operation and maintenance including but not limited to those in sections 7.4 (Post Closure Operation and Maintenance), 7.4 (Contaminating Lifespan), 9.0 (Monitorimng Criteria), and 10.3.4 (Closure Plan).

Application instructions and forms are available on the Ministry's website at: http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/guidance-forms-and-fees.

If you have any questions, please contact Roshan D'Souza, Environmental Protection Officer at 250 354 6365 or email Roshan.Dsouza@gov.bc.ca.

Yours truly,

Luc Lachance, P.Eng.
For Director,
Environmental Management Act

APPENDIX B

2018 Groundwater and Soil Gas Monitoring Result Tables

TABLE B-1:
GENERAL GROUNDWATER CHEMSITRY WESTSIDE LANDFILL, WEST KELOWNA, BC

					8050782-01	8050782-02	8050782-03	8050782-04	8050782-05	8050782-06	8050782-07	8050782-08	8111608-01	8111608-02	8111608-03	8111608-04	8111608-05	8111608-06	8111608-07	8111608-08
					2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
					2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-05-08	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
					Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Analyte	**CSR - DW[1]**	**CSR-AW-F[2]**	**Units**	**MRL**	**BHA**	**BH1**	**BH2**	**BH3**	**BH4**	**BH5**	**BH7**	**MW-99-2**	**BHA**	**BH1**	**BH2**	**BH3**	**BH4**	**BH5**	**BH7**	**MW99-2**
Chloride	250	1500	mg/L	0.1	98	189	217	97.9	207	117	91.9	37.1	80.7	117	217	78.4	211	178	83.8	113
Nitrate (as N)	10	400	mg/L	0.01	3.35	0.563	0.089	3.33	0.373	7.31	3.72	0.047	2.59	26.7	0.344	2.57	0.398	11.1	3.09	0.074
Sulfate	500	1280- 4290[H] | 4290	mg/L	1	43.5	143	137	42.7	96.4	50.5	46.8	14.4	38.4	205	79.3	38.2	94	56.3	53.2	15.6
Alkalinity, Total (as CaCO3)			mg/L	1	348	399	1450	346	696	234	446	594	351	431	1610	357	703	234	508	622
Alkalinity, Phenolphthalein (as CaCO3)			mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)			mg/L	1	348	399	1450	346	696	234	446	594	351	431	1610	357	703	234	508	622
Alkalinity, Carbonate (as CaCO3)			mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)			mg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)			mg/L	0.02	0.037	0.132	0.266	0.057	0.058	0.048	<0.020	0.054	0.043	0.184	0.323	<0.020	<0.020	0.037	0.02	0.09
BOD, 5-day			mg/L																	
Chemical Oxygen Demand			mg/L																	
Solids, Total Dissolved			mg/L	15	656	986	2260	627	1230	582	715	675	548	1100	1980	547	1110	699	717	736
pH			pH units	0.1	7.63	7.52	7.26	7.51	7.51	7.77	7.6	7.75	7.54	7.42	7.34	7.56	7.56	7.75	7.61	7.76
Conductivity (EC)			uS/cm	2	1030	1510	2970	995	1880	925	1160	1130	906	1570	3030	928	1860	1120	1210	1350
Hardness, Total (as CaCO3)			mg/L	0.5	430	702	1710	454	930	385	491	578	362	677	1690	375	867	423	509	660
Aluminum, dissolved	9.5		mg/L	0.005	<0.0050	<0.0050	0.0131	<0.0050	<0.0050	<0.0050	<0.0050	0.0791	0.0062	<0.0050	0.0113	<0.0050	<0.0050	<0.0050	0.0088	<0.0050
Antimony, dissolved	0.006	0.09	mg/L	0.0002	<0.00020	0.00029	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00032	0.00021	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Arsenic, dissolved	0.01	0.05	mg/L	0.0005	0.00128	0.00087	0.00394	0.00128	<0.00050	0.0013	0.00171	0.00185	0.0015	0.00101	0.00523	0.00151	<0.00050	0.00115	0.00208	0.00067
Barium, dissolved	1	10	mg/L	0.005	0.0104	0.0256	0.0094	0.0116	0.0344	0.0107	0.0209	0.0107	0.0106	0.0356	0.012	0.0111	0.0427	0.0155	0.0225	0.0086
Beryllium, dissolved	0.008	0.0015	mg/L	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth, dissolved			mg/L	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Boron, dissolved	5	12	mg/L	0.005	0.111	0.463	0.329	0.126	0.506	0.0586	0.058	0.0168	0.0731	0.71	0.399	0.0938	0.467	0.0635	0.0588	0.0254
Cadmium, dissolved	0.005	0005 - 0.004[H] | 0.0	mg/L	0.00001	0.000018	0.000079	0.000022	0.000027	0.000051	0.000016	0.000143	<0.000010	0.00002	0.00012	<0.000010	0.000013	0.00008	0.000013	0.000128	0.000021
Calcium, dissolved			mg/L	0.2	114	180	366	120	182	105	126	111	93.4	172	350	97	164	113	127	118
Chromium, dissolved	0.05	0.09[III], 0.01[VI]	mg/L	0.0005	<0.00050	<0.00050	0.00152	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00063	<0.00050	0.00235	0.0006	<0.00050	0.00058	<0.00050	<0.00050
Cobalt, dissolved	0.001	0.04	mg/L	0.0001	0.00017	**0.00145**	**0.00295**	0.00017	**0.00152**	<0.00010	0.00078	0.00031	0.00013	**0.00166**	**0.00253**	0.00014	**0.00171**	<0.00010	0.00088	0.00062
Copper, dissolved	1	0.02 - 0.09[H] | 0.09	mg/L	0.0004	<0.00040	0.00308	<0.00040	<0.00040	0.00057	<0.00040	0.00102	0.00872	0.00151	0.0103	0.00057	0.00114	0.00207	0.00089	0.00271	0.00233
Iron, dissolved	6.5		mg/L	0.01	0.013	0.119	2.31	0.011	<0.010	<0.010	<0.010	0.032	0.011	0.034	2.35	<0.010	<0.010	<0.010	0.02	0.257
Lead, dissolved	0.01	0.04 - 0.16[H] | 0.16	mg/L	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Lithium, dissolved	0.008		mg/L	0.0001	**0.02**	**0.0192**	**0.0259**	**0.0209**	**0.0355**	**0.0235**	**0.0223**	**0.0388**	**0.0179**	**0.0216**	**0.0277**	**0.0184**	**0.0367**	**0.0221**	**0.022**	**0.0457**
Magnesium, dissolved			mg/L	0.01	35	60.8	192	37.2	115	29.6	43	73	31.1	59.7	198	32.3	111	34.1	46.5	88.8
Manganese, dissolved	1.5		mg/L	0.0002	0.00075	***1.98***	***8.23***	0.00091	0.463	0.00035	0.489	0.032	0.00431	1.59	7.69	0.00458	0.325	0.00213	0.487	0.123
Mercury, dissolved	0.001	0.00025	mg/L	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum, dissolved	0.25	10	mg/L	0.0001	0.00435	0.00119	0.00546	0.00429	0.00627	0.00817	0.0025	0.00083	0.00414	0.00187	0.00419	0.00431	0.0068	0.00699	0.00269	0.00073
Nickel, dissolved		0.250 - 1.5[H]	mg/L	0.0004	0.00159	0.0074	0.0218	0.00162	0.0215	0.00058	0.00527	0.00074	0.00154	0.0124	0.0214	0.00147	0.0217	0.00078	0.00646	0.00063
Phosphorus, dissolved			mg/L	0.05	<0.050	<0.050	0.142	<0.050	<0.050	<0.050	<0.050	0.05	<0.050	<0.050	0.15	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved			mg/L	0.1	4.6	8.12	2.15	4.89	5.39	3.32	2.91	1.81	3.81	9.01	2.45	3.92	5.2	2.95	2.71	0.69
Selenium, dissolved	0.01	0.02	mg/L	0.0005	0.00079	<0.00050	<0.00050	0.00079	<0.00050	0.00092	0.00108	<0.00050	0.00064	<0.00050	<0.00050	0.00071	<0.00050	0.00108	0.00076	<0.00050
Silicon, dissolved			mg/L	1	12	14.3	22.7	13.1	11.3	9.4	13.4	11.9	13.3	17.7	29.4	13.7	13.1	10.3	15	8.9
Silver, dissolved		0.0005 - 0.015[H]	mg/L	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Sodium, dissolved	200		mg/L	0.1	60.4	68.5	124	64	95.9	60	84.6	56.9	49.1	94.3	134	50.8	95.1	58	75.5	49.5
Strontium, dissolved	2.5		mg/L	0.001	0.676	1.14	**3.1**	0.712	2.03	0.465	0.716	1.49	0.596	1.19	**3.04**	0.608	1.9	0.537	0.766	1.67
Sulfur, dissolved			mg/L	3	9.4	48.1	45.7	12.4	31.2	16.3	13.4	<3.0	13.1	78.5	33.3	14.5	36.5	21.9	20.2	9.1
Tellurium, dissolved			mg/L	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium, dissolved		0.003	mg/L	0.00002	0.00002	0.00002	<0.000020	<0.000020	0.000029	<0.000020	<0.000020	0.000026	<0.000020	<0.000020	<0.000020	<0.000020	0.000033	<0.000020	<0.000020	<0.000020
Thorium, dissolved			mg/L	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, dissolved	2500		mg/L	0.0002	<0.00020	<0.00020	0.00023	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium, dissolved		1	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten, dissolved	0.003		mg/L	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium, dissolved	0.02	0.085	mg/L	0.00002	0.00841	0.00217	0.00823	0.00871	0.0268	0.00669	0.0106	0.0101	0.0073	0.00296	0.00634	0.00744	0.0301	0.00674	0.0128	0.00784
Vanadium, dissolved	0.02		mg/L	0.001	0.0036	0.0015	0.0056	0.0038	0.0037	0.0058	0.0116	0.0015	0.0038	0.0018	0.0077	0.0039	0.0035	0.005	0.0134	<0.0010
Zinc, dissolved	3	0.075 - 2.4[H]	mg/L	0.004	<0.0040	<0.0040	0.0064	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0042	<0.0040	0.0064	<0.0040	<0.0040	<0.0040	0.0051	0.007
Zirconium, dissolved	0.0003		mg/L	0.0001	0.00014	**0.00038**	**0.00515**	0.00013	**0.00053**	<0.00010	0.00021	**0.00035**	0.0001	**0.00039**	**0.00525**	<0.00010	**0.00052**	<0.00010	0.00026	**0.00039**
Boron, total			mg/L																	

1. Drinking water criteria, from: Environmental Management Act, Contaminated Sites Regulation, [includes amendments up to B.C. Reg. 253/2016, November 1, 2017
2. Freshwater Aquatic criteria, from: Environmental Management Act, Contaminated Sites Regulation, [includes amendments up to B.C. Reg. 253/2016, November 1, 2017

[H] hardness dependant criteria
trivalent ion [III] | hexavalent ion [VI]
BOD - Biological Oxygen Demand (5-day)
RDL - detection limit
Exceeds DW standard — **Bold**
Exceeds DW standard, but not applicable to Site. — ***Bold Italics***

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
1/29/2018	VP12-01				0		Snow covered/frozen
1/29/2018	VP07-14				0		Snow covered/frozen
1/29/2018	BH103	0	1.7	16.9	0	0	
1/29/2018	VP07-01d	30	1.2	19.1	0	0	
1/29/2018	VP07-01s	15	0.7	20.4	0	0	
1/29/2018	BH102	24250	10.9	1.1	0	0	
1/29/2018	VP15-01	40	0.9	20.2	0	0	
1/29/2018	VP15-02				0		purge back pressure
1/29/2018	VP15-03	0	0	20.9	0	0	
1/29/2018	VP07-02	50	1.1	19.8	0	0	
1/29/2018	VP07-15	125	2.7	14.8	0	0	
1/29/2018	BH101s	40	1.2	19	0	0	
1/29/2018	BH101d	0	4.1	12.1	0	0	
1/29/2018	VP07-03	0	0	20.9	0	0	
1/29/2018	VP07-16	50	1.6	19.3	0	0	
1/29/2018	VP11-09	120	1.5	17.7	0	0	
1/29/2018	VP07-20	5	0	20.9	0	0	
1/29/2018	VP07-11	35	0.9	19.3	0	0	
1/29/2018	VP07-19	5	0.5	20.7	0	0	
1/29/2018	VP11-10	15	0.5	20.1	0	0	
1/29/2018	MW07-1	0	0.3	20.9	0	0	
1/29/2018	VP11-01	20	0.6	19.7	0	0	
1/29/2018	VP07-12	40	1.3	18.9	0	0	
1/29/2018	VP07-18	0	0.2	20.3	0	0	
1/29/2018	VP07-13	20	1.1	19.4	0	0	
1/29/2018	VP11-02	5	1	19	0	0	
1/29/2018	VP07-05	10	0	20.5	0	0	
1/29/2018	VP07-08	20	0.3	18.8	0	0	
1/29/2018	VP07-09	30	0.1	18.5	0	0	
1/30/2018	VP11-05	140	2	17.3	0	0	
1/30/2018	MW99-4	200	3.6	15.5	0	0	
1/30/2018	MW99-3	90	1	19.8	0	0	
1/30/2018	MW99-2	105	2	17.8	0	0	
1/30/2018	VP11-04	75	0.9	18.8	0	0	
1/30/2018	VP11-08	30	0.8	19.3	0	0	
1/30/2018	VP11-07	45	1.1	18.9	0	0	
1/30/2018	VP11-06	25	0.7	19.6	0	0	
2/26/2018	VP12-01				0		Snow covered/frozen
2/26/2018	VP07-14				0		Snow covered/frozen
2/26/2018	BH103	75	1.8	17	0	0	
2/26/2018	VP07-01d	0	0.1	20.9	0	0	
2/26/2018	VP07-01s	5	0.7	20	0	0	
2/26/2018	BH102	50250	27.1	0	0	0	
2/26/2018	VP15-01	50	1.5	18.2	0	0	
2/26/2018	VP15-02				0		purge back pressure
2/26/2018	VP15-03	120	0	20.7	0	0	
2/26/2018	VP07-02	25	1	18.9	0	0	
2/26/2018	VP07-15	200	3.8	16.6	0	0	

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
2/26/2018	BH101s	30	0.9	19.9	0	0	
2/26/2018	BH101d	110	2.3	15.5	0	0	
2/26/2018	VP07-03	65	0.5	20.9	0	0	
2/26/2018	VP07-16	40	1.3	19.3	0	0	
2/26/2018	VP11-09	110	2.7	16.7	0	0	
2/26/2018	VP07-20	0	0	20.9	0	0	
2/26/2018	VP07-11	12250	1.3	16.5	0	0	
2/26/2018	VP07-19	15	0.4	20.6	0	0	
2/26/2018	VP11-10	40	1.1	18.6	0	0	
2/26/2018	MW07-1	20	0.3	20.6	0	0	
2/26/2018	VP11-01	30	0.6	19.9	0	0	
2/26/2018	VP07-12	25	1	19.9	0	0	
2/26/2018	VP07-18	10	0.1	20.9	0	0	
2/26/2018	VP07-13	20	0.8	19.5	0	0	
2/26/2018	VP11-02	25	1.1	19.1	0	0	
2/26/2018	VP07-05	25	0	20.9	0	0	
2/26/2018	VP07-08	15	0.3	19.1	0	0	
2/26/2018	VP07-09	10	0.1	19.2	0	0	
2/27/2018	VP11-05	0	1.5	19.9	0	0	
2/27/2018	MW99-4	0	4.3	16.1	0	0	
2/27/2018	MW99-3	55	1	20.5	0	0	
2/27/2018	MW99-2	160	2.7	18.6	0	0	
2/27/2018	VP11-04	40	1	20.3	0	0	
2/27/2018	VP11-08	90	1.3	20.6	0	0	
2/27/2018	VP11-07	80	1	20.3	0	0	
2/27/2018	VP11-06	75	0.5	20.9	0	0	
3/12/2018	VP12-01				0		Could not locate
3/12/2018	VP07-14				0		1.10m water too high
3/12/2018	BH103	0	0.1	20.9	0	0	
3/12/2018	VP07-01d	0	0	20.9	0	0	
3/12/2018	VP07-01s	0	0.4	20.6	0	0	
3/12/2018	BH102	50250	7.9	12.4	0	0	
3/12/2018	VP15-01	70	1.6	17.2	0	0	
3/12/2018	VP15-02				0		purge back pressure
3/12/2018	VP15-03	700	0.1	20.9	0	0	
3/12/2018	VP07-02	0	0.2	20.6	0	0	
3/12/2018	VP07-15	160	4.3	15	0	0	
3/12/2018	BH101s	30	0.7	19.2	0	0	
3/12/2018	BH101d	175	4.1	12.6	0	0	
3/12/2018	VP07-03	0	0.1	20.9	0	0	
3/12/2018	VP07-16	5	0.6	20.7	0	0	
3/12/2018	VP11-09	190	3.5	15.8	0	0	
3/12/2018	VP07-20	80	0	20.9	0	0	
3/12/2018	VP07-11	23500	1.5	14.7	0	0	
3/12/2018	VP07-19	510	0.3	20.7	0	0	
3/12/2018	VP11-10	50	0.6	19.2	0	0	
3/12/2018	MW07-1	20	0.2	20.9	0	0	
3/12/2018	VP11-01	35	0.6	19.4	0	0	

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
3/12/2018	VP07-12	35	1	18.3	0	0	
3/12/2018	VP07-18	20	0	20.9	0	0	
3/12/2018	VP07-13	20	0.8	20.3	0	0	
3/12/2018	VP11-02	0	0	20.9	0	0	
3/12/2018	VP07-05	20	0	20.9	0	0	
3/12/2018	VP07-08	0	0	20.3	0	0	
3/12/2018	VP07-09	0	0	20.3	0	0	
4/16/2018	VP12-01	0	1.7	17.5	0	0	
4/16/2018	VP07-14				0		water too high
4/16/2018	BH103	90	4.5	10.3	0	0	
4/16/2018	VP07-01d	0	0	20.9	0	0	
4/16/2018	VP07-01s	0	0	20.9	0	0	
4/16/2018	BH102	50250	37	0	0	0	
4/16/2018	VP15-01	65	3.6	17	0	0	
4/16/2018	VP15-02				0		purge back pressure
4/16/2018	VP15-03	380	0	20.9	0	0	purge back pressure
4/16/2018	VP07-02	40	2.1	18.3	0	0	
4/16/2018	VP07-15	490	10.2	8.3	0	0	
4/16/2018	BH101s	250	2.9	14.5	0	0	
4/16/2018	BH101d	490	10.5	1.1	0	0	
4/16/2018	VP07-03	15	0.2	20.9	0	0	
4/16/2018	VP07-16	0	0.2	20.9	0	0	
4/16/2018	VP11-09	2000	11.8	4.1	0	0	
4/16/2018	VP07-20	0	0	20.9	0	0	
4/16/2018	VP07-11	50	1.2	19.4	0	0	
4/16/2018	VP07-19	15	0.7	20.9	0	0	
4/16/2018	VP11-10	60	1.4	18.5	0	0	purge back pressure
4/16/2018	MW07-1	150	0	20.9	0	0	purge back pressure
4/16/2018	VP11-01	75	1	19.4	0	0	
4/16/2018	VP07-12	70	1.4	19.7	0	0	
4/16/2018	VP07-18	35	0.9	19.3	0	0	
4/16/2018	VP07-13	15	0	20.9	0	0	
4/16/2018	VP11-02	15	0.7	20.9	0	0	
4/16/2018	VP07-05	0	0	20.9	0	0	
4/16/2018	VP07-08	30	0.3	19.9	0	0	
4/16/2018	VP07-09	5	0	20.9	0	0	
4/17/2018	VP11-05	105	2.3	17.4	0	0	
4/17/2018	MW99-4	95	2.8	17.3	0	0	
4/17/2018	MW99-3	55	1.5	18.3	0	0	
4/17/2018	MW99-2	85	1.9	17	0	0	
4/17/2018	VP11-04	75	1.7	17.1	0	0	
4/17/2018	VP11-08	165	4.2	13.4	0	0	
4/17/2018	VP11-07	35	1.2	18.7	0	0	
4/17/2018	VP11-06	5	0.6	19.6	0	0	
5/7/2018	VP12-01	45	2.7	17.6	0	0	
5/7/2018	VP07-14	40	3.1	17.5	0	0	
5/7/2018	BH103	230	8	12.3	0	0	
5/7/2018	VP07-01d	0	0	20.6	0	0	

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
5/7/2018	VP07-01s	20	1.2	19.1	0	0	
5/7/2018	BH102	50250	34.5	0	0	0	
5/7/2018	VP15-01	75	4	17.3	0	0	
5/7/2018	VP15-02				0		purge back pressure, No sample
5/7/2018	VP15-03	35	0	20.9	0	0	purge back pressure
5/7/2018	VP07-02	15	1.7	18.5	0	0	
5/7/2018	VP07-15	140	6.7	15.4	0	0	
5/7/2018	BH101s	65	2.6	18.4	0	0	
5/7/2018	BH101d	520	15.2	0.2	0	0	
5/7/2018	VP07-03	0	0.4	20.9	0	0	
5/7/2018	VP07-16	5	0.7	20.9	0	0	
5/7/2018	VP11-09	100	5.3	16.4	0	0	
5/7/2018	VP07-20	20	0.1	20.9	0	0	
5/7/2018	VP07-11	60	1.4	19	0	0	
5/7/2018	VP07-19	15	1.2	20.7	0	0	
5/7/2018	VP11-10	40	1.8	18.9	0	0	purge back pressure
5/7/2018	MW07-1	10	1.3	19.9	0	0	purge back pressure
5/7/2018	VP11-01	30	1.6	19.9	0	0	
5/7/2018	VP07-12	30	1.5	20	0	0	
5/7/2018	VP07-18	0	0	20.9	0	0	
5/7/2018	VP07-13	40	1	19.9	0	0	
5/7/2018	VP11-02	55	1.9	19.3	0	0	
5/7/2018	VP07-05	0	0	20.9	0	0	
5/7/2018	VP07-08	20	0.2	20.9	0	0	
5/7/2018	VP07-09	35	0.1	20.9	0	0	
6/4/2018	BH103	125	4	17.2	0	0	
6/4/2018	BH102	15500	3.5	20.1	0	0	
6/4/2018	VP15-01	40	2.1	18.4	0	0	
6/4/2018	VP15-02	0	0	20.9	0	0	purge back pressure - something covering screens
6/4/2018	VP15-03	0	0	20.8	0	0	slight purge back pressure - possible something covering screens
6/4/2018	VP11-09	25	3	18.3	0	0	
6/4/2018	VP07-11	0	2.2	18.7	0	0	
6/4/2018	VP11-08	180	7.5	13.2	0	0	
6/4/2018	VP11-07	50	1.7	19.5	0	0	
6/4/2018	VP11-06	0	1.1	20.3	0	0	
7/9/2018	BH103	65	2.5	18.4	0	0	
7/9/2018	BH102	65	3.3	17.4	0	0	
7/9/2018	VP15-01	20	1.6	18.8	0	0	
7/9/2018	VP15-02				0		No Sample - purge back pressure - something covering screens

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
7/9/2018	VP15-03	25	0	20.7	0	0	
7/9/2018	VP11-09	0	1.6	18.6	0	0	
7/9/2018	VP07-11				0		No Sample - Decommisioned
7/9/2018	VP11-08	200	7.8	12	0	0	
7/9/2018	VP11-07	0	1.5	18.8	0	0	
7/9/2018	VP11-06	0	0.9	19.2	0	0	
8/13/2018	VP12-01	0	1.4	19.3	0	0	
8/13/2018	VP07-14	65	2.7	18.1	0	0	
8/13/2018	BH103	40	1.8	18.7	0	0	
8/13/2018	VP07-01d	30	1.5	19.1	0	0	
8/13/2018	VP07-01s	15	0.5	20.1	0	0	
8/13/2018	BH102	55	1.6	18.8	0	0	
8/13/2018	VP15-01	40	1.2	19.2	0	0	
8/13/2018	VP15-02				0		purge back pressure, No sample
8/13/2018	VP15-03	30	0	20.9	0	0	purge back pressure
8/13/2018	VP07-02	0	1.1	19.2	0	0	
8/13/2018	VP07-15	60	2.2	18.4	0	0	
8/13/2018	BH101s	60	2	18.5	0	0	
8/13/2018	BH101d	390	14	10.3	0	0	
8/13/2018	VP07-03	15	0.7	19.5	0	0	
8/13/2018	VP07-16	60	2.1	18.2	0	0	
8/13/2018	VP11-09	15	1.1	20.1	0	0	
8/13/2018	VP11-10				0		No sample taken, construction in vacinity, dangerous
8/13/2018	MW07-1	55	1.7	18.8	0	0	
8/13/2018	VP11-01	30	0.3	20.9	0	0	
8/13/2018	VP11-02	25	1.3	19.2	0	0	
8/13/2018	VP07-05	65	2.9	17.9	0	0	
8/13/2018	VP07-08	35	1.1	19.9	0	0	
8/13/2018	VP07-09	0	0.5	19.7	0	0	
8/13/2018	VP11-05	30	1.3	19.3	0	0	
8/13/2018	MW99-4	30	1.7	18.8	0	0	
8/13/2018	MW99-3	5	1.6	18.8	0	0	
8/13/2018	MW99-2	35	1.4	19.2	0	0	
8/13/2018	VP11-04	25	1.2	19.3	0	0	
8/13/2018	VP11-08	300	6.4	13.3	0	0	
8/13/2018	VP11-07	30	1.3	19.5	0	0	
8/13/2018	VP11-06	5	0.8	19.9	0	0	
9/11/2018	BH103	35	1.5	19.4	0	0	
9/11/2018	BH102	30	1.4	19.2	0	0	
9/11/2018	VP15-01	15	1	19.4	0	0	
9/11/2018	VP15-02				0		purge back pressure - something covering screens

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
9/11/2018	VP15-03	0	0	20.9	0	0	slight purge back pressure - possible something covering screens
9/11/2018	VP11-09	5	0.7	19.9	0	0	
9/11/2018	VP11-08	145	5.2	14.8	0	0	
9/11/2018	VP11-07	30	1.1	19.4	0	0	
9/11/2018	VP11-06	0	0.7	19.6	0	0	
10/16/2018	BH103	70	2	18	0	0	
10/16/2018	BH102	260	4.7	15.8	0	0	
10/16/2018	VP15-01	130	1.7	18.9	0	0	
10/16/2018	VP15-02				0		purge back pressure - something covering screens
10/16/2018	VP15-03	115	0	20.9	0	0	slight purge back pressure - possible something covering screens
10/16/2018	VP11-09	25	1.2	19.4	0	0	
10/16/2018	VP11-08	200	4.5	16.4	0	0	
10/16/2018	VP11-07	55	1.5	19.1	0	0	
10/16/2018	VP11-06	25	1.1	19.7	0	0	
11/19/2018	VP12-01	350	2.2	16.8	0	0	
11/19/2018	VP07-14				0		2.0 m water level, no sample
11/19/2018	BH103	140	2.9	15.3	0	0	
11/19/2018	VP07-01d	40	0.7	20.3	0	0	
11/19/2018	VP07-01s	290	1.3	18.3	0	0	
11/19/2018	BH102	41000	11.4	5	0	0	
11/19/2018	VP15-01	85	2.3	17.6	0	0	
11/19/2018	VP15-02				0		purge back pressure
11/19/2018	VP15-03	15	0	20.9	0	0	purge back pressure
11/19/2018	VP07-02	0	1.1	19.3	0	0	
11/19/2018	VP07-15	90	2.8	17	0	0	
11/19/2018	BH101s	95	3.2	17.7	0	0	
11/19/2018	BH101d	350	11.2	9.6	0	0	
11/19/2018	VP07-03	30	1.2	19.9	0	0	
11/19/2018	VP07-16	135	2.4	18.8	0	0	
11/19/2018	VP11-09	55	1.5	18.9	0	0	
11/19/2018	VP11-10	10	0.4	20.7	0	0	
11/19/2018	MW07-1	30	0.9	20.4	0	0	
11/19/2018	VP11-01	15	0.7	20	0	0	
11/19/2018	VP11-02	55	1.7	18.9	0	0	
11/19/2018	VP07-05	25	1.2	18.4	0	0	
11/19/2018	VP07-08	60	0.7	17.6	0	0	
11/19/2018	VP07-09	40	0.2	18.2	0	0	
11/19/2018	VP11-05	195	3.4	16.8	0	0	
11/19/2018	MW99-4	130	3.6	16	0	0	

TABLE B-2

SUMMARY OF SOIL GAS MONITORING RESULTS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Date	Monitor	CH4 (ppm)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Notes
11/19/2018	MW99-3	90	1.5	18.9	0	0	
11/19/2018	MW99-2	70	1.9	18.1	0	0	
11/19/2018	VP11-04	100	1.6	17.6	0	0	
11/19/2018	VP11-08	50	1.7	20	0	0	
11/19/2018	VP11-07	50	1.7	19.3	0	0	
11/19/2018	VP11-06	0	1	20.9	0	0	
12/3/2018	VP12-01	135	2.4	17.2	0	0	
12/3/2018	VP07-14	140	4.8	15	0	0	
12/3/2018	BH103	120	3.3	16	0	0	
12/3/2018	VP07-01d	40	1.5	18.8	0	0	
12/3/2018	VP07-01s	35	1.2	19.7	0	0	
12/3/2018	BH102	38000	21.4	0	0	0	
12/3/2018	VP15-01	70	2.7	17.3	0	0	
12/3/2018	VP15-02				0		purge back pressure
12/3/2018	VP15-03	45	0	20.9	0	0	
12/3/2018	VP07-02	55	1.5	18.4	0	0	
12/3/2018	VP07-15	140	3.6	15.7	0	0	
12/3/2018	BH101s	75	2.4	18.5	0	0	
12/3/2018	BH101d	330	10.5	10.1	0	0	
12/3/2018	VP07-03	5	0.5	20.9	0	0	
12/3/2018	VP07-16	70	2.5	18.7	0	0	
12/3/2018	VP11-09	50	1.5	19.2	0	0	
12/3/2018	VP11-10	5	0.6	20.9	0	0	
12/3/2018	MW07-1	25	1.1	19.7	0	0	
12/3/2018	VP11-01	20	0.8	20.5	0	0	
12/3/2018	VP11-02	55	1.7	19	0	0	
12/3/2018	VP07-05	0	2.2	17.5	0	0	
12/3/2018	VP07-08	10	0.3	20.2	0	0	
12/3/2018	VP07-09	30	0.1	18.2	0	0	
12/3/2018	VP11-05	100	2.8	16.9	0	0	
12/3/2018	MW99-4	135	3.4	16.5	0	0	
12/3/2018	MW99-3	65	1.5	19.4	0	0	
12/3/2018	MW99-2	85	2.3	17.9	0	0	
12/3/2018	VP11-04	75	1.7	17.5	0	0	
12/3/2018	VP11-08	55	1.5	19.9	0	0	
12/3/2018	VP11-07	45	1.6	19.1	0	0	
12/3/2018	VP11-06	20	1	20.2	0	0	

TABLE B-3

GROUNDWATER ELEVATIONS, WESTSIDE LANDFILL, WEST KELOWNA, BC

Monitor	30/01/2018	27/02/2018	17/04/2018	08/05/2018	13/08/2018	19/11/2018	20/11/2018	03/12/2018
BH1	517.217	516.997	517.127	516.922	516.367		516.872	
BH2				524.402			524.217	
BH3				459.638			459.318	
BH4	493.936	493.276	493.331	493.201	492.546		493.546	
BH5	478.081	478.091	478.171	478.136	477.866		477.946	
BH7	496.805	498.385	497.78	497.55	496.62		496.925	
BH8		468.468						
MW99-2	542.435	543.155	543.575	542.76	542.06	542.275	542.27	541.515
MW99-3	534.751	534.691	534.741		534.511	534.521		534.456
MW99-4	531.007	531.667	531.652		531.022	531.022		531.012

APPENDIX C

CARO Laboratory - Certificates of Analysis (COA)

CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Central Okanagan 1450 KLO Road KELOWNA, BC V1W 3Z4		
ATTENTION	Angela Lambrecht	**WORK ORDER**	8050782
PO NUMBER	60167	**RECEIVED / TEMP**	2018-05-08 14:35 / 9°C
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17
PROJECT INFO	041440062	**COC NUMBER**	43220.34210

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 jshanko@caro.ca

Authorized By:

Jennifer Shanko, A.Sc.T.
Account Manager

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BHA (8050782-01) | Matrix: Water | Sampled: 2018-05-08 08:16					
Anions					
Chloride	**98.0**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**3.35**	0.010	mg/L	2018-05-09	
Sulfate	**43.5**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**348**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**348**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.037**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**1030**	2.0	µS/cm	2018-05-10	
pH	**7.63**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**656**	15	mg/L	2018-05-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**430**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00128**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0104**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.111**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000018**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**114**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00017**	0.00010	mg/L	2018-05-14	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-05-14	
Iron, dissolved	**0.013**	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0200**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**35.0**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.00075**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00435**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00159**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**4.60**	0.10	mg/L	2018-05-14	
Selenium, dissolved	**0.00079**	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**12.0**	1.0	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BHA (8050782-01) | Matrix: Water | Sampled: 2018-05-08 08:16, Continued					
Dissolved Metals, Continued					
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**60.4**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**0.676**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**9.4**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	**0.000020**	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.00841**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0036**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00014**	0.00010	mg/L	2018-05-14	
BH1 (8050782-02) | Matrix: Water | Sampled: 2018-05-08 10:25					
Anions					
Chloride	**189**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**0.563**	0.010	mg/L	2018-05-09	
Sulfate	**143**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**399**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**399**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.132**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**1510**	2.0	µS/cm	2018-05-10	
pH	**7.52**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**986**	15	mg/L	2018-05-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**702**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	**0.00029**	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00087**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0256**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH1 (8050782-02) | Matrix: Water | Sampled: 2018-05-08 10:25, Continued					
Dissolved Metals, Continued					
Boron, dissolved	**0.463**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000079**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**180**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00145**	0.00010	mg/L	2018-05-14	
Copper, dissolved	**0.00308**	0.00040	mg/L	2018-05-14	
Iron, dissolved	**0.119**	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0192**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**60.8**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**1.98**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00119**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00740**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**8.12**	0.10	mg/L	2018-05-14	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**14.3**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**68.5**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**1.14**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**48.1**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	**0.000020**	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.00217**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0015**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00038**	0.00010	mg/L	2018-05-14	
BH2 (8050782-03) | Matrix: Water | Sampled: 2018-05-08 11:11					
Anions					
Chloride	**217**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**0.089**	0.010	mg/L	2018-05-09	
Sulfate	**137**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**1450**	1.0	mg/L	2018-05-10	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH2 (8050782-03) | Matrix: Water | Sampled: 2018-05-08 11:11, Continued					
General Parameters, Continued					
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**1450**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.266**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**2970**	2.0	µS/cm	2018-05-10	
pH	**7.26**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**2260**	15	mg/L	2018-05-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1710**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0131**	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00394**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0094**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.329**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000022**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**366**	0.20	mg/L	2018-05-14	
Chromium, dissolved	**0.00152**	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00295**	0.00010	mg/L	2018-05-14	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-05-14	
Iron, dissolved	**2.31**	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0259**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**192**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**8.23**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00546**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.0218**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	**0.142**	0.050	mg/L	2018-05-14	
Potassium, dissolved	**2.15**	0.10	mg/L	2018-05-14	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**22.7**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**124**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**3.10**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**45.7**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH2 (8050782-03) | Matrix: Water | Sampled: 2018-05-08 11:11, Continued					
Dissolved Metals, Continued					
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	**0.00023**	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.00823**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0056**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	**0.0064**	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00515**	0.00010	mg/L	2018-05-14	
BH3 (8050782-04) | Matrix: Water | Sampled: 2018-05-08 08:20					
Anions					
Chloride	**97.9**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**3.33**	0.010	mg/L	2018-05-09	
Sulfate	**42.7**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**346**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**346**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.057**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**995**	2.0	µS/cm	2018-05-10	
pH	**7.51**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**627**	15	mg/L	2018-05-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**454**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00128**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0116**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.126**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000027**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**120**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00017**	0.00010	mg/L	2018-05-14	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH3 (8050782-04) | Matrix: Water | Sampled: 2018-05-08 08:20, Continued					
Dissolved Metals, Continued					
Iron, dissolved	**0.011**	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0209**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**37.2**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.00091**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00429**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00162**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**4.89**	0.10	mg/L	2018-05-14	
Selenium, dissolved	**0.00079**	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**13.1**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**64.0**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**0.712**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**12.4**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.00871**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0038**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00013**	0.00010	mg/L	2018-05-14	
BH4 (8050782-05) | Matrix: Water | Sampled: 2018-05-08 08:35					
Anions					
Chloride	**207**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**0.373**	0.010	mg/L	2018-05-09	
Sulfate	**96.4**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**696**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**696**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.058**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**1880**	2.0	µS/cm	2018-05-10	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH4 (8050782-05) | Matrix: Water | Sampled: 2018-05-08 08:35, Continued					
General Parameters, Continued					
pH	**7.51**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**1230**	15	mg/L	2018-05-14	
Calculated Parameters					
Hardness, Total (as CaCO3)	**930**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0344**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.506**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000051**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**182**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00152**	0.00010	mg/L	2018-05-14	
Copper, dissolved	**0.00057**	0.00040	mg/L	2018-05-14	
Iron, dissolved	< 0.010	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0355**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**115**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.463**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00627**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.0215**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**5.39**	0.10	mg/L	2018-05-14	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**11.3**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**95.9**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**2.03**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**31.2**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	**0.000029**	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.0268**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0037**	0.0010	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH4 (8050782-05) | Matrix: Water | Sampled: 2018-05-08 08:35, Continued					
Dissolved Metals, Continued					
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00053**	0.00010	mg/L	2018-05-14	
BH5 (8050782-06) | Matrix: Water | Sampled: 2018-05-08 08:56					
Anions					
Chloride	**117**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**7.31**	0.010	mg/L	2018-05-09	
Sulfate	**50.5**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**234**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**234**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.048**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**925**	2.0	µS/cm	2018-05-10	
pH	**7.77**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**582**	15	mg/L	2018-05-10	
Calculated Parameters					
Hardness, Total (as CaCO3)	**385**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00130**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0107**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.0586**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000016**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**105**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Copper, dissolved	< 0.00040	0.00040	mg/L	2018-05-14	
Iron, dissolved	< 0.010	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0235**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**29.6**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.00035**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH5 (8050782-06) | Matrix: Water | Sampled: 2018-05-08 08:56, Continued					
Dissolved Metals, Continued					
Molybdenum, dissolved	**0.00817**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00058**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**3.32**	0.10	mg/L	2018-05-14	
Selenium, dissolved	**0.00092**	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**9.4**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**60.0**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**0.465**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**16.3**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.00669**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0058**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
BH7 (8050782-07) | Matrix: Water | Sampled: 2018-05-08 10:52					
Anions					
Chloride	**91.9**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**3.72**	0.010	mg/L	2018-05-09	
Sulfate	**46.8**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**446**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**446**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-05-10	
Conductivity (EC)	**1160**	2.0	µS/cm	2018-05-10	
pH	**7.60**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**715**	15	mg/L	2018-05-10	
Calculated Parameters					
Hardness, Total (as CaCO3)	**491**	0.500	mg/L	N/A	
Dissolved Metals					

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
BH7 (8050782-07) | Matrix: Water | Sampled: 2018-05-08 10:52, Continued					
Dissolved Metals, Continued					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00171**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0209**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.0580**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	**0.000143**	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**126**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00078**	0.00010	mg/L	2018-05-14	
Copper, dissolved	**0.00102**	0.00040	mg/L	2018-05-14	
Iron, dissolved	< 0.010	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0223**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**43.0**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.489**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00250**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00527**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-05-14	
Potassium, dissolved	**2.91**	0.10	mg/L	2018-05-14	
Selenium, dissolved	**0.00108**	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**13.4**	1.0	mg/L	2018-05-14	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**84.6**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**0.716**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	**13.4**	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.0106**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0116**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00021**	0.00010	mg/L	2018-05-14	
MW-99-2 (8050782-08) | Matrix: Water | Sampled: 2018-05-08 10:00					
Anions					

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
MW-99-2 (8050782-08) | Matrix: Water | Sampled: 2018-05-08 10:00, Continued					
Anions, Continued					
Chloride	**37.1**	0.10	mg/L	2018-05-09	
Nitrate (as N)	**0.047**	0.010	mg/L	2018-05-09	
Sulfate	**14.4**	1.0	mg/L	2018-05-09	
General Parameters					
Alkalinity, Total (as CaCO3)	**594**	1.0	mg/L	2018-05-10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Bicarbonate (as CaCO3)	**594**	1.0	mg/L	2018-05-10	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-05-10	
Ammonia, Total (as N)	**0.054**	0.020	mg/L	2018-05-10	
Conductivity (EC)	**1130**	2.0	µS/cm	2018-05-10	
pH	**7.75**	0.10	pH units	2018-05-10	HT2
Solids, Total Dissolved	**675**	15	mg/L	2018-05-10	
Calculated Parameters					
Hardness, Total (as CaCO3)	**578**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0791**	0.0050	mg/L	2018-05-14	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Arsenic, dissolved	**0.00185**	0.00050	mg/L	2018-05-14	
Barium, dissolved	**0.0107**	0.0050	mg/L	2018-05-14	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Boron, dissolved	**0.0168**	0.0050	mg/L	2018-05-14	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-05-14	
Calcium, dissolved	**111**	0.20	mg/L	2018-05-14	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Cobalt, dissolved	**0.00031**	0.00010	mg/L	2018-05-14	
Copper, dissolved	**0.00872**	0.00040	mg/L	2018-05-14	
Iron, dissolved	**0.032**	0.010	mg/L	2018-05-14	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Lithium, dissolved	**0.0388**	0.00010	mg/L	2018-05-14	
Magnesium, dissolved	**73.0**	0.010	mg/L	2018-05-14	
Manganese, dissolved	**0.0320**	0.00020	mg/L	2018-05-14	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-05-13	
Molybdenum, dissolved	**0.00083**	0.00010	mg/L	2018-05-14	
Nickel, dissolved	**0.00074**	0.00040	mg/L	2018-05-14	
Phosphorus, dissolved	**0.050**	0.050	mg/L	2018-05-14	
Potassium, dissolved	**1.81**	0.10	mg/L	2018-05-14	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Silicon, dissolved	**11.9**	1.0	mg/L	2018-05-14	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Analyzed	Qualifier
MW-99-2 (8050782-08) | Matrix: Water | Sampled: 2018-05-08 10:00, Continued					
Dissolved Metals, Continued					
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-05-14	
Sodium, dissolved	**56.9**	0.10	mg/L	2018-05-14	
Strontium, dissolved	**1.49**	0.0010	mg/L	2018-05-14	
Sulfur, dissolved	< 3.0	3.0	mg/L	2018-05-14	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-05-14	
Thallium, dissolved	**0.000026**	0.000020	mg/L	2018-05-14	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-05-14	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-05-14	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-05-14	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-05-14	
Uranium, dissolved	**0.0101**	0.000020	mg/L	2018-05-14	
Vanadium, dissolved	**0.0015**	0.0010	mg/L	2018-05-14	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-05-14	
Zirconium, dissolved	**0.00035**	0.00010	mg/L	2018-05-14	

Sample Qualifiers:

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

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

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 Dissolved in Water	SM 2540 C* (2011)	Gravimetry (Dried at 103-105C)	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
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	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

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 B8E0707										
Blank (B8E0707-BLK1)				Prepared: 2018-05-09, Analyzed: 2018-05-09						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8E0707-BS1)				Prepared: 2018-05-09, Analyzed: 2018-05-09						
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Nitrate (as N)	4.07	0.010	mg/L	4.00		102	93-108			
Sulfate	16.1	1.0	mg/L	16.0		100	91-109			
Dissolved Metals, Batch B8E0877										
Blank (B8E0877-BLK1)				Prepared: 2018-05-10, Analyzed: 2018-05-13						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B8E0877-SRM1)				Prepared: 2018-05-10, Analyzed: 2018-05-13						
Mercury, dissolved	0.00500	0.000010	mg/L	0.00489		102	80-120			
Dissolved Metals, Batch B8E1069										
Blank (B8E1069-BLK1)				Prepared: 2018-05-14, Analyzed: 2018-05-14						
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							

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REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8E1069, Continued										
Blank (B8E1069-BLK1), Continued				Prepared: 2018-05-14, Analyzed: 2018-05-14						
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 (B8E1069-BS1)				Prepared: 2018-05-14, Analyzed: 2018-05-14						
Aluminum, dissolved	0.0226	0.0050	mg/L	0.0200		113	80-120			
Antimony, dissolved	0.0197	0.00020	mg/L	0.0200		98	80-120			
Arsenic, dissolved	0.0188	0.00050	mg/L	0.0200		94	80-120			
Barium, dissolved	0.0179	0.0050	mg/L	0.0200		90	80-120			
Beryllium, dissolved	0.0215	0.00010	mg/L	0.0200		108	80-120			
Bismuth, dissolved	0.0184	0.00010	mg/L	0.0200		92	80-120			
Boron, dissolved	0.0228	0.0050	mg/L	0.0200		114	80-120			
Cadmium, dissolved	0.0188	0.000010	mg/L	0.0200		94	80-120			
Calcium, dissolved	2.16	0.20	mg/L	2.00		108	80-120			
Chromium, dissolved	0.0196	0.00050	mg/L	0.0200		98	80-120			
Cobalt, dissolved	0.0206	0.00010	mg/L	0.0200		103	80-120			
Copper, dissolved	0.0200	0.00040	mg/L	0.0200		100	80-120			
Iron, dissolved	2.09	0.010	mg/L	2.00		104	80-120			
Lead, dissolved	0.0196	0.00020	mg/L	0.0200		98	80-120			
Lithium, dissolved	0.0231	0.00010	mg/L	0.0200		115	80-120			
Magnesium, dissolved	2.03	0.010	mg/L	2.00		102	80-120			
Manganese, dissolved	0.0205	0.00020	mg/L	0.0200		103	80-120			
Molybdenum, dissolved	0.0190	0.00010	mg/L	0.0200		95	80-120			
Nickel, dissolved	0.0204	0.00040	mg/L	0.0200		102	80-120			
Phosphorus, dissolved	2.06	0.050	mg/L	2.00		103	80-120			
Potassium, dissolved	2.18	0.10	mg/L	2.00		109	80-120			
Selenium, dissolved	0.0203	0.00050	mg/L	0.0200		102	80-120			
Silicon, dissolved	2.0	1.0	mg/L	2.00		101	80-120			
Silver, dissolved	0.0194	0.000050	mg/L	0.0200		97	80-120			
Sodium, dissolved	2.15	0.10	mg/L	2.00		108	80-120			
Strontium, dissolved	0.0194	0.0010	mg/L	0.0200		97	80-120			
Sulfur, dissolved	4.9	3.0	mg/L	5.00		99	80-120			
Tellurium, dissolved	0.0178	0.00050	mg/L	0.0200		89	80-120			
Thallium, dissolved	0.0199	0.000020	mg/L	0.0200		100	80-120			
Thorium, dissolved	0.0165	0.00010	mg/L	0.0200		83	80-120			
Tin, dissolved	0.0182	0.00020	mg/L	0.0200		91	80-120			
Titanium, dissolved	0.0219	0.0050	mg/L	0.0200		109	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8E1069, Continued										
LCS (B8E1069-BS1), Continued				Prepared: 2018-05-14, Analyzed: 2018-05-14						
Tungsten, dissolved	0.0163	0.0010	mg/L	0.0200		81	80-120			
Uranium, dissolved	0.0219	0.000020	mg/L	0.0200		109	80-120			
Vanadium, dissolved	0.0200	0.0010	mg/L	0.0200		100	80-120			
Zinc, dissolved	0.0200	0.0040	mg/L	0.0200		100	80-120			
Zirconium, dissolved	0.0186	0.00010	mg/L	0.0200		93	80-120			
Reference (B8E1069-SRM1)				Prepared: 2018-05-14, Analyzed: 2018-05-14						
Aluminum, dissolved	0.232	0.0050	mg/L	0.233		100	79-114			
Antimony, dissolved	0.0452	0.00020	mg/L	0.0430		105	89-123			
Arsenic, dissolved	0.429	0.00050	mg/L	0.438		98	87-113			
Barium, dissolved	3.16	0.0050	mg/L	3.35		94	85-114			
Beryllium, dissolved	0.245	0.00010	mg/L	0.213		115	79-122			
Boron, dissolved	1.84	0.0050	mg/L	1.74		106	79-117			
Cadmium, dissolved	0.216	0.000010	mg/L	0.224		96	89-112			
Calcium, dissolved	8.38	0.20	mg/L	7.69		109	85-120			
Chromium, dissolved	0.460	0.00050	mg/L	0.437		105	87-113			
Cobalt, dissolved	0.136	0.00010	mg/L	0.128		106	90-117			
Copper, dissolved	0.924	0.00040	mg/L	0.844		109	90-115			
Iron, dissolved	1.40	0.010	mg/L	1.29		108	86-112			
Lead, dissolved	0.109	0.00020	mg/L	0.112		97	90-113			
Lithium, dissolved	0.125	0.00010	mg/L	0.104		120	77-127			
Magnesium, dissolved	7.31	0.010	mg/L	6.92		106	84-116			
Manganese, dissolved	0.364	0.00020	mg/L	0.345		106	85-113			
Molybdenum, dissolved	0.420	0.00010	mg/L	0.426		98	87-112			
Nickel, dissolved	0.896	0.00040	mg/L	0.840		107	90-114			
Phosphorus, dissolved	0.537	0.050	mg/L	0.495		108	74-119			
Potassium, dissolved	3.49	0.10	mg/L	3.19		109	78-119			
Selenium, dissolved	0.0345	0.00050	mg/L	0.0331		104	89-123			
Sodium, dissolved	20.1	0.10	mg/L	19.1		105	81-117			
Strontium, dissolved	0.884	0.0010	mg/L	0.916		96	82-111			
Thallium, dissolved	0.0382	0.000020	mg/L	0.0393		97	90-113			
Uranium, dissolved	0.266	0.000020	mg/L	0.266		100	87-113			
Vanadium, dissolved	0.912	0.0010	mg/L	0.869		105	85-110			
Zinc, dissolved	0.883	0.0040	mg/L	0.881		100	88-114			
General Parameters, Batch B8E0794										
Blank (B8E0794-BLK1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Solids, Total Dissolved	< 15	15	mg/L							
LCS (B8E0794-BS1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Solids, Total Dissolved	251	15	mg/L	240		105	85-115			
General Parameters, Batch B8E0799										
Blank (B8E0799-BLK1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
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 (B8E0799-BLK2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Alkalinity, Total (as CaCO3)	< 1.0	1.0	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8050782
PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8E0799, Continued										
Blank (B8E0799-BLK2), Continued				Prepared: 2018-05-10, Analyzed: 2018-05-10						
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 (B8E0799-BS1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Alkalinity, Total (as CaCO3)	99.3	1.0	mg/L	100		99	92-106			
LCS (B8E0799-BS2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Alkalinity, Total (as CaCO3)	99.8	1.0	mg/L	100		100	92-106			
LCS (B8E0799-BS3)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
LCS (B8E0799-BS4)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Conductivity (EC)	1410	2.0	µS/cm	1410		100	95-104			
Reference (B8E0799-SRM1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
pH	7.02	0.10	pH units	7.01		100	98-102			
Reference (B8E0799-SRM2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
pH	7.00	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B8E0844										
Blank (B8E0844-BLK1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
LCS (B8E0844-BS1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Ammonia, Total (as N)	1.01	0.020	mg/L	1.00		101	90-115			
General Parameters, Batch B8E0882										
Blank (B8E0882-BLK1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B8E0882-BLK2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
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 (B8E0882-BLK3)				Prepared: 2018-05-11, Analyzed: 2018-05-11						
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 (B8E0882-BS2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Alkalinity, Total (as CaCO3)	101	1.0	mg/L	100		101	92-106			

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PROJECT	Westside Landfill	**REPORTED**	2018-05-15 12:17

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8E0882, Continued										
LCS (B8E0882-BS3)				Prepared: 2018-05-11, Analyzed: 2018-05-11						
Alkalinity, Total (as CaCO3)	101	1.0	mg/L	100		101	92-106			
LCS (B8E0882-BS4)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Conductivity (EC)	1400	2.0	µS/cm	1410		100	95-104			
LCS (B8E0882-BS5)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
Conductivity (EC)	1420	2.0	µS/cm	1410		101	95-104			
LCS (B8E0882-BS6)				Prepared: 2018-05-11, Analyzed: 2018-05-11						
Conductivity (EC)	1420	2.0	µS/cm	1410		100	95-104			
Reference (B8E0882-SRM1)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
pH	7.00	0.10	pH units	7.01		100	98-102			
Reference (B8E0882-SRM2)				Prepared: 2018-05-10, Analyzed: 2018-05-10						
pH	7.01	0.10	pH units	7.01		100	98-102			
Reference (B8E0882-SRM3)				Prepared: 2018-05-11, Analyzed: 2018-05-11						
pH	7.00	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B8E0992										
Blank (B8E0992-BLK1)				Prepared: 2018-05-14, Analyzed: 2018-05-14						
Solids, Total Dissolved	< 15	15	mg/L							
LCS (B8E0992-BS1)				Prepared: 2018-05-14, Analyzed: 2018-05-14						
Solids, Total Dissolved	253	15	mg/L	240		105	85-115			

CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Central Okanagan 1450 KLO Road KELOWNA, BC V1W 3Z4		
ATTENTION	Angela Lambrecht	**WORK ORDER**	8111608
PO NUMBER	60167	**RECEIVED / TEMP**	2018-11-20 14:00 / 7°C
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07
PROJECT INFO	041440062	**COC NUMBER**	43419.57721

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	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BHA (8111608-01) | Matrix: Water | Sampled: 2018-11-20 09:50					
Anions					
Chloride	**80.7**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**2.59**	0.010	mg/L	2018-11-21	
Sulfate	**38.4**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**362**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0062**	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00150**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0106**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.0731**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000020**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**93.4**	0.20	mg/L	2018-11-25	
Chromium, dissolved	**0.00063**	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00013**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00151**	0.00040	mg/L	2018-11-25	
Iron, dissolved	**0.011**	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0179**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**31.1**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.00431**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00414**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.00154**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**3.81**	0.10	mg/L	2018-11-25	
Selenium, dissolved	**0.00064**	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**13.3**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**49.1**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**0.596**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**13.1**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00730**	0.000020	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BHA (8111608-01) | Matrix: Water | Sampled: 2018-11-20 09:50, Continued					
Dissolved Metals, Continued					
Vanadium, dissolved	**0.0038**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	**0.0042**	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00010**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**351**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**351**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.043**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**906**	2.0	µS/cm	2018-11-21	
pH	**7.54**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**548**	15	mg/L	2018-11-23	
BH1 (8111608-02) | Matrix: Water | Sampled: 2018-11-20 10:50					
Anions					
Chloride	**117**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**26.7**	0.010	mg/L	2018-11-21	
Sulfate	**205**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**677**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Antimony, dissolved	**0.00032**	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00101**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0356**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.710**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000120**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**172**	0.20	mg/L	2018-11-25	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00166**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.0103**	0.00040	mg/L	2018-11-25	
Iron, dissolved	**0.034**	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0216**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**59.7**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**1.59**	0.00020	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH1 (8111608-02) | Matrix: Water | Sampled: 2018-11-20 10:50, Continued					
Dissolved Metals, Continued					
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00187**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.0124**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**9.01**	0.10	mg/L	2018-11-25	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**17.7**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**94.3**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**1.19**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**78.5**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00296**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	**0.0018**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00039**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**431**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**431**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.184**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**1570**	2.0	µS/cm	2018-11-21	
pH	**7.42**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**1100**	15	mg/L	2018-11-23	
BH2 (8111608-03) | Matrix: Water | Sampled: 2018-11-20 10:25					
Anions					
Chloride	**217**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**0.344**	0.010	mg/L	2018-11-21	
Sulfate	**79.3**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**1690**	0.500	mg/L	N/A	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH2 (8111608-03) | Matrix: Water | Sampled: 2018-11-20 10:25, Continued					
Dissolved Metals					
Aluminum, dissolved	**0.0113**	0.0050	mg/L	2018-11-25	
Antimony, dissolved	**0.00021**	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00523**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0120**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.399**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**350**	0.20	mg/L	2018-11-25	
Chromium, dissolved	**0.00235**	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00253**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00057**	0.00040	mg/L	2018-11-25	
Iron, dissolved	**2.35**	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0277**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**198**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**7.69**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00419**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.0214**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	**0.150**	0.050	mg/L	2018-11-25	
Potassium, dissolved	**2.45**	0.10	mg/L	2018-11-25	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**29.4**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**134**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**3.04**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**33.3**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	**0.00020**	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00634**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	**0.0077**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	**0.0064**	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00525**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**1610**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**1610**	1.0	mg/L	2018-11-21	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH2 (8111608-03) | Matrix: Water | Sampled: 2018-11-20 10:25, Continued					
General Parameters, Continued					
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.323**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**3030**	2.0	µS/cm	2018-11-21	
pH	**7.34**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**1980**	15	mg/L	2018-11-23	
BH3 (8111608-04) | Matrix: Water | Sampled: 2018-11-20 09:49					
Anions					
Chloride	**78.4**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**2.57**	0.010	mg/L	2018-11-21	
Sulfate	**38.2**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**375**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00151**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0111**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.0938**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000013**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**97.0**	0.20	mg/L	2018-11-25	
Chromium, dissolved	**0.00060**	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00014**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00114**	0.00040	mg/L	2018-11-25	
Iron, dissolved	< 0.010	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0184**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**32.3**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.00458**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00431**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.00147**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**3.92**	0.10	mg/L	2018-11-25	
Selenium, dissolved	**0.00071**	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**13.7**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH3 (8111608-04) | Matrix: Water | Sampled: 2018-11-20 09:49, Continued					
Dissolved Metals, Continued					
Sodium, dissolved	**50.8**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**0.608**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**14.5**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00744**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	**0.0039**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**357**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**357**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-11-23	
Conductivity (EC)	**928**	2.0	µS/cm	2018-11-21	
pH	**7.56**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**547**	15	mg/L	2018-11-23	
BH4 (8111608-05) | Matrix: Water | Sampled: 2018-11-20 09:20					
Anions					
Chloride	**211**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**0.398**	0.010	mg/L	2018-11-21	
Sulfate	**94.0**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**867**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0427**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.467**	0.0050	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH4 (8111608-05) | Matrix: Water | Sampled: 2018-11-20 09:20, Continued					
Dissolved Metals, Continued					
Cadmium, dissolved	**0.000080**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**164**	0.20	mg/L	2018-11-25	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00171**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00207**	0.00040	mg/L	2018-11-25	
Iron, dissolved	< 0.010	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0367**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**111**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.325**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00680**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.0217**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**5.20**	0.10	mg/L	2018-11-25	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**13.1**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**95.1**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**1.90**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**36.5**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	**0.000033**	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.0301**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	**0.0035**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00052**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**703**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**703**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	< 0.020	0.020	mg/L	2018-11-23	
Conductivity (EC)	**1860**	2.0	µS/cm	2018-11-21	
pH	**7.56**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**1110**	15	mg/L	2018-11-23	

CARO ANALYTICAL SERVICES

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH5 (8111608-06) | Matrix: Water | Sampled: 2018-11-20 09:40					
Anions					
Chloride	**178**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**11.1**	0.010	mg/L	2018-11-21	
Sulfate	**56.3**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**423**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00115**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0155**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.0635**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000013**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**113**	0.20	mg/L	2018-11-25	
Chromium, dissolved	**0.00058**	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00089**	0.00040	mg/L	2018-11-25	
Iron, dissolved	< 0.010	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0221**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**34.1**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.00213**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00699**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.00078**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**2.95**	0.10	mg/L	2018-11-25	
Selenium, dissolved	**0.00108**	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**10.3**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**58.0**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**0.537**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**21.9**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00674**	0.000020	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH5 (8111608-06) | Matrix: Water | Sampled: 2018-11-20 09:40, Continued					
Dissolved Metals, Continued					
Vanadium, dissolved	**0.0050**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**234**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**234**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.037**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**1120**	2.0	µS/cm	2018-11-21	
pH	**7.75**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**699**	15	mg/L	2018-11-23	
BH7 (8111608-07) | Matrix: Water | Sampled: 2018-11-20 10:03					
Anions					
Chloride	**83.8**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**3.09**	0.010	mg/L	2018-11-21	
Sulfate	**53.2**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**509**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	**0.0088**	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00208**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0225**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.0588**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000128**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**127**	0.20	mg/L	2018-11-25	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00088**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00271**	0.00040	mg/L	2018-11-25	
Iron, dissolved	**0.020**	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0220**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**46.5**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.487**	0.00020	mg/L	2018-11-25	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
BH7 (8111608-07) | Matrix: Water | Sampled: 2018-11-20 10:03, Continued					
Dissolved Metals, Continued					
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00269**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.00646**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**2.71**	0.10	mg/L	2018-11-25	
Selenium, dissolved	**0.00076**	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**15.0**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**75.5**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**0.766**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**20.2**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.0128**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	**0.0134**	0.0010	mg/L	2018-11-25	
Zinc, dissolved	**0.0051**	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00026**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**508**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**508**	1.0	mg/L	2018-11-21	
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.020**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**1210**	2.0	µS/cm	2018-11-21	
pH	**7.61**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**717**	15	mg/L	2018-11-23	
MW99-2 (8111608-08) | Matrix: Water | Sampled: 2018-11-20 11:10					
Anions					
Chloride	**113**	0.10	mg/L	2018-11-21	
Nitrate (as N)	**0.074**	0.010	mg/L	2018-11-21	
Sulfate	**15.6**	1.0	mg/L	2018-11-21	
Calculated Parameters					
Hardness, Total (as CaCO3)	**660**	0.500	mg/L	N/A	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Analyzed	Qualifier
MW99-2 (8111608-08) | Matrix: Water | Sampled: 2018-11-20 11:10, Continued					
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Arsenic, dissolved	**0.00067**	0.00050	mg/L	2018-11-25	
Barium, dissolved	**0.0086**	0.0050	mg/L	2018-11-25	
Beryllium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Bismuth, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Boron, dissolved	**0.0254**	0.0050	mg/L	2018-11-25	
Cadmium, dissolved	**0.000021**	0.000010	mg/L	2018-11-25	
Calcium, dissolved	**118**	0.20	mg/L	2018-11-25	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Cobalt, dissolved	**0.00062**	0.00010	mg/L	2018-11-25	
Copper, dissolved	**0.00233**	0.00040	mg/L	2018-11-25	
Iron, dissolved	**0.257**	0.010	mg/L	2018-11-25	
Lead, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Lithium, dissolved	**0.0457**	0.00010	mg/L	2018-11-25	
Magnesium, dissolved	**88.8**	0.010	mg/L	2018-11-25	
Manganese, dissolved	**0.123**	0.00020	mg/L	2018-11-25	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2018-11-23	
Molybdenum, dissolved	**0.00073**	0.00010	mg/L	2018-11-25	
Nickel, dissolved	**0.00063**	0.00040	mg/L	2018-11-25	
Phosphorus, dissolved	< 0.050	0.050	mg/L	2018-11-25	
Potassium, dissolved	**0.69**	0.10	mg/L	2018-11-25	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Silicon, dissolved	**8.9**	1.0	mg/L	2018-11-25	
Silver, dissolved	< 0.000050	0.000050	mg/L	2018-11-25	
Sodium, dissolved	**49.5**	0.10	mg/L	2018-11-25	
Strontium, dissolved	**1.67**	0.0010	mg/L	2018-11-25	
Sulfur, dissolved	**9.1**	3.0	mg/L	2018-11-25	
Tellurium, dissolved	< 0.00050	0.00050	mg/L	2018-11-25	
Thallium, dissolved	< 0.000020	0.000020	mg/L	2018-11-25	
Thorium, dissolved	< 0.00010	0.00010	mg/L	2018-11-25	
Tin, dissolved	< 0.00020	0.00020	mg/L	2018-11-25	
Titanium, dissolved	< 0.0050	0.0050	mg/L	2018-11-25	
Tungsten, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Uranium, dissolved	**0.00784**	0.000020	mg/L	2018-11-25	
Vanadium, dissolved	< 0.0010	0.0010	mg/L	2018-11-25	
Zinc, dissolved	**0.0070**	0.0040	mg/L	2018-11-25	
Zirconium, dissolved	**0.00039**	0.00010	mg/L	2018-11-25	
General Parameters					
Alkalinity, Total (as CaCO3)	**622**	1.0	mg/L	2018-11-21	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Bicarbonate (as CaCO3)	**622**	1.0	mg/L	2018-11-21	

TEST RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
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Analyte	Result	RL	Units	Analyzed	Qualifier
MW99-2 (8111608-08) | Matrix: Water | Sampled: 2018-11-20 11:10, Continued					
General Parameters, Continued					
Alkalinity, Carbonate (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	1.0	mg/L	2018-11-21	
Ammonia, Total (as N)	**0.090**	0.020	mg/L	2018-11-23	
Conductivity (EC)	**1350**	2.0	µS/cm	2018-11-21	
pH	**7.76**	0.10	pH units	2018-11-21	HT2
Solids, Total Dissolved	**736**	15	mg/L	2018-11-23	

Sample Qualifiers:

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

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

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 Dissolved in Water	SM 2540 C* (2011)	Gravimetry (Dried at 103-105C)	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
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	Regional District of Central Okanagan	**WORK ORDER**	8111608
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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 "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 B8K1601										
Blank (B8K1601-BLK1)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B8K1601-BLK2)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Chloride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.010	0.010	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B8K1601-BS1)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Chloride	16.1	0.10	mg/L	16.0		100	90-110			
Nitrate (as N)	3.92	0.010	mg/L	4.00		98	93-108			
Sulfate	16.0	1.0	mg/L	16.0		100	91-109			
LCS (B8K1601-BS2)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Chloride	16.1	0.10	mg/L	16.0		101	90-110			
Nitrate (as N)	4.01	0.010	mg/L	4.00		100	93-108			
Sulfate	16.2	1.0	mg/L	16.0		101	91-109			
Dissolved Metals, Batch B8K1783										
Blank (B8K1783-BLK1)				Prepared: 2018-11-22, Analyzed: 2018-11-23						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B8K1783-BLK2)				Prepared: 2018-11-22, Analyzed: 2018-11-23						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Reference (B8K1783-SRM1)				Prepared: 2018-11-22, Analyzed: 2018-11-23						
Mercury, dissolved	0.00498	0.000010	mg/L	0.00489		102	80-120			
Reference (B8K1783-SRM2)				Prepared: 2018-11-22, Analyzed: 2018-11-23						
Mercury, dissolved	0.00492	0.000010	mg/L	0.00489		101	80-120			
Dissolved Metals, Batch B8K1858										

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8K1858, Continued										
Blank (B8K1858-BLK1)				Prepared: 2018-11-25, Analyzed: 2018-11-25						
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							
Blank (B8K1858-BLK2)				Prepared: 2018-11-25, Analyzed: 2018-11-25						
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							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8K1858, Continued										
Blank (B8K1858-BLK2), Continued				Prepared: 2018-11-25, Analyzed: 2018-11-25						
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 (B8K1858-BLK3)				Prepared: 2018-11-25, Analyzed: 2018-11-25						
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							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8K1858, Continued										
Blank (B8K1858-BLK3), Continued				Prepared: 2018-11-25, Analyzed: 2018-11-25						
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 (B8K1858-BS1)				Prepared: 2018-11-25, Analyzed: 2018-11-25						
Aluminum, dissolved	0.0240	0.0050	mg/L	0.0200		120	80-120			
Antimony, dissolved	0.0204	0.00020	mg/L	0.0200		102	80-120			
Arsenic, dissolved	0.0222	0.00050	mg/L	0.0200		111	80-120			
Barium, dissolved	0.0201	0.0050	mg/L	0.0200		100	80-120			
Beryllium, dissolved	0.0217	0.00010	mg/L	0.0200		109	80-120			
Bismuth, dissolved	0.0211	0.00010	mg/L	0.0200		105	80-120			
Boron, dissolved	0.0188	0.0050	mg/L	0.0200		94	80-120			
Cadmium, dissolved	0.0208	0.000010	mg/L	0.0200		104	80-120			
Calcium, dissolved	2.09	0.20	mg/L	2.00		104	80-120			
Chromium, dissolved	0.0219	0.00050	mg/L	0.0200		109	80-120			
Cobalt, dissolved	0.0222	0.00010	mg/L	0.0200		111	80-120			
Copper, dissolved	0.0224	0.00040	mg/L	0.0200		112	80-120			
Iron, dissolved	1.94	0.010	mg/L	2.00		97	80-120			
Lead, dissolved	0.0213	0.00020	mg/L	0.0200		107	80-120			
Lithium, dissolved	0.0221	0.00010	mg/L	0.0200		110	80-120			
Magnesium, dissolved	2.06	0.010	mg/L	2.00		103	80-120			
Manganese, dissolved	0.0186	0.00020	mg/L	0.0200		93	80-120			
Molybdenum, dissolved	0.0197	0.00010	mg/L	0.0200		99	80-120			
Nickel, dissolved	0.0218	0.00040	mg/L	0.0200		109	80-120			
Phosphorus, dissolved	2.16	0.050	mg/L	2.00		108	80-120			
Potassium, dissolved	2.01	0.10	mg/L	2.00		100	80-120			
Selenium, dissolved	0.0223	0.00050	mg/L	0.0200		112	80-120			
Silicon, dissolved	2.1	1.0	mg/L	2.00		106	80-120			
Silver, dissolved	0.0204	0.000050	mg/L	0.0200		102	80-120			
Sodium, dissolved	1.97	0.10	mg/L	2.00		98	80-120			
Strontium, dissolved	0.0183	0.0010	mg/L	0.0200		91	80-120			
Sulfur, dissolved	4.8	3.0	mg/L	5.00		96	80-120			
Tellurium, dissolved	0.0209	0.00050	mg/L	0.0200		105	80-120			
Thallium, dissolved	0.0213	0.000020	mg/L	0.0200		106	80-120			
Thorium, dissolved	0.0207	0.00010	mg/L	0.0200		104	80-120			
Tin, dissolved	0.0210	0.00020	mg/L	0.0200		105	80-120			
Titanium, dissolved	0.0217	0.0050	mg/L	0.0200		108	80-120			
Tungsten, dissolved	0.0186	0.0010	mg/L	0.0200		93	80-120			
Uranium, dissolved	0.0211	0.000020	mg/L	0.0200		105	80-120			
Vanadium, dissolved	0.0215	0.0010	mg/L	0.0200		108	80-120			
Zinc, dissolved	0.0238	0.0040	mg/L	0.0200		119	80-120			
Zirconium, dissolved	0.0221	0.00010	mg/L	0.0200		110	80-120			
Duplicate (B8K1858-DUP1)		**Source: 8111608-01**		Prepared: 2018-11-25, Analyzed: 2018-11-25						
Aluminum, dissolved	< 0.0050	0.0050	mg/L		0.0062				11	
Antimony, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Arsenic, dissolved	0.00147	0.00050	mg/L		0.00150				8	
Barium, dissolved	0.0103	0.0050	mg/L		0.0106				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	0.0775	0.0050	mg/L		0.0731			6	13	
Cadmium, dissolved	0.000014	0.000010	mg/L		0.000020				20	
Calcium, dissolved	92.8	0.20	mg/L		93.4			< 1	8	
Chromium, dissolved	0.00059	0.00050	mg/L		0.00063				14	
Cobalt, dissolved	0.00014	0.00010	mg/L		0.00013				10	
Copper, dissolved	0.00111	0.00040	mg/L		0.00151				20	

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B8K1858, Continued										
Duplicate (B8K1858-DUP1), Continued		**Source: 8111608-01**		Prepared: 2018-11-25, Analyzed: 2018-11-25						
Iron, dissolved	< 0.010	0.010	mg/L		0.011				14	
Lead, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Lithium, dissolved	0.0176	0.00010	mg/L		0.0179			2	14	
Magnesium, dissolved	31.7	0.010	mg/L		31.1			2	6	
Manganese, dissolved	0.00430	0.00020	mg/L		0.00431			< 1	9	
Molybdenum, dissolved	0.00417	0.00010	mg/L		0.00414			< 1	19	
Nickel, dissolved	0.00141	0.00040	mg/L		0.00154				20	
Phosphorus, dissolved	< 0.050	0.050	mg/L		< 0.050				14	
Potassium, dissolved	3.81	0.10	mg/L		3.81			< 1	8	
Selenium, dissolved	0.00073	0.00050	mg/L		0.00064				20	
Silicon, dissolved	13.4	1.0	mg/L		13.3			1	12	
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050				20	
Sodium, dissolved	49.8	0.10	mg/L		49.1			1	6	
Strontium, dissolved	0.595	0.0010	mg/L		0.596			< 1	6	
Sulfur, dissolved	13.0	3.0	mg/L		13.1				20	
Tellurium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Thallium, dissolved	< 0.000020	0.000020	mg/L		< 0.000020				13	
Thorium, dissolved	< 0.00010	0.00010	mg/L		< 0.00010				20	
Tin, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				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	0.00734	0.000020	mg/L		0.00730			< 1	14	
Vanadium, dissolved	0.0037	0.0010	mg/L		0.0038				20	
Zinc, dissolved	< 0.0040	0.0040	mg/L		0.0042				11	
Zirconium, dissolved	0.00010	0.00010	mg/L		0.00010				20	
Reference (B8K1858-SRM1)				Prepared: 2018-11-25, Analyzed: 2018-11-25						
Aluminum, dissolved	0.240	0.0050	mg/L	0.233		103	79-114			
Antimony, dissolved	0.0452	0.00020	mg/L	0.0430		105	89-123			
Arsenic, dissolved	0.476	0.00050	mg/L	0.438		109	87-113			
Barium, dissolved	3.09	0.0050	mg/L	3.35		92	85-114			
Beryllium, dissolved	0.221	0.00010	mg/L	0.213		104	79-122			
Boron, dissolved	1.57	0.0050	mg/L	1.74		90	79-117			
Cadmium, dissolved	0.222	0.000010	mg/L	0.224		99	89-112			
Calcium, dissolved	7.06	0.20	mg/L	7.69		92	85-120			
Chromium, dissolved	0.457	0.00050	mg/L	0.437		105	87-113			
Cobalt, dissolved	0.134	0.00010	mg/L	0.128		105	90-117			
Copper, dissolved	0.887	0.00040	mg/L	0.844		105	90-115			
Iron, dissolved	1.22	0.010	mg/L	1.29		95	86-112			
Lead, dissolved	0.112	0.00020	mg/L	0.112		100	90-113			
Lithium, dissolved	0.108	0.00010	mg/L	0.104		104	77-127			
Magnesium, dissolved	6.60	0.010	mg/L	6.92		95	84-116			
Manganese, dissolved	0.303	0.00020	mg/L	0.345		88	85-113			
Molybdenum, dissolved	0.420	0.00010	mg/L	0.426		99	87-112			
Nickel, dissolved	0.894	0.00040	mg/L	0.840		106	90-114			
Phosphorus, dissolved	0.482	0.050	mg/L	0.495		97	74-119			
Potassium, dissolved	2.87	0.10	mg/L	3.19		90	78-119			
Selenium, dissolved	0.0360	0.00050	mg/L	0.0331		109	89-123			
Sodium, dissolved	17.6	0.10	mg/L	19.1		92	81-117			
Strontium, dissolved	0.834	0.0010	mg/L	0.916		91	82-111			
Thallium, dissolved	0.0395	0.000020	mg/L	0.0393		100	90-113			
Uranium, dissolved	0.248	0.000020	mg/L	0.266		93	87-113			
Vanadium, dissolved	0.908	0.0010	mg/L	0.869		105	85-110			
Zinc, dissolved	0.919	0.0040	mg/L	0.881		104	88-114			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8K1692										
Blank (B8K1692-BLK1)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8K1692-BLK2)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
Blank (B8K1692-BLK3)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	< 0.020	0.020	mg/L							
LCS (B8K1692-BS1)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	1.06	0.020	mg/L	1.00		106	90-115			
LCS (B8K1692-BS2)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	1.01	0.020	mg/L	1.00		101	90-115			
LCS (B8K1692-BS3)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	1.00	0.020	mg/L	1.00		100	90-115			
Duplicate (B8K1692-DUP1)		**Source: 8111608-05**		Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	< 0.020	0.020	mg/L		< 0.020				15	
Matrix Spike (B8K1692-MS1)		**Source: 8111608-05**		Prepared: 2018-11-23, Analyzed: 2018-11-23						
Ammonia, Total (as N)	0.250	0.020	mg/L	0.250	< 0.020	97	75-125			
General Parameters, Batch B8K1712										
Blank (B8K1712-BLK1)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
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 (B8K1712-BS1)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Alkalinity, Total (as CaCO3)	105	1.0	mg/L	100		105	92-106			
LCS (B8K1712-BS2)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
Conductivity (EC)	1400	2.0	µS/cm	1410		99	95-104			
Duplicate (B8K1712-DUP1)		**Source: 8111608-08**		Prepared: 2018-11-21, Analyzed: 2018-11-21						
Alkalinity, Total (as CaCO3)	612	1.0	mg/L		622			2	10	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0	mg/L		< 1.0				10	
Alkalinity, Bicarbonate (as CaCO3)	612	1.0	mg/L		622			2	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)	1350	2.0	µS/cm		1350			< 1	5	
pH	7.77	0.10	pH units		7.76			< 1	4	
Reference (B8K1712-SRM1)				Prepared: 2018-11-21, Analyzed: 2018-11-21						
pH	7.00	0.10	pH units	7.01		100	98-102			
General Parameters, Batch B8K1731										
Blank (B8K1731-BLK1)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Solids, Total Dissolved	< 15	15	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Regional District of Central Okanagan	**WORK ORDER**	8111608
PROJECT	Westside Landfill	**REPORTED**	2018-11-27 13:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B8K1731, Continued										
LCS (B8K1731-BS1)				Prepared: 2018-11-23, Analyzed: 2018-11-23						
Solids, Total Dissolved	243	15	mg/L	240		101	85-115			
Duplicate (B8K1731-DUP1)			**Source: 8111608-03**	Prepared: 2018-11-23, Analyzed: 2018-11-23						
Solids, Total Dissolved	1950	15	mg/L		1980			2	16	

APPENDIX D

QA/QC Results, Westside Landfill
West Kelowna, BC

1.0 Methods

The following discussion includes a brief summary of the Quality Assurance and Quality Control (QA/QC) procedures established for the field groundwater sampling program and for review of the data, as well as the QA/QC measures implemented by the analytical laboratory. The Regional District of Central Okanagan was responsible for collection and submission of groundwater samples for analysis, and for following appropriate protocols.

The Quality Assurance (QA) measures established for the field program included:

Submission of blind field duplicate samples for a minimum of 10% of the samples analyzed. A blind field duplicate sample is a second sample from a specific monitoring location that is submitted to the analytical lab without identifying the location to the laboratory.

The relative percent difference (RPD) between field duplicate sample results was used to assess duplicate sample data. The RPD is a measure of the variability between two outcomes from the same procedure or process and is calculated by

$$absolute\left(\frac{(x_1 - x_2)}{average(x_1, x_2)}\right) \times 100$$

where x_1 is the original sample result and x_2 is the blind field duplicate result.

In general, the RPD should not be more than 20% for inorganics in groundwater. If analytical results are within five times the reported analytical detection limit (RADL, or RDL) for the parameter, then calculation of the RPD is not a valid means of assessing laboratory bias.

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

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

Reports from the lab are internally reviewed prior to submission. If internal QA/QC problems are encountered, the field samples and internal QA/QC samples are re-analysed. No samples were re-analysed for this field investigation. The results are included in the analytical laboratory reports, provided in Appendix C.

Paired Groundwater Analysis

A total of two duplicate water samples were collected during the 2018 monitoring program, one for each sampling event, satisfying the requirement of at least 10% duplicate samples. The duplicate water samples were labelled BHA and were collected from monitoring wells BH3 for the 8 May 2018 round and from BH3 for the 18 November 2018 round. The results for the sample and duplicate are presented in Figures D-1 and D-2, for the May and November results, respectively.

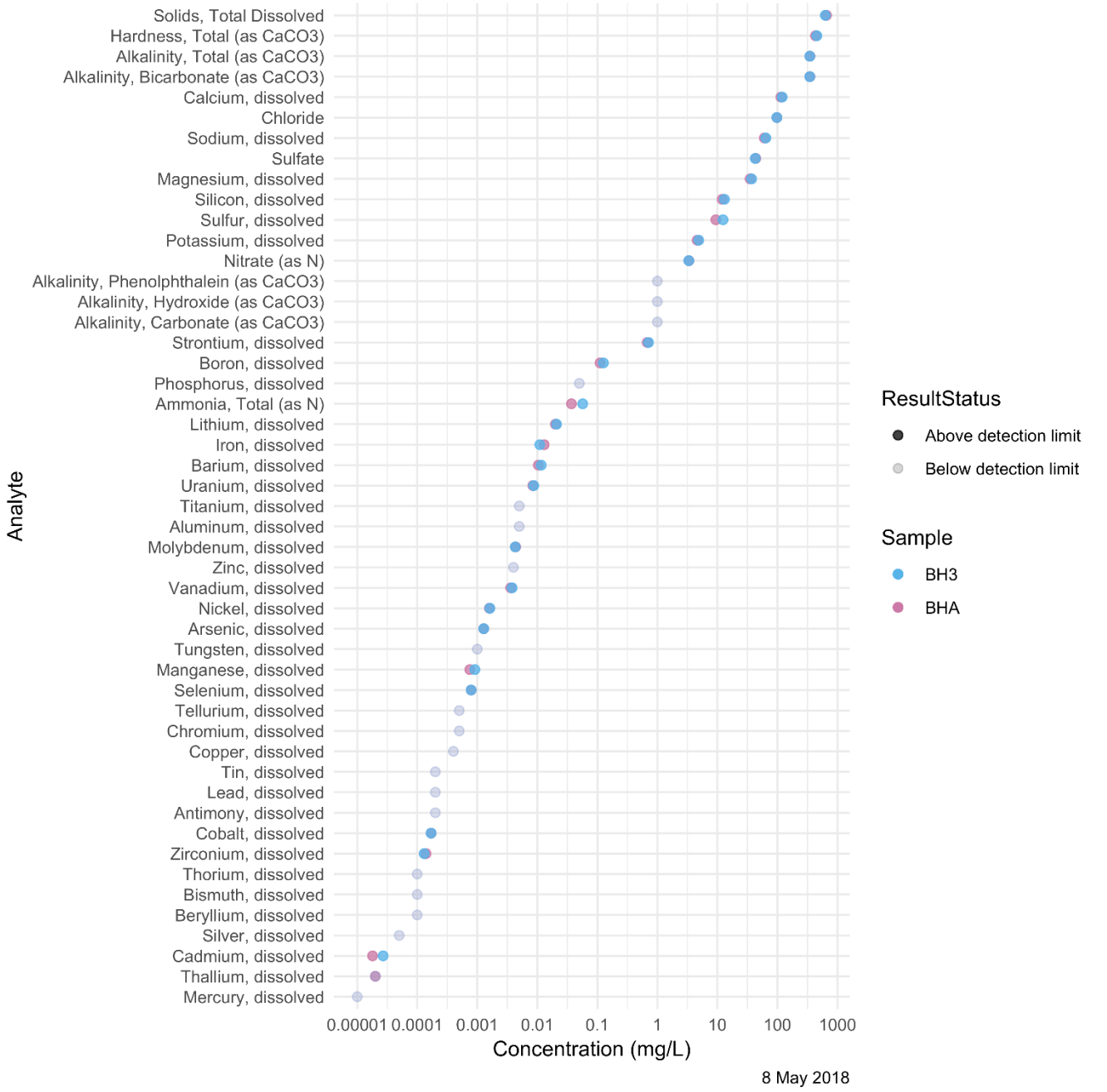


Figure D-1 - May 2018 Results

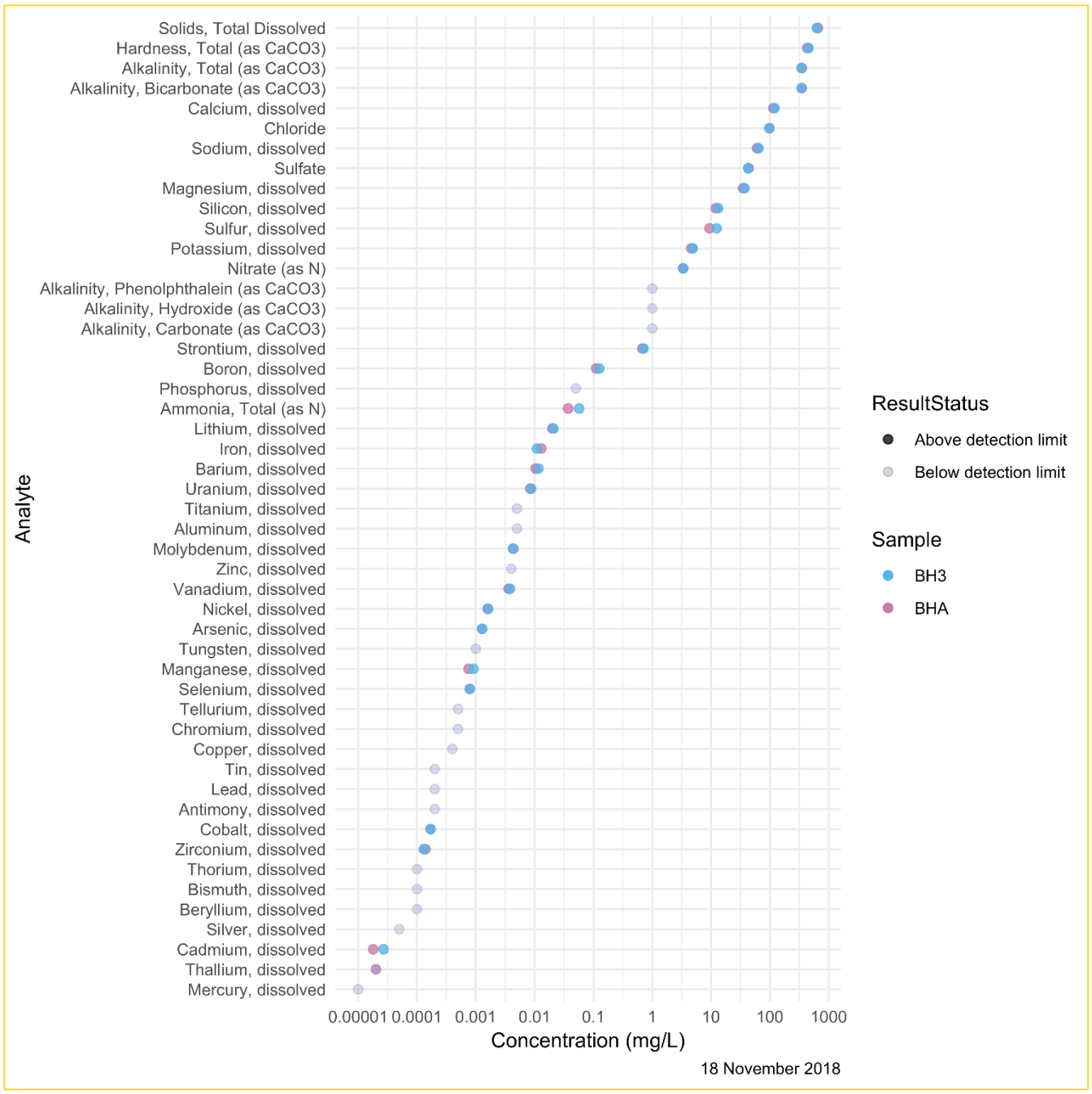


Figure D-2 - November 2018 Results

Calculations of RPD are provided in Table D1, Appendix D. Only the results for dissolved Boron in November exceed a 20% RPD. Since boron levels were not above drinking water standard, no resampling is required.

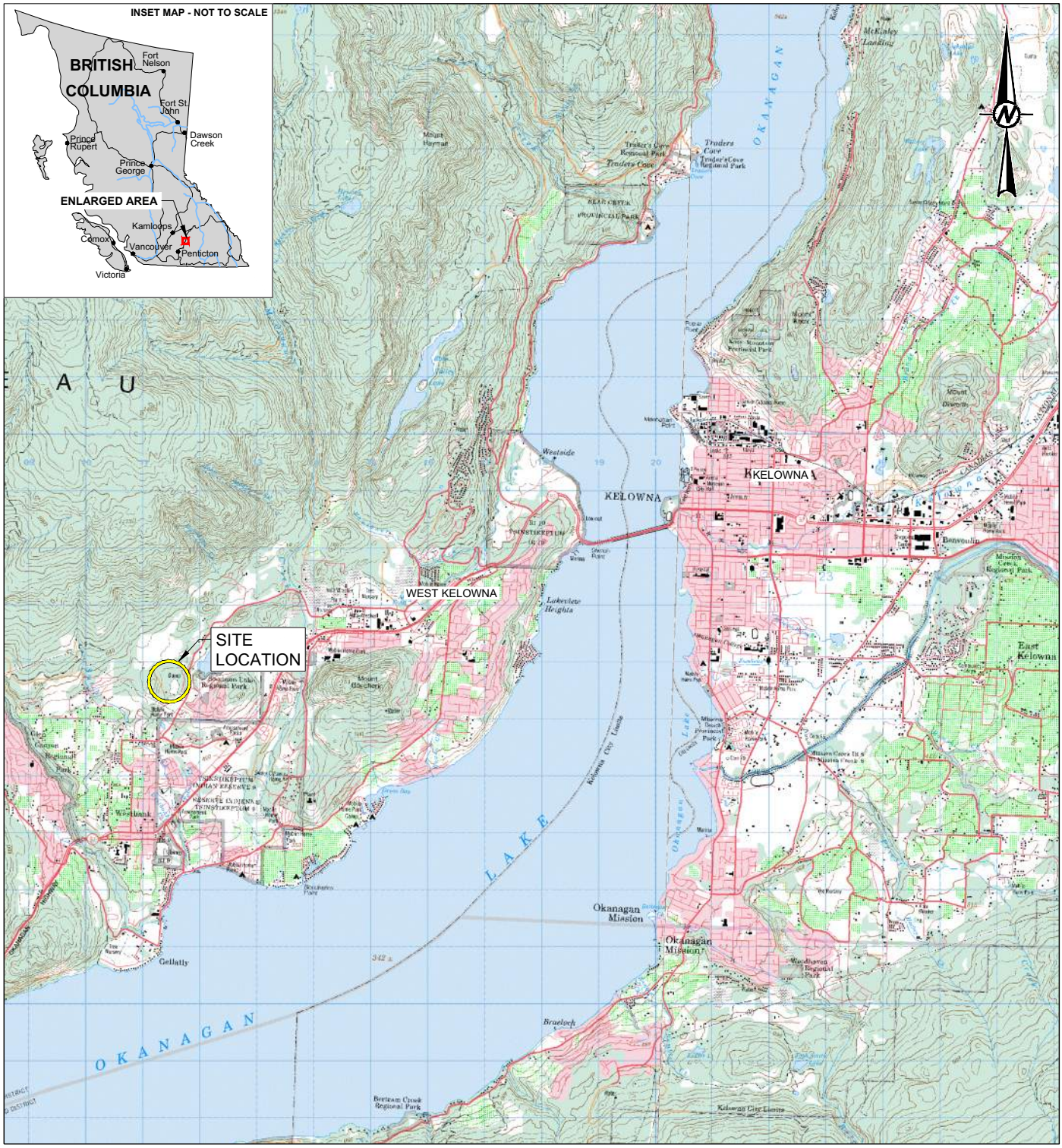
Laboratory Quality Control

- The results of the internal laboratory QC testing are provided in the laboratory reports included in Appendix C.

APPENDIX E

Construction Diagrams, Westside Landfill

West Kelowna, BC



REFERENCE

TOPOGRAPHIC MAPS 82E/13 AND /14 © 2001 AND 1999 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED.
PROJECTION: TRANSVERSE MERCATOR DATUM: NAD83
COORDINATE SYSTEM: UTM ZONE 10

URBAN systems

0 2,500 5,000
1:100,000 METRES

CLIENT
REGIONAL DISTRICT OF CENTRAL OKANAGAN (RDCO)

CONSULTANT

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA F.P. KLOTZBACH 25250

RE-ISSUED FOR RECORDS
2019-05-06
MAY 2, 2019

YYYY-MM-DD	2015-09-25
DESIGNED	
PREPARED	
REVIEWED	
ISSUED FOR RECORDS	F.KLOTZBACH 2018/11/30

PROJECT
T15-229 GRADING WORKS FOR WESTSIDE LANDFILL
WEST KELOWNA, B.C.

TITLE
KEY PLAN

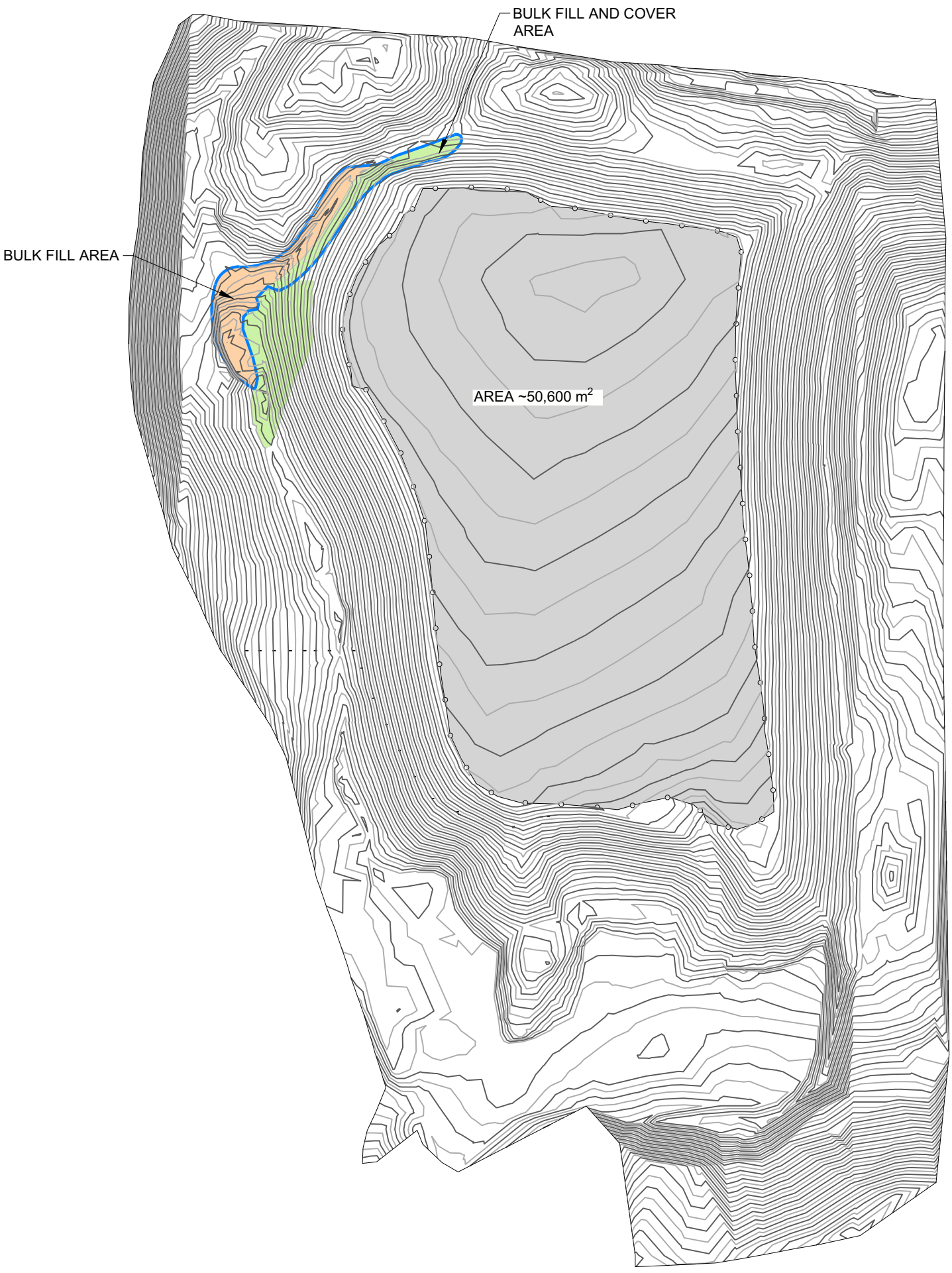
PROJECT NO.	PHASE	REV.	FIGURE
1406505	8006	1	1

File Name: 1173609703-01 asbuilt.dwg

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

25 mm

0



0 50 100 150
SCALE METRES

LEGEND

- FINISHED GROUND TOPOGRAPHIC CONTOUR (INTERVAL = 0.5 m)
- APPROXIMATE BOUNDARY OF TOP PORTION OF LANDFILL WHERE FILLING AND GRADING, FINAL COVER PLACEMENT, FERTILIZING AND SEEDING
- APPROXIMATE BOUNDARY OF AREA WHERE FILLING AND SURFACE WATER WORKS REQUIRED
- BULK FILL ONLY, FERTILIZE AND SEED
- BULK FILL, PLACE COVER, FERTILIZE AND SEED
- GRADE, PLACE COVER, FERTILIZE AND SEED

REFERENCE

EXISTING CONTOURS BASED ON SURVEY BY FRITSCH LAND SURVEYING INC. DATED MAY, 2013.

URBAN systems

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA F.P. KLOTZBACH 25250 CONSULTANT

RE-ISSUED FOR RECORDS
2019-05-06
MAY 6, 2019

REGIONAL DISTRICT OF CENTRAL OKANAGAN (RDCO)

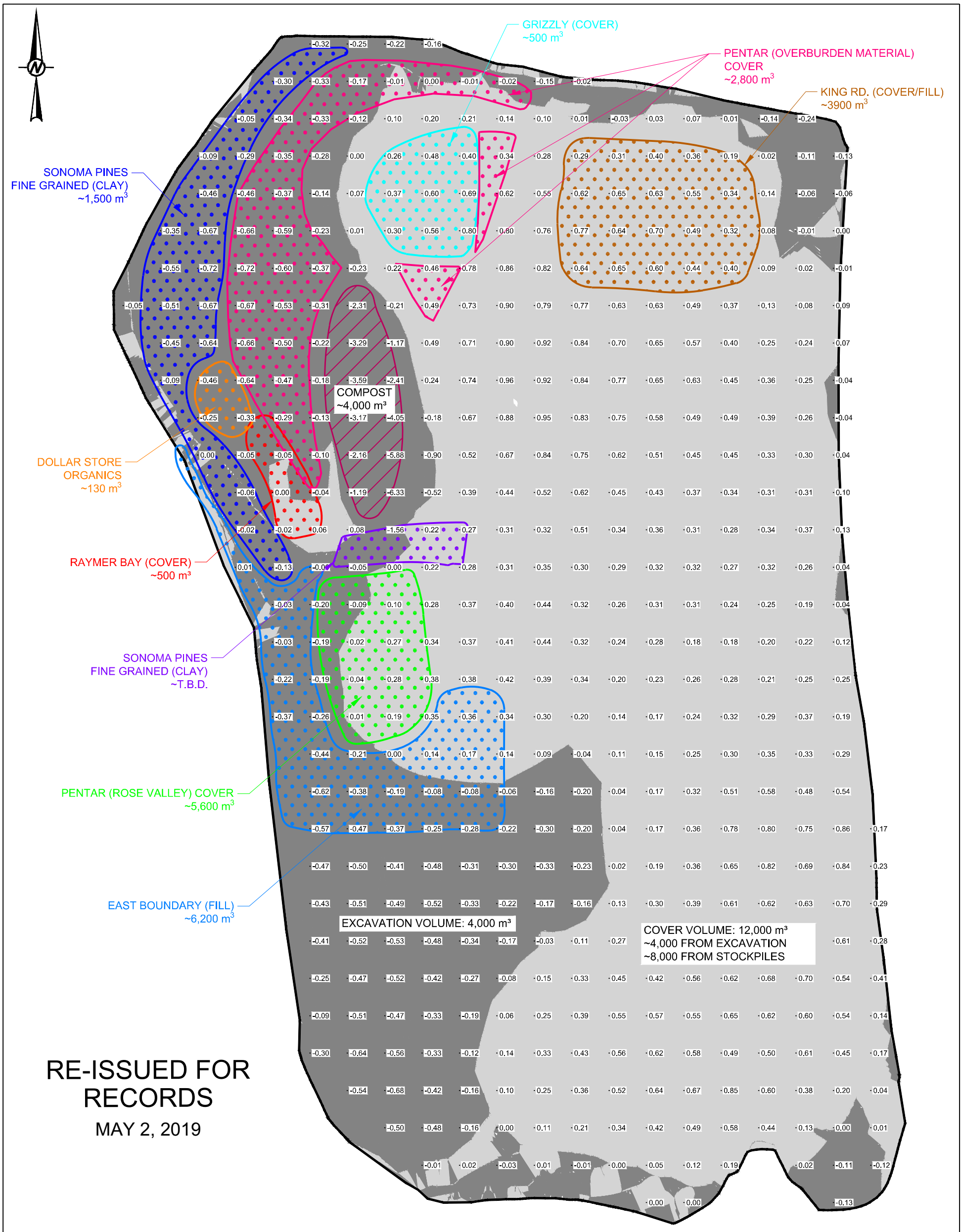
YYYY-MM-DD	2015-09-25
DESIGNED	
PREPARED	
REVIEWED	
ISSUED FOR RECORDS	F.KLOTZBACH 2018-11-30

PROJECT
T15-229 GRADING WORKS FOR WESTSIDE LANDFILL
WEST KELOWNA, B.C.

TITLE
LOCATIONS OF WORK COMPONENTS

PROJECT NO.	PHASE	REV.	FIGURE
1406505	8006	1	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
0 25 mm



RE-ISSUED FOR RECORDS

MAY 2, 2019

LEGEND

- AREAS WHERE CUTTING IS REQUIRED (APPROXIMATE)
- AREAS WHERE FILLING IS REQUIRED (APPROXIMATE)
- COMPOST STOCKPILES
- -0.12 CUT (-) OR FILL (+) DEPTH IN METRES IN 10 m GRID PATTERN (DOES NOT INCLUDE STOCKPILES, OTHER THAN COMPOST)

STOCKPILE

- SONOMA PINES - FINE GRAINED (CLAY)
- PENTAR - OVERBURDEN MATERIAL (COVER)
- DOLLAR STORE (ORGANICS)
- SONOMA PINES - FINE GRAINED (CLAY)
- GRIZZLY (COVER)
- PENTAR - ROSE VALLEY (COVER)
- RAYMER BAY (COVER)
- KING RD. (COVER/FILL)
- EAST BOUNDARY (FILL)

REFERENCE

EXISTING CONTOURS BASED ON SURVEY BY FRITSCH LAND SURVEYING INC. DATED MAY 2013.

NOTES

1. ELEVATIONS AND DEPTHS SHOWN IN METRES, AND DO NOT INCLUDE ADDITIONAL COMPOST MATERIAL.
2. ALL VOLUMES ARE APPROXIMATE AND SUBJECT TO CHANGE.
3. T.B.D. - TO BE DETERMINED.

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0 25 50
1:1,000 METRES

PROFESSIONAL ENGINEER
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F.P. KLOTZBACH
25250
2019-05-06

CLIENT
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CONSULTANT

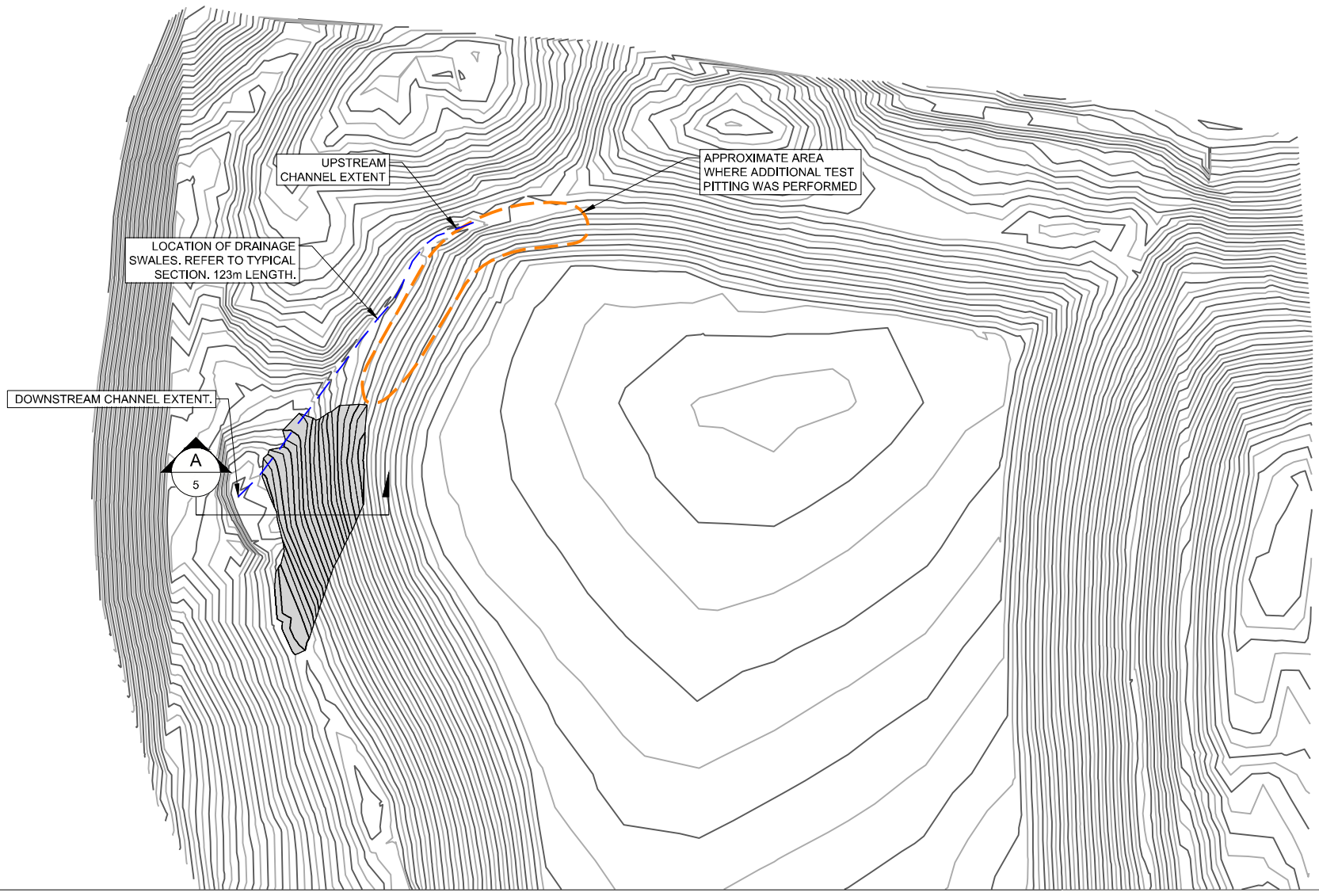
PROJECT
T15-229 GRADING WORKS FOR WESTSIDE LANDFILL
WEST KELOWNA, B.C.

YYYY-MM-DD	2015-10-21
DESIGNED	
PREPARED	
REVIEWED	
ISSUED FOR RECORDS	F.KLOTZBACH 2018-11-30

TITLE
GRADING PLAN FOR TOP SURFACE OF LANDFILL AND DISTRIBUTION OF STOCKPILES

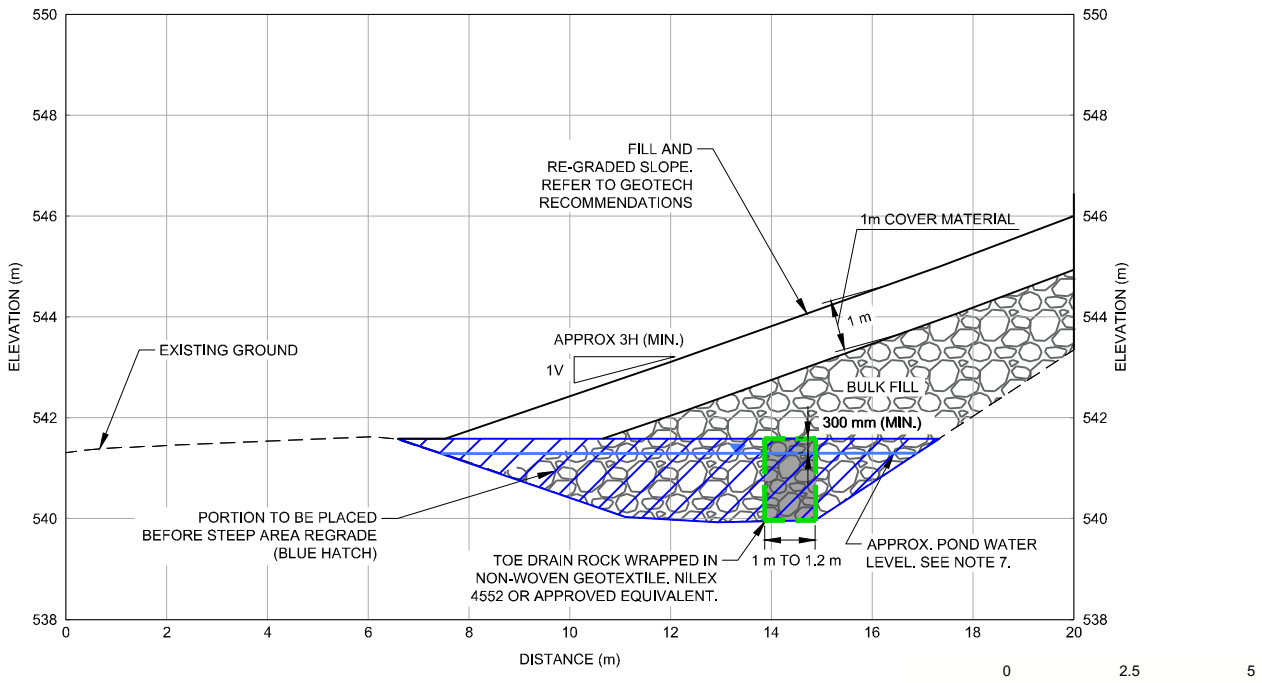
PROJECT NO.	PHASE	REV.	FIGURE
1406505	8006	2	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
25 mm
0



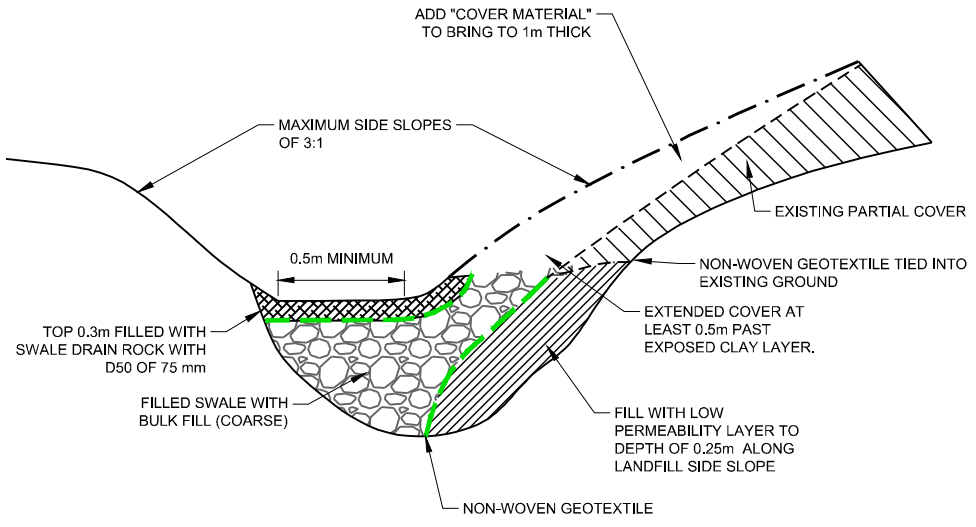
WESTSIDE LANDFILL NORTHERN PLAN AREA
1:2,000 m

0 50 100
1:2,000 METRES



SCALE: 1:150 m — A/5 — TYPICAL TOE DRAIN SECTION

0 2.5 5
1:150 METRES



TYPICAL SECTION FOR SWALES
1:30 m

0 0.5 1
1:30 METRES

NOTES:

1. ALL CONSTRUCTION FOLLOWS RDCO STANDARDS AND SPECIFICATIONS.
2. BURIED UTILITIES, IF PRESENT, ARE NOT SHOWN ON THIS DRAWING.
3. BULK FILL IS ANY WORKABLE MATERIAL REASONABLY FREE OF ORGANIC MATTER. APPROVED BY RDCO.
4. THE TOE DRAIN ROCK IS CLEAN, WELL-GRADED, AND ANGULAR. THE SIZE IS SIMILAR TO A CLASS 10KG RIPRAP FROM THE MINISTRY OF TRANSPORTATION (APPROX. 300mm-MINUS).
5. NON-WOVEN GEOTEXTILE IS NILEX 4552 OR APPROVED EQUAL. THE MINIMUM TRAPEZOIDAL TEAR IS 0.33kN. THE MINIMUM GRAB TENSILE STRENGTH IS 0.8kN.
6. SWALE DRAIN ROCK HAS A D50 OF 75mm.
7. REFER TO GOLDER'S STEEP AREA REGRADING PLAN FOR GEOTECHNICAL RECOMMENDATIONS.
8. POND DRAINED AS FAR AS PRACTICAL AND MUCKED OUT PRIOR TO PLACING BULK FILL AND INSTALLING TOE DRAIN ROCK.

LEGEND

- ADDITIONAL TEST PIT EXCAVATION AREA
- ORIGINAL GROUND TOPOGRAPHIC CONTOUR (INTERVAL = 0.5m)
- PROPOSED GROUND TOPOGRAPHIC CONTOUR (INTERVAL = 0.5m)
- NON-WOVEN GEOTEXTILE

PROFILE LEGEND

- EXISTING COVER SURFACE
- PROPOSED COVER SURFACE

REFERENCE

URBAN systems

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA F. P. KLOTZBACH 25250 CONSULTANT

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2019-05-06
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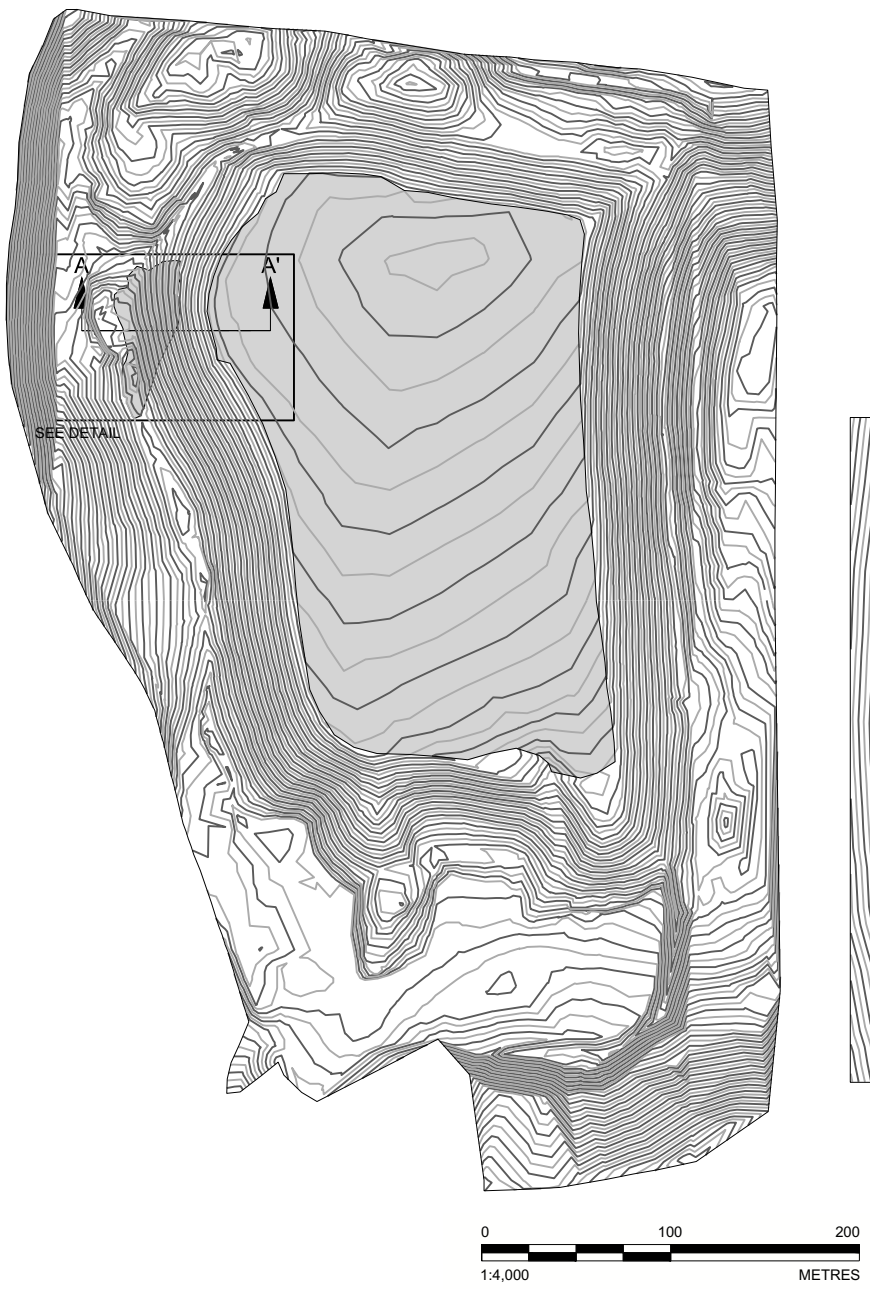
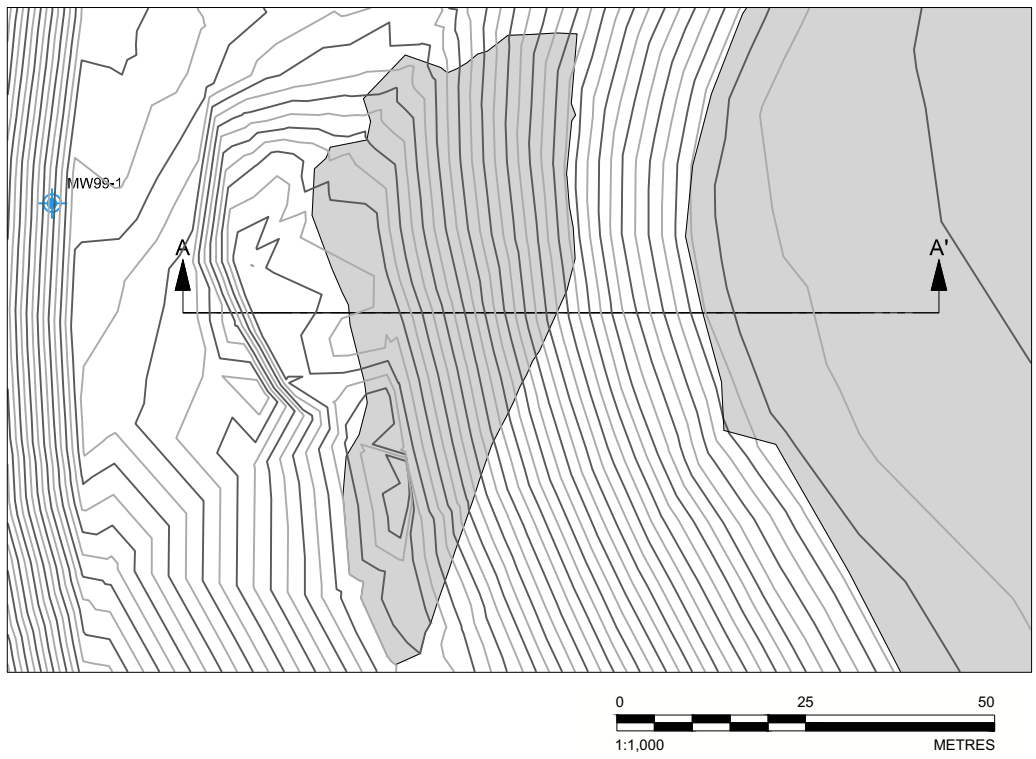
PROJECT
T15-229 GRADING WORKS FOR WESTSIDE LANDFILL
WEST KELOWNA, B.C.

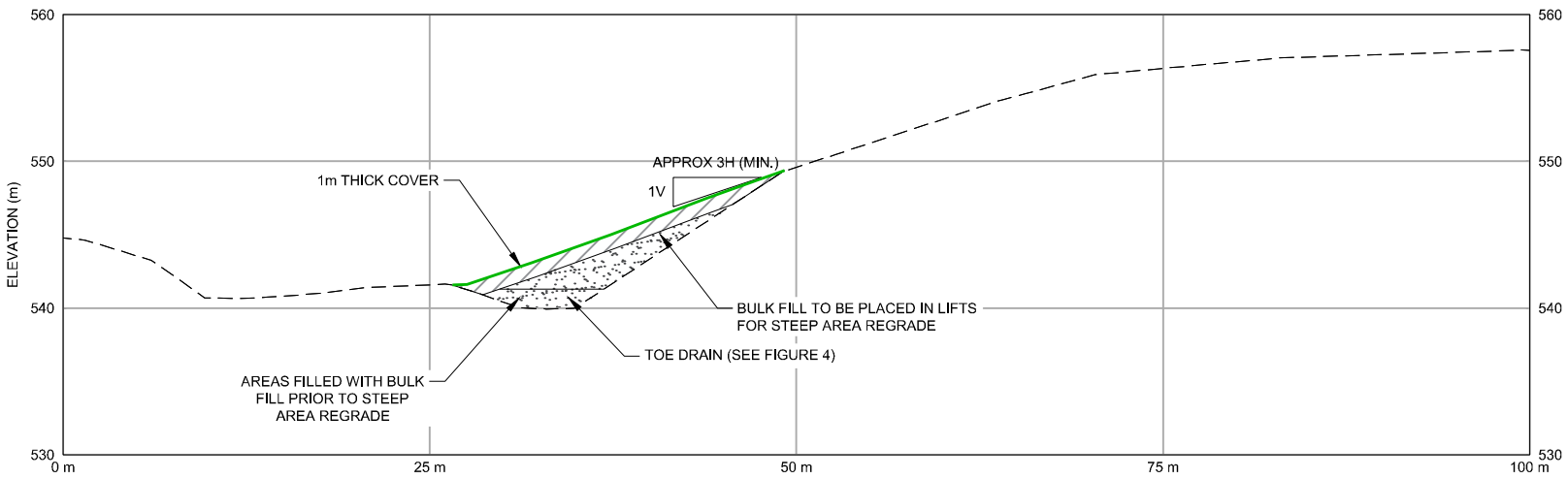
TITLE
NORTHWEST DRAINAGE CHANNEL AND SLOPE RE-GRADING DRAINAGE WORKS

PROJECT NO.	PHASE	REV.	FIGURE
1406505	8006	2	4

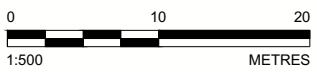
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
0 25 mm







SECTION A-A'



LEGEND

- ORIGINAL GROUND TOPOGRAPHIC CONTOUR (INTERVAL = 0.5m)
- PROPOSED GROUND TOPOGRAPHIC CONTOUR (INTERVAL = 0.5m)
- MW99-1 MONITORING WELL

PROFILE LEGEND

- EXISTING SURFACE
- FINAL SURFACE

REFERENCE

NOTES

1. BULK FILL USED IN FILLING OF DEPRESSIONS AND POND TO BE ANY WORKABLE MATERIAL REASONABLY FREE OF ORGANIC MATTER. TO BE APPROVED BY RDCO. WILL BE AVAILABLE ON SITE.
2. BULK FILL WILL BE PLACED IN MAXIMUM 300 mm HORIZONTAL LIFTS WITH EACH LIFT COMPACTED TO AT LEAST 95 PERCENT OF STANDARD PROCTOR (ASTMD698)
3. COVER MATERIAL TO BE APPROVED BY RDCO. WILL BE AVAILABLE ON SITE.

REGIONAL DISTRICT OF CENTRAL OKANAGAN (RDCO)

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA F.P. KLOTZBACH 25250 CONSULTANT

RE-ISSUED FOR RECORDS

2019-05-06 MAY 6, 2019

YYYY-MM-DD	2017-02-27
DESIGNED	
PREPARED	
REVIEWED	
ISSUED FOR RECORDS	F.KLOTZBACH 2018-11-30

PROJECT

T15-229 GRADING WORKS FOR WESTSIDE LANDFILL
WEST KELOWNA, B.C.

TITLE

STEEP AREA RE-GRADING PLAN

PROJECT NO.	PHASE	REV.	FIGURE
1406505	8006	2	5

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0 25 mm

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