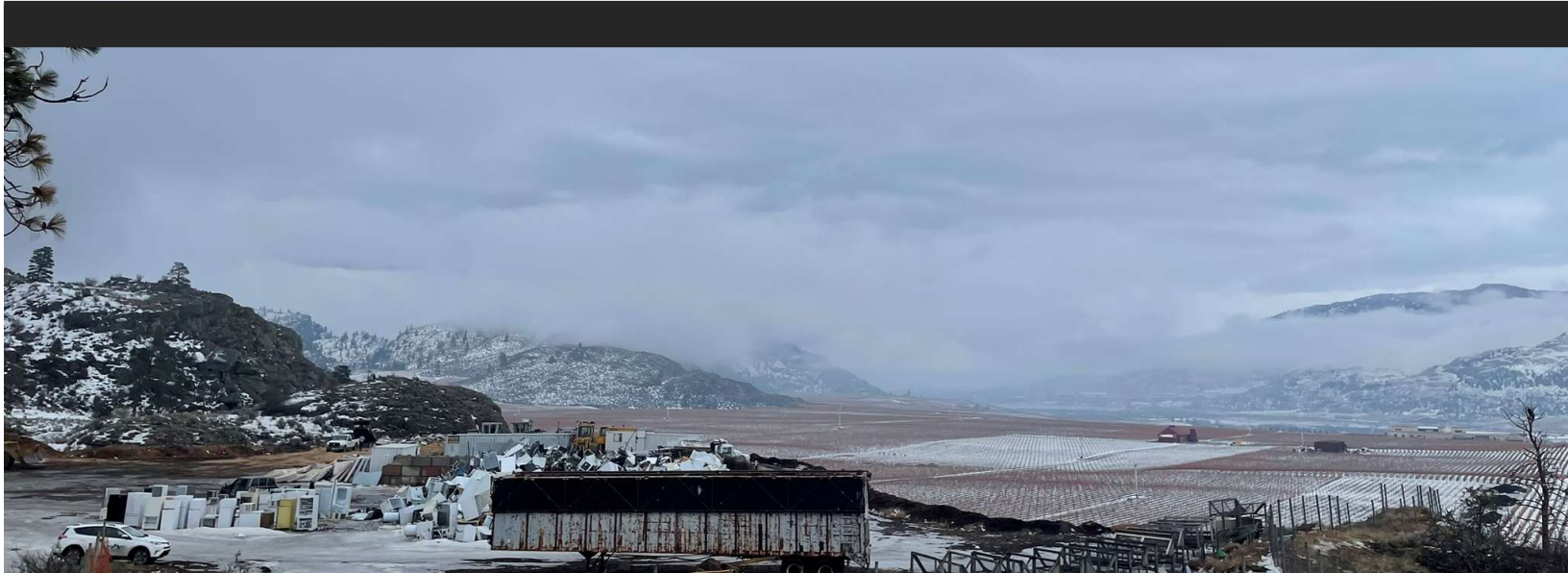


2025 Annual Groundwater Monitoring Report

Oliver Landfill (OC 15280)

498 Saddle Ridge Road, Oliver, BC



Prepared By:
Ecoscape Environmental Consultants Ltd.

Prepared For:
Regional District of Okanagan-Similkameen

March 23, 2026

2025 ANNUAL GROUNDWATER MONITORING REPORT

OLIVER LANDFILL (PR-15280)

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TABLE OF CONTENTS

Acronyms and Abbreviations.....	iii
1.0 Introduction.....	4
1.1. Background.....	4
2.0 Objective and Work Scope	5
3.0 Site Description.....	6
3.1. Climate and Biogeoclimatic Zones	7
3.2. Topography, Drainage and Nearby Watercourses.....	7
3.3. Regional And Local Geology and Hydrogeology	7
4.0 Regulatory Framework.....	9
4.1. Operational Certificate and Landfill Criteria	9
4.2. Applicable Guidelines and Standards.....	10
5.0 Groundwater Monitoring Program	11
5.1. Recent Changes to the Monitoring Network	11
5.2. Current Monitoring Well Network.....	11
5.3. Groundwater Sampling Methodology	13
6.0 Groundwater Monitoring Program Results	14
6.1. Site Observations	14
6.2. Water Levels and Inferred Groundwater Flow Direction	14
6.3. 2025 Analytical Results Relative to Applicable Standards and Guidelines.....	15
6.3.1 Background Groundwater Quality.....	16
6.3.2 Downgradient Groundwater Quality.....	16
6.4. Water Quality Trend Analysis.....	16
6.4.1 Background Well – Black Sage Well #2.....	18
6.4.2 MW98-1	18
6.4.3 MW98-2	20
6.4.4 MW08-2	20
7.0 Piper Diagram	21
8.0 Conceptual Model and Water Quality Discussion.....	22
9.0 Quality Assurance/Quality Control	23
10.0 Landfill Gas Monitoring.....	24
10.1. Landfill Gas Monitoring Network.....	24
10.2. Landfill Gas Monitoring Methods	25
10.3. Landfill Gas Monitoring Results	25
11.0 Summary and Conclusions	26
12.0 Recommendations	27
13.0 Limitations.....	27
14.0 Closure	28
References	29

LIST OF FIGURES

- FIGURE 1: Site Location
- FIGURE 2: Site Layout
- FIGURE 3: Environmental Monitoring and Sampling Locations
- FIGURE 4: Water Level Time Series Plot
- FIGURE 5: Chloride and Nitrate in Groundwater Time Series Plots
- FIGURE 6: Dissolved Sodium and Sulphate in Groundwater Time Series Plots
- FIGURE 7: Conductivity and Alkalinity in Groundwater Time Series Plot
- FIGURE 8: Dissolved Manganese in Groundwater Time Series Plots
- FIGURE 9: Piper Diagram

LIST OF APPENDICES

- APPENDIX A: General Terms and Conditions
- APPENDIX B: Operational Certificate
- APPENDIX C: Well Logs
- APPENDIX D: Historical Water Quality Data
- APPENDIX E: 2025 Laboratory Certificates of Analysis
- APPENDIX F: Landfill Gas Monitoring Data

ACRONYMS AND ABBREVIATIONS

AO	Aesthetic Objective
BCAWQG	BC Approved Water Quality Guidelines
BCGS	BC Geological Survey
BC GWPR	BC Groundwater Protection Regulation
BC WGG	BC Water Quality Guidelines (combination of BCAWQG and BCWWQG)
BCWWQG	BC Working Water Quality Guidelines
BOD	Biological Oxygen Demand
CALA	Canadian Association for Laboratory Accreditation
CARO	Caro Analytical Services, Kelowna, BC
CaCO ₃	Calcium Carbonate
CCME	Canadian Council of Ministers of the Environment
CFU	Colony Forming Unit
COD	Chemical Oxygen Demand
CRA	Conestoga-Rovers & Associates
CSR	BC Contaminated Sites Regulation
CSR AW	CSR Freshwater Aquatic Water numerical standard
CSR DW	CSR Drinking Water numerical standard
CSR IW	CSR Irrigation Water numerical standard
CSR LW	CSR Livestock Watering numerical standard
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DOCP	Design, Operations and Closure Plan
DW	Drinking Water numerical standard
EC	Electrical Conductivity
EMA	Environmental Management Act
ENV	BC Ministry of Environment and Parks
GCDWQ	Guidelines for Canadian Drinking Water Quality
GLL	Gartner Lee Ltd.
GSC	Geological Survey of Canada
IDF	Interior Douglas Fir
m asl	Meters Above Sea Level
m bgs	Meters Below Ground Surface
m btoc	Meters Below Top of Casing
mg/L	Milligrams per Litre
MAC	Maximum Acceptable Concentration
MPN	Most Probable Number
N	Nitrogen
OC	Operational Certificate
ORP	Oxidation-reduction Potential
QA/QC	Quality Assurance/Quality Control
RDOS	Regional District of Okanagan-Similkameen
RPD	Relative Percent Difference
SD	Standard Deviation
STN ID	Climate Station ID
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
US GPM	US Gallons Per Minute
WRA	Water Resource Atlas
WTN	Well Tag Number

1.0 INTRODUCTION

The Regional District of Okanagan-Similkameen (the Client) retained Ecoscape Environmental Consultants Ltd. (Ecoscape) to review groundwater and landfill gas quality data at the Oliver Landfill (the Site, Figure 1) and to prepare this annual environmental monitoring report per the Site's BC Ministry of Environment and Parks (ENV) Operational Certificate (PR-15280) monitoring and reporting requirements.

This report presents a summary and analysis of environmental monitoring data collected by RDOS staff from January 1 to December 31, 2025, and includes a discussion of the applicable regulatory context, field procedures, quality assurance/quality control measures, water quality trends and recommendations for future Site monitoring. General terms and conditions applicable to this report are attached as Appendix A.

1.1. Background

The Oliver Landfill was originally designed and constructed as a natural attenuation landfill and continues to operate as such. The Site is classified as a natural attenuation landfill because it does not have a low permeability liner or a leachate collection system below the waste mass. Rather, the landfill relies on its small size, relatively low leachate generation potential (based on climatic conditions), deep groundwater conditions and the use of appropriate operating and closure procedures to protect the receiving environment from potential leachate impacts.

The Oliver Landfill has operated since 1979, at which time landfilling commenced against the bedrock-overburden interface along the east edge of the Site. Landfilling progressed along the bedrock-overburden interface towards the north end of the Site and then to the western portion of the Site contained by bedrock outcrops (CRA, 2010). Some refuse was reportedly placed in a small off-site gully north of the Site.

The Oliver Landfill currently operates under Operational Certificate PR-15280 (the OC) issued by the Ministry of Environment, Lands, and Parks (now BC ENV) on April 26, 2011, and provides solid waste disposal services to businesses, institutions, and residents within Oliver and nearby surrounding areas within the RDOS. A composting area was recently constructed at the west end of the Site. A copy of the OC, which has not been amended since 2011, is provided in Appendix B.

2.0 OBJECTIVE AND WORK SCOPE

The objective of this assessment was to fulfill the annual monitoring and reporting requirements outlined in the OC. This was accomplished by evaluating spatial and temporal trends in groundwater and landfill gas quality and identifying locations where groundwater quality exceeded applicable guidelines and standards.

Key questions answered in this report are:

- Do groundwater quality and landfill gas meet applicable guidelines and standards at and beyond the Site boundary?
- Does groundwater quality at and near the Site vary spatially between sample locations and temporally between seasons and years as a result of ongoing landfilling at the Site, and if so, what are the variances?
- If spatial and temporal trends in groundwater chemistry exist, do these trends suggest adverse effects, and is this linked to permitted landfill operations?

In meeting these objectives and answering these questions, Ecoscape and RDOS undertook the following tasks:

- Collected representative groundwater samples from select monitoring locations on and near the Site (Figure 3) on a tri-annual basis, as summarized in Section 5;
- Collected quarterly landfill gas readings from an onsite landfill gas probe (Figure 3);
- Submitted groundwater quality samples for analyses to Caro Analytical Services (CARO), which is accredited by the Canadian Association for Laboratory Accreditation (CALA);
- Entered groundwater quality data into a database (tabulated) and compared to applicable guidelines and standards to determine if exceedances were observed;
- Analyzed temporal and spatial water quality trends to evaluate the potential for landfill leachate impacts on groundwater quality; and,
- Prepared this annual environmental monitoring report.

3.0 SITE DESCRIPTION

The Site is located approximately 6 km southeast of Oliver, BC and is accessed by Black Sage Road (Figure 1).

A Site description is provided in Table 1.

Table 1. Site Description	
Topic	Details
Civic Address	498 Saddle Ridge Road, Oliver, BC
Legal Description	Lot 2450s, Similkameen Division of Yale District, Plan 14590, except Plan 31702
Site Owner	RDOS
Latitude and Longitude (of Site centre)	49° 07' 37" N and 119° 33' 05" W
Approximate Site Area	13.8 ha
Current Land Use	Natural Attenuation Landfill
Site Elevation	Approximately 400 m above sea level

Nearby surrounding properties include the Osoyoos First Nation Indian Reserve No. 1 to the east and privately owned land to the north, west and south. Land use in the area is largely horticulture and agriculture, with vineyards and orchards to the south and west. Properties to the north and east of the Site are undeveloped.

A feedlot historically operated at the west end of the Site, north of the Site entrance, where the composting facility now occurs. These operations had the potential to release deleterious substances to the environment, resulting in groundwater contamination. This potential has been considered when evaluating groundwater chemistry at and downgradient of the Site.

The Site's geological and hydrogeological framework was previously developed by Conestoga Rovers Associates (CRA) in their report titled "*Hydrogeological Assessment, Oliver Landfill Site*", dated 2009, and was expanded upon in the 2010 Design, Operations, and Closure Plan (DOCP) prepared by Conestoga-Rovers & Associates (CRA, 2010).

The following subsections provide a summary of Site physiography, geology, and hydrogeology detailed in the above-listed assessments, along with available information online.

3.1. Climate and Biogeoclimatic Zones

The Site is located within the Okanagan Very Dry Hot Bunchgrass Variant (BGxh1) biogeoclimatic zone. The BG zone generally has a continental climate characterized by warm, dry summers, and moderately cool winters with little snowfall (Meidinger and Pojar, 1991).

Climate normal data from Environment Canada (2026) was used to complete this assessment. Based on data collected from the Oliver station (STN ID 1133270) between 1981 and 2010 the average annual total precipitation (rain and snow) was 345 mm with an average rainfall of 303 mm, suggesting the Site climate is relatively dry. The highest precipitation typically occurred between May and June (as rain), and again in December and January (as snow). The daily average temperatures for July (the warmest month) and January (the coldest month) were 21.9 °C and -1 °C, respectively.

It is important to note, however, that most climate models for the BC Interior indicate that seasonal precipitation and temperature patterns will likely shift from the above-referenced “normals”, which are based on data collected over a decade ago. Specifically, we can expect to see warmer and drier summers, coupled with earlier spring freshet, while winter seasons will experience increased precipitation falling as rain as opposed to snow, particularly in low-elevation areas.

3.2. Topography, Drainage and Nearby Watercourses

The Site is located atop an outwash terrace at the toe of a south-to-west dipping bedrock slope and sits approximately 400 m above sea level (masl). The Okanagan River is the nearest major waterbody, approximately 1.6 km west of the Site and 100 m lower in elevation. The Okanagan River flows south and eventually drains into the Columbia River System approximately 80 km south of the Canada-U.S Border.

The Site and nearby surrounding area slope west to southwest towards the Okanagan River. Surface drainage at the Site is expected to mimic topography with flow towards the southwest. There are currently no formalized stormwater control systems on Site, as high evapotranspiration compared to precipitation and high on-site soil permeability are inferred to limit surface water accumulation. No surface waterbodies flow onto, occur on, or exit the Site.

3.3. Regional And Local Geology and Hydrogeology

The BC Geological Survey (BCGS) maintains a province-wide repository of bedrock geological maps. In its current edition, bedrock geology is amalgamated from original maps at scales ranging from 1:250,000 to 1:50,000 (Cui et al. 2017). These scales are low resolution, and as such, Site geology may be different than BCGS mapping. According to BC Geological Survey mapping, bedrock beneath the Site comprises Proterozoic-aged

quartz-biotite gneiss, quartzite, marble, and/or amphibolite of the Grand Forks Gneiss / Monashee Complex (Cui et. al, 2017). Prominent bedrock outcrops occur along the northwest to southeast corner of the Site, in some cases rising 25 to 40 m above ground.

The Okanagan Valley was historically subject to intense glaciation during the Pleistocene epoch that formed a deep, north-south oriented basin, comprising glacially-derived gullies, stream channels, alluvial fans and deltas, with a wide variety of sediments including lacustrine silts and clays, till, and granular deposits (Nasmith, 1962).

Locally, a bedrock depression filled with glacial deposits occurs at the northeast portion of the Site. Five (5) monitoring wells (MW98-1, MW98-2, MW08-1, MW08-2, and MW08-3) previously drilled onsite encountered glacial outwash sand deposits generally underlain by finer lacustrine sediments and/or bedrock. The upper granular deposits reportedly comprised poorly sorted, fine-grained sand with inter-layered gravel and silt. The underlying lacustrine sediments were primarily silts, ranging in content from 45 to 60 percent, interlayered with varying amounts of clay and fine sands. Monitoring wells MW98-2 and MW08-1 through MW08-3 were screened in saturated sand and gravel immediately above fine-grained lacustrine sediments. MW98-1 was completed in bedrock.

As observed on the Site and listed in the monitoring well logs (Appendix C), overburden thickness at the Site ranges from 0 m (where bedrock outcrops) to 119 m near the southern Site boundary (MW08-2).

A review of the BC Water Resources Atlas (WRA) indicated the southern portion of the Site is underlain by ENV-mapped Aquifer 254. The aquifer boundaries were mapped based on the extent of Quaternary deposits in the Okanagan River floodplain, extending from Tuc-El-Nuit Lake south to Osoyoos Lake. The aquifer was classified as a highly productive and highly vulnerable unconfined sand and gravel aquifer, under moderate demand at the time of mapping. Depth to water was generally shallow, ranging from 0.3 to 114.0 m, with an average of 6.4 mbgs (ENV, 2025).

Groundwater flow in the aquifer presumably follows the Okanagan River, flowing south towards Osoyoos Lake, but may be subparallel to the river beneath steeper, upland areas along the perimeter of the aquifer. The aquifer is likely recharged by direct precipitation, stream losses, and flow from surrounding upland areas, in which precipitation and snowmelt infiltrates bedrock, migrates downward, and then flows laterally through bedrock fractures into the aquifer.

It is important to note that groundwater recharge rates recorded in the onsite monitoring wells are quite low compared to well yields reported in the valley bottom, near the centre of Aquifer 254. Recharge rates in the onsite overburden wells have generally been less than 1.3 L/min, which is the lower threshold of what constitutes a drinking water aquifer

according to BC ENV *Protocol 21 for Contaminated Sites Water Use Determination* (ENV, 2017).

No domestic water wells have been identified within 1 km of the Site during a previously conducted door-to-door survey (CaulWell, 2021), which is an important consideration when evaluating potential receptors to leachate impacted groundwater.

CRA (2010) estimated groundwater velocity beneath the Site to range from 0.9 m/year to 92 m/year, meaning that it would take anywhere from 11 to 1000 years for groundwater beneath the Site to travel and reach downgradient groundwater users located approximately 1 km west of the Site.

4.0 REGULATORY FRAMEWORK

4.1. Operational Certificate and Landfill Criteria

The Site currently operates under OC 15280 issued by the BC ENV in 2011 under the provisions of the *Environmental Management Act*.

The OC requires the RDOS to implement and maintain a groundwater monitoring program capable of identifying potential impacts on the receiving environment and public health, prepared by a qualified professional. The current monitoring program includes tri-annual water level and quality monitoring meant to capture seasonal water quality trends. Landfill gas is also monitored quarterly.

The OC also requires RDOS to submit an annual monitoring report completed by a qualified professional documenting any effect of leachate discharge on the quality of the receiving environment using appropriate statistical and graphical analysis. Trend analyses, as well as an evaluation of the impacts of leachate discharges on the receiving environment, must be included in the report.

Per the OC, this assessment follows guidance provided in the BC ENV *Landfill Criteria for Municipal Solid Waste* (the Landfill Criteria) (2016), which indicates the following standards and guidelines are typically applicable to water quality assessments at current and historical landfill sites:

- The *Contaminated Sites Regulation* (CSR) Schedule 3.2 Generic Numerical Water Standards;
- The BC *Approved and Working Water Quality Guidelines*; and
- Other water quality criteria for parameters not addressed by the preceding guidelines and standards.

As a minimum, the appropriate water quality criteria must be satisfied at and beyond the landfill site boundary, or 150 m from the landfill footprint, whichever is closer. More stringent requirements may be set by the director. Existing and potential future

groundwater uses within 1 km of the landfill footprint are to be considered when establishing applicable guidelines and standards.

The monitoring program outlined in this report was developed based on Site-specific hydrogeological reports, available monitoring well data, and input from RDOS staff to meet the intent of the Landfill Criteria.

4.2. Applicable Guidelines and Standards

The *Contaminated Sites Regulation* (CSR) is the primary regulatory document that currently describes the EMA's requirements for contaminated sites management in BC. The CSR first came into effect in 1997 and was amended most recently in October 2025 (includes amendments up to B.C. Reg. 171/2025, October 27, 2025). Schedule 3.2 of the CSR provides numerical standards for various contaminant concentrations in water for the following uses: aquatic life (AW), irrigation (IW), livestock watering (LW), and drinking water (DW).

BC ENV also recognizes that background groundwater concentrations of some inorganic parameters exceed the above-listed numerical standards in some regions throughout BC. As such, the BC ENV established *Protocol 9 – Establishing Local Background Concentrations in Groundwater* (2023), which lists regional background groundwater concentrations for select inorganic substances for three regions in British Columbia. Concentrations of a water quality parameter in a groundwater sample that exceed applicable numerical water quality standards but are below a background concentration at the site are not considered contaminated under the CSR. BC ENV-established background concentrations cannot be applied to the Site, as it falls outside of the geographic boundaries of regions included in Protocol 9; however, the province-wide background cobalt concentration of 0.02 mg/L has been applied to this assessment.

For the protection of potential future groundwater, irrigation, and livestock watering users in the area, the following CSR standards were applied:

- CSR Drinking Water (DW) numerical standards;
- CSR Irrigation Water (IW) numerical standards; and
- CSR Livestock Watering (LW) numerical standards.

The CSR Freshwater Aquatic Life standards were not considered applicable based on the inferred absence of downgradient surface waterbodies within 1 km of the Site.

The *Guidelines for Canadian Drinking Water Quality* Maximum Acceptable Concentrations (health-based guideline) (GCDWQ MAC) and Aesthetic Objectives and Operation Guidelines (based on aesthetic and operational considerations) (GCDWQ AO & O), which are typically reserved for potable water sources, were also conservatively applied to all sampled wells as an added contingency.

With respect to the GCDWQ, groundwater with one or more parameters exceeding the health-based MACs is considered not potable. In samples where parameters are found to exceed only AO & Os, the water is deemed potable, but treatment may be desired to address taste, colour, or odour concerns.

5.0 GROUNDWATER MONITORING PROGRAM

5.1. Recent Changes to the Monitoring Network

Monitoring wells MW98-01 and MW98-02 were installed in 1998, and MW08-01 through MW08-03 were installed in 2008. The wells were persistently dry following installation or had an insufficient volume of water for sampling.

Given the lack of groundwater data collected at the Site, the ENV requested that additional monitoring wells be installed at the Site (circa 2010). However, in 2012, groundwater sampling at MW98-1 was deemed possible, and additional wells were not installed. Since 2015, a bladder pump has been the primary method used to sample this well.

Although a thin layer of groundwater was generally present above silt and bedrock at MW98-2 and MW08-2, RDOS staff were not able to collect samples from these wells using standard techniques. In 2019, RDOS staff constructed a prototype bailing device which successfully allowed sample collection from MW98-2 and MW08-2. Both of these wells have been sampled using a HydraSleeve® since 2021, which has also proven to be an effective technique. Sampling at MW08-1 and MW08-3 is still not possible due to the wells being nearly dry.

Water quality sampling was historically completed quarterly, but was reduced to tri-annually in 2017. Samples have since been collected in March/April, July/August, and November/December, to best capture the seasonally low, seasonally high, and receding arm of the South Okanagan groundwater hydrograph.

5.2. Current Monitoring Well Network

The current monitoring network consists of five (5) cross- to downgradient groundwater monitoring wells: MW98-1, MW98-2, MW08-1, MW08-2 and MW08-3.

Establishing an upslope background sampling location has proven to be challenging at the Site. Unimpacted groundwater is likely not present in any significant amounts in overburden, if any, upgradient of the landfill, and drilling a background well in bedrock is not feasible in terms of access, and potentially not defensible because groundwater flowing through bedrock may differ geochemically from that expected to flow beneath the Site. As such, the Town of Oliver's supply well Black Sage Well #2, situated approximately 1.1 km downslope of the Site, was sampled to assess background water

quality. This well provides a reasonable representation of background quality, as it does not appear to be affected by landfill leachate or nearby agricultural activities and is screened in Aquifer 254.

Landfill gas probe MW98-3 was monitored quarterly.

No surface water bodies were observed on or near the Site. Therefore, surface water quality is not monitored.

Table 2 below summarizes the monitoring network, and monitoring locations are shown on Figure 3.

Table 2. Summary of Oliver Monitoring Network

Monitoring Well ID	Location	Rationale	Well Depth (mbtoc)	Approx. Elevation (masl) ¹	Screened Interval (mbtoc)	Screened Lithology
MW98-1	North of the landfill, near the north Site boundary.	Monitor potential offsite migration of leachate impacts the northwest.	18.40	407	-	Bedrock
MW98-2	Near the southwest Site corner	Monitor potential offsite migration of leachate impacts to the southwest.	85.30	380	67 to 73	Sand and Silt
MW08-1	Near the Site centre	Monitor leachate impacts near the active landfill area.	23.16	381	21.64 to 23.16	Sand
MW08-2	South Site boundary	Monitor potential offsite migration of leachate impacts to the south.	54.71	378	53.19 to 54.71	Sand
MW08-3	South Site boundary	Monitor potential offsite migration of leachate impacts to the south.	47.24	379	40.54 to 42.06	Sand
Black Sage Well #2 (WTN 24513)	Along Black Sage Road, 1.1 km west of the Site	Provide background groundwater chemistry.	15.2	285	Unknown	Sand
Soil Gas Probe						
MW98-3	Near southwest Site corner	Monitor potential offsite landfill gas migration to the southwest	5.5	380	-	Sand

Notes:

1 = Elevations based on 2007 contours from aerial imagery.

masl = meters above sea level

mbtoc = meters below top of casing

WTN = well tag number

5.3. Groundwater Sampling Methodology

Water quality monitoring and sampling were conducted by Environmental Technicians employed by the RDOS.

RDOS personnel collected water quality samples in general accordance with BC ENV's *British Columbia Field Sampling Manual* (2013) and BC ENV *Technical Guidance on Contaminated Sites 8* (ENV 2021), and the sampling program generally meets the intent of the OC.

Monitoring well conditions and accessibility of sample locations were documented during each sampling event. RDOS personnel also observed vegetation near each sampling location for signs of abnormal stress (e.g., discolouration or mortality) or abundance potentially linked to landfill leachate, and for signs of liquid flowing from or along the site surface, which could indicate leachate breakout.

RDOS personnel completed the following procedures when collecting water quality samples:

- Measured static water level off a permanent marking on the top of each well riser using a decontaminated electric water level meter;
- Purged monitoring wells, where applicable, until temperature, pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), and electrical conductivity (EC) readings were stabilized (+/-10%);
- Noted visual and olfactory groundwater observations, including sheen, colour, turbidity and odour;
- Collected groundwater samples using a bladder pump (MW98-1), HydraSleeve¹ (MW98-2 and MW08-2), or from a sampling port (Black Sage Well #2) directly into clean, new laboratory-supplied containers, and field filtered (0.45 µm) and preserved them as required for each analytical parameter; and
- Stored sample bottles in ice-chilled coolers for transport to CARO for chemical analysis.

RDOS personnel followed proper chain-of-custody procedures during sample transport and ensured regular communication was maintained with CARO as necessary.

¹ The HydraSleeve is a “no-purge” sampling device that allows groundwater to be sampled from the screened portion of the well. When collecting a sample, the sealed HydraSleeve is gently lowered into the well to the screened interval then pulled upward, at which time the device opens to allow groundwater to be collected. Once filled, the sampler re-seals itself for transport back to the ground surface. Groundwater samples collected using this method are representative of the aquifer conditions since groundwater is only collected from the screened depth with no exposure to oxygen or overlying stagnant well water. Lowering the HydraSleeve into the well results in very little agitation of the groundwater column and little to no displacement of the groundwater within the well.

Field results, including water level elevations and field-measured parameters, were tabulated by RDOS staff and uploaded to the Wireless Water database.

Laboratory results were sent directly by CARO to the database manager Wireless Water, where laboratory data is merged with field data for long-term data storage and analysis.

6.0 GROUNDWATER MONITORING PROGRAM RESULTS

The 2025 Site observations, water level measurements, groundwater quality exceedances, and water quality trends are discussed in this section. The 2025 and historical water quality results are tabularized in Appendix D. Laboratory certificates of analysis are attached in Appendix E.

6.1. Site Observations

All monitoring well locations were readily accessible, in good condition, and generally available for sampling in 2025. Consistent with previous years, monitoring wells MW08-1 and MW08-3 were dry during all three sampling events, and were therefore not sampled. Monitoring wells MW98-1, MW98-2, and MW08-02 provided sufficient water to sample during one or more sampling events.

RDOS staff did not observe signs of stressed vegetation, leachate breakout or ponding water at or near any of the monitoring locations during the 2025 sampling events.

6.2. Water Levels and Inferred Groundwater Flow Direction

RDOS personnel measured groundwater levels on April 7, July 23, and November 4, 2025, and summarized the results in Appendix D.

Groundwater depths beneath the Site were generally consistent with previous years, ranging from 10.55 meters below top of casing (m btoc) (MW98-1 in April 2025) to 68.23 m btoc (MW98-2 in November 2025). Groundwater levels were generally highest (shallowest) in July, and lowest in November, fluctuating from 0.07 m btoc (MW08-2 and MW98-1), to 6.07 m btoc (MW98-1) over the monitoring period.

Historical water level fluctuations over time were plotted on Figure 4. Water levels have been remarkably stable in the overburden monitoring wells, although water levels in MW08-02 reached a historical low in November 2024. Similarly, the water level measured in MW98-2 reached its lowest water level since spring 2016 during the November 2024 sampling event. Water levels have been quite variable in bedrock monitoring well MW98-1. No obvious long-term increasing or decreasing trends were observed.

Groundwater flow direction has not been fully characterized at the Site because monitoring well elevations have not been accurately surveyed; however, based on

groundwater elevation estimates, observed topography in the area, and hydrogeological principles, flow is expected to be towards the west-southwest.

6.3. 2025 Analytical Results Relative to Applicable Standards and Guidelines

RDOS personnel collected groundwater samples from onsite monitoring wells three times in 2025: spring (April), summer (July) and fall (November). Black Sage Well #2 was sampled in May and August.

During each sampling event, personnel collected samples from wells with sufficient groundwater for sampling and submitted them to CARO in Kelowna, BC for chemical analysis of the following parameters:

- Alkalinity;
- Anions (bromide, chloride, fluoride, nitrate, nitrite, ammonia, and sulphate);
- Chemical Oxygen Demand (COD);
- Electrical conductivity and pH; and,
- Dissolved Metals.

In addition, personnel recorded depth to water, pH, temperature, DO, ORP, conductivity, turbidity, and total dissolved solids (TDS) in the field.

Table 3. Summary of 2025 Water Quality Exceedances		
Sampling Location	Sampling Location	Exceedances
Black Sage Well #2	GCDWQ AO & O	Manganese (dissolved), Total dissolved solids [F]
MW08-2	GCDWQ MAC	Manganese (dissolved), Uranium (dissolved)
	GCDWQ AO & O	Manganese (dissolved), Total dissolved solids [F]
	CSR IW	Manganese (dissolved), Uranium (dissolved)
	CSR DW	Lithium (dissolved), Selenium (dissolved), Uranium (dissolved)
MW98-1	GCDWQ MAC	Nitrate (as N), Nitrate + Nitrite (as N), Nitrate + Nitrite (as N) (calculated)
	GCDWQ AO & O	Manganese (dissolved), pH [F], Total dissolved solids [F]
	CSR IW	Uranium (dissolved)
	CSR DW	Lithium (dissolved), Nitrate (as N), Nitrate + Nitrite (as N), Nitrate + Nitrite (as N) (calculated)
MW98-2	GCDWQ AO & O	Manganese (dissolved), Total dissolved solids [F]
	CSR IW	Uranium (dissolved)
	CSR DW	Lithium (dissolved)

Notes: F = Field Result(s)

Concentrations of the remaining parameters analyzed by the laboratory were below applicable guidelines and standards.

6.3.1 Background Groundwater Quality

The August 2025 sample from Black Sage Well #2 marginally exceeded the GCDWQ AO manganese guideline of 0.02 mg/L with a concentration of 0.024 mg/L. All parameters were below applicable guidelines and standards in the May 2025 sample.

6.3.2 Downgradient Groundwater Quality

Key landfill-leachate indicator parameters, including nitrate, TDS, manganese, and iron exceeded applicable guidelines/standards in one or more samples collected from cross-to downgradient monitoring wells MW98-1, MW98-2 and/or MW08-2. Several additional dissolved metals also exceeded guidelines and/or standards in samples collected downgradient of the landfill. Some metals are not contaminants of concern associated with municipal solid waste and construction demolition debris. Rather, leachate interactions with the receiving environment likely released and mobilized these metals from native soils and bedrock into groundwater.

Furthermore, Per BC ENV Protocol 9, the background groundwater concentrations for lithium and uranium in the Thompson-Okanagan Region (the nearest ENV region to the Site) are 0.096 mg/L and 0.087 mg/L, respectively. These regional background concentrations are near or above most lithium and uranium concentrations identified in groundwater at and near the Site, possibly indicating that some metal concentrations exceeding BC CSR standards are naturally occurring in the area.

6.4. Water Quality Trend Analysis

Analyses and discussion of spatial and temporal trends in landfill leachate indicator parameter concentrations at the Site are discussed in this section.

Landfill leachate indicator parameters are those which are typically present at concentrations above natural, background concentrations in leachate-impacted groundwater. The chemical composition of landfill leachate-impacted groundwater can vary, and largely depends on waste composition, climatic conditions, and the age and degradation rate of the solid waste (Bulc, 2006); however, indicator parameters generally include but are not limited to, alkalinity, chloride, electrical conductivity, sulphate, sodium, ammonia, nitrate, iron, manganese, and heavy metals boron, cadmium, chromium, copper, nickel and zinc (Christensen et al., 2001).

Ecoscape plotted time-series graphs of select leachate indicator parameters, displaying changes in concentration over time between 2013 and 2025. These are shown in Figures 5 through 8 as follows:

- Chloride (Figure 5)
 - Chloride concentrations are typically elevated in leachate due to the degradation of food waste and paper products; however, chloride also naturally occurs in groundwater and may come from external sources such as road salt, industrial processes, wastewater effluent disposal to ground, and agricultural activity. Chloride is often found at the leading edge of a landfill leachate plume because it is conservative (non-reactive) in the environment and is thus useful in evaluating the plume's extent.
- Nitrate (Figure 5)
 - Garden and food waste, and biosolids contribute to organic nitrogen within the landfill mass. Over time, waste decomposition can deplete oxygen, resulting in anaerobic conditions favourable for ammonification, during which heterotrophic bacteria convert organic nitrogen to ammonia. When ammonia in groundwater encounters appropriate aerobic conditions, microorganisms oxidize ammonium to nitrate (i.e., nitrification), with nitrite as an intermediary product. Other common anthropogenic sources of nitrate include wastewater disposal to ground, agricultural activities, industrial processes, and mining (blast residuals from explosives).
- Dissolved Sodium (Figure 6)
 - Sodium is often the dominant cation in leachate; however, various geochemical processes, including dissolution, precipitation, and cation exchange may affect concentrations during groundwater transport. Like chloride, sodium also naturally occurs in groundwater, and may also come from external sources such as road salt, industrial processes, residential water softener use, and agricultural activity.
- Sulphate (Figure 6)
 - Sulphate is often generated in landfill leachate during the decomposition of organic matter and soluble waste.
- Electrical Conductivity (Figure 7)
 - Electrical conductivity is useful in monitoring landfill leachate impacts because it is a measure of the total dissolved minerals within groundwater, which are often elevated near landfill sites.
- Total Alkalinity (Figure 7)
 - Alkalinity is often elevated at the leading edge of a leachate-impacted groundwater plume, a phenomenon sometimes referred to as a hardness halo (Griffen et al. 1976), as a result of ion exchange between calcium and/or magnesium ions bound to sediments and various cations present in the leachate.

- Dissolved Manganese (Figure 8)
 - Decomposition of organic matter in leachate can deplete oxygen, creating reducing conditions (and generating organic acids). Under reducing conditions, manganese oxides (both naturally occurring and anthropogenically produced) are generally reduced to more soluble forms, mobilizing dissolved manganese in groundwater.

Groundwater quality data from 2013 to 2025 and a summary of descriptive statistics (mean, maximum, minimum, standard deviation, etc.) are tabularized in Appendix D.

Trend observations at each sample location are discussed below.

6.4.1 Background Well – Black Sage Well #2

Leachate indicator parameter concentrations have generally remained low and stable in Black Sage Well #2 since it was first sampled in 2018, with historical manganese and uranium exceedances inferred to be naturally occurring in the local sand and gravel aquifer.

The following table is a summary of average background concentrations of key leachate-indicator parameters measured at Black Sage #2 Well. The term “elevated above background” used in the discussions below refers to parameter concentrations above those listed in Table 4.

Table 4: Summary Statistics of Key Indicator Parameters at Background Well				
Parameter	Unit	Average	Minimum	Maximum
Chloride	mg/L	9.41	6.78	13.0
Nitrate (as N)	mg/L	1.124	<0.010	3.13
Sodium (dissolved)	mg/L	15.2	13.0	21.6
Sulphate	mg/L	48.7	28.1	87.5
Conductivity	µS/cm	462	338	694
Alkalinity (total)	mg/L	186	130	311
Manganese (dissolved)	mg/L	0.00951	0.00095	0.0240

6.4.2 MW98-1

MW98-1 was completed in bedrock and is situated near and cross-gradient of the landfill footprint. MW98-1 continued to show the highest concentrations of chloride, nitrate, and conductivity within the monitoring network. Concentrations of most plotted leachate indicator parameters increased between 2013 to 2019, followed by a decreasing trend in

2020 and 2021. Since then, most of the parameters have been somewhat variable but stable, with no obvious long-term trends observed.

The following trends were observed in samples collected from MW98-1:

- Chloride – elevated above background and variable over time. Concentrations peaked at 135 mg/L in 2017 and then decreased to just over 40 mg/L by mid-2021. Since then, concentrations have been stable but variable, generally fluctuating between 35 mg/L and 60 mg/L, remaining below applicable guidelines and standards.
- Nitrate – elevated several orders of magnitude above background. Concentrations were around 15 mg/L in 2013 and increased to over 120 mg/L in 2017. Following this peak, a decreasing trend was observed up until the summer of 2021. From that point onwards, concentrations have exhibited some variability, generally fluctuating between 30 mg/L and 60 mg/L. Concentrations measured in 2025 ranged from 54.8 mg/L to 57.5 mg/L.
- Dissolved Sodium – elevated above background. Like most parameters, concentrations were low in 2013, at around 13 mg/L before increasing to 42 mg/L in 2018. Concentrations decreased to about 22 mg/L in late 2020 and have been variable but stable since then.
- Sulphate – elevated above background. Concentrations were around 30 mg/L in 2009 before spiking above 140 mg/L in 2016. Sulphate concentrations decreased to approximately 60 mg/L by late 2020, and were stable until rebounding to 80 mg/L in November 2022. Since then, concentrations have remained stable but variable, generally fluctuating between 50 mg/L and 70 mg/L.
- Conductivity – elevated above background, with an increasing trend observed between 2009 and 2017. Values were around 1,800 $\mu\text{s}/\text{cm}$ to 2,000 $\mu\text{s}/\text{cm}$ between 2017 and 2019 before decreasing to under 1,200 $\mu\text{s}/\text{cm}$ in 2021. Values have since fluctuated between approximately 1000 $\mu\text{s}/\text{cm}$ and 1,500 $\mu\text{s}/\text{cm}$.
- Total Alkalinity – elevated above background and generally increased over time until November 2022, when it reached a historical maximum of 431 mg/L. In the spring of 2023, total alkalinity decreased significantly to 215 mg/L; however, concentrations have since rebounded, fluctuating between 270 mg/L and 390 mg/L.
- Dissolved manganese – elevated above background and highly variable over time. Concentrations were around 0.1 mg/L in 2013 before spiking to 4.3 mg/L in April. Concentrations have since decreased, generally falling between 0.001 mg/L and 0.2 mg/L since Spring 2022. Concentrations ranged from 0.003 mg/L to 0.026 mg/L in 2025.

6.4.3 MW98-2

MW98-2 is situated approximately 80 m west of MW08-2, near the southwest Site corner. Leachate indicator parameter concentrations have generally been near or slightly above background since the well was first sampled in 2019.

The following trends were observed in samples collected from MW98-2 since 2019:

- Chloride – low and below background, but gradually increasing, reaching a historical maximum of 8.73 mg/L in July 2024. Concentrations ranged from 8.3 mg/L to 8.6 mg/L in 2025.
- Nitrate – near or below background and stable at around 0.05 mg/L, apart from a minor spike to 0.3 mg/L in July 2025.
- Dissolved Sodium – elevated above background. Concentrations increased from just under 20 mg/L in 2019 to 26 mg/L in April 2024. Concentrations have been variable but stable since 2019, fluctuating between 20 mg/L and 26 mg/L.
- Sulphate – near or below background, increasing slightly since July 2023, reaching a historical maximum of 67.2 mg/L in July 2024, before returning to 50.2 mg/L by November 2025.
- Conductivity – elevated above background. Conductivity values increased steadily from around 750 $\mu\text{s}/\text{cm}$ in 2019 to a historical maximum of 917 $\mu\text{s}/\text{cm}$ in July 2024. Concentrations remained elevated in 2025, ranging from 864 $\mu\text{s}/\text{cm}$ to 884 $\mu\text{s}/\text{cm}$.
- Total Alkalinity – elevated above background, and typically the highest concentrations within the monitoring network. Concentrations slightly increased between 2019 and 2021 and have since been variable but stable, averaging at around 420 mg/L.
- Dissolved manganese – generally near or below background and stable.

6.4.4 MW08-2

MW08-2 is located at the southern Site boundary and may be showing signs of leachate impacts, but to a much lesser degree than MW98-1.

The following trends were observed in samples collected from MW08-2 since 2019:

- Chloride – elevated above background. Concentrations increased from around 18 mg/L in 2019 to a historical maximum of 51 mg/L in spring 2023, followed by a decrease to approximately 40 mg/L in summer 2023. Concentrations have since stabilized around 35 mg/L to 45 mg/L.
- Nitrate – near or below background, concentrations remained low and stable, apart from a minor spike to 0.34 mg/L in July 2025.
- Dissolved Sodium – elevated above background and the highest concentrations within the monitoring network in 2025. Concentrations have gradually increased, reaching a historical maximum of 33.1 mg/L in July 2025, before decreasing to 30.5 mg/L in November 2025.

- Sulphate – elevated above background and the highest concentrations within the monitoring network in 2025. Concentrations drastically increased from just over 10 mg/L in fall 2021 to 131 mg/L in fall 2022. Concentrations fluctuated between approximately 80 and 120 mg/L in 2023 and 2024, and then spiked to a historical maximum of 159 mg/L in July 2025, before falling back to 118 mg/L in November 2025. Sulphate concentrations in MW08-2 are highly variable compared to other wells in the monitoring network.
- Conductivity – elevated above background, and variable. Conductivity values have shown some seasonality but have generally increased from around 425 $\mu\text{s}/\text{cm}$ in 2019 to 958 $\mu\text{s}/\text{cm}$ in July 2025.
- Total Alkalinity – elevated above background, and highly variable. Concentrations spiked from around 215 mg/L in 2019 to over 500 mg/L in early 2021, followed by a decrease to under 250 mg/L in mid-2021. Concentrations rebounded to 314 mg/L in November 2022 and have remained variable but generally decreasing since. Concentrations reached a historical low of 173 mg/L in April 2025.
- Dissolved manganese – elevated above background. Concentrations have fluctuated an order of magnitude since 2019, with noticeable spikes to at 0.24 mg/L in fall 2020, and 0.23 mg/L in summer 2025. Concentrations have regularly exceeded the GCDMQ AO guideline of 0.02 mg/L and occasionally the GCDWQ MAC of 0.12 mg/L.

7.0 PIPER DIAGRAM

A Piper diagram can be a useful tool for characterizing groundwater chemistry and serves as a visual aid in differentiating between distinct water chemistry signatures and how these compare across monitoring locations. A Piper diagram shows the relative percent of anions and cations in two ternary plots, which are then projected onto a central diamond plot. The major ions include Na^+ , Ca^+ , Mg^+ , K^+ , HCO_3^- , CO_3^{2-} , SO_4^{2-} and Cl^- , which account for the vast majority of total dissolved solids present in natural groundwater. The central diamond plot is where monitoring locations can be visually grouped into distinct hydrogeochemical categories commonly referred to as facies. We produced a Piper plot using the average results from the 2023, 2024 and 2025 sampling data and present it in Figure 9.

Samples from all monitored locations plotted as magnesium bicarbonate type, which likely indicates that the wells are completed within the same hydrogeological regime (either within the same aquifer or hydraulically connected aquifers). Monitoring well MW98-1 and MW08-2 plotted higher up the diamond and away from the remaining wells, including background Black Sage Well #2, supporting the notion that groundwater at MW98-1 and MW08-2 is likely impacted by landfill leachate. MW98-2 also plotted away from the background well, and may therefore also be affected by Site operations.

8.0 CONCEPTUAL MODEL AND WATER QUALITY DISCUSSION

The Site is underlain by what is inferred to be the lateral terminus of Aquifer 254. The aquifer is quite thin beneath the Site, contained within unconfined saturated sand and gravel atop fine-grained lacustrine sediments. Groundwater recharge rates measured in onsite monitoring wells MW98-2 and MW08-02, which penetrate the aquifer, are low compared to documented well yields near the centre of the aquifer in the valley bottom.

Hydrogeological principles indicate Aquifer 254 is recharged by direct precipitation, stream losses, and downgradient flow through higher-elevation bedrock fractures, such as those intercepted by MW98-1. Based on groundwater elevation estimates and observed topography in the area, groundwater flow beneath and near is expected to be towards the west-southwest.

Groundwater chemistry upgradient of the Site has not yet been established. MW98-1 is topographically elevated above and hydraulically cross-gradient of the landfill, but has historically shown the highest degree of leachate-impacted groundwater compared to remaining monitored locations. The well is likely affected by preferential leachate-impacted groundwater flow through bedrock fractures. Most leachate parameter concentrations decreased in samples from MW98-1 between 2019 and 2021, but some have since rebounded and should be carefully monitored.

Leachate indicator parameters have also been elevated in samples from downgradient monitoring wells MW98-2 and MW08-2 but are generally low with respect to applicable water quality guidelines and standards, indicating limited groundwater impacts from landfill operations at the southern Site boundary. Increasing trends continue to be observed in MW08-2, which warrants careful attention moving forward.

Downgradient well Black Sage Well #2 does not appear to be impacted by landfill leachate at this time and is therefore inferred to represent background groundwater quality.

Monitoring wells MW08-1 and MW08-3, both of which were screened immediately atop low permeability silt or bedrock have been perpetually dry, validating the dry climatic conditions in the area and relatively thin aquifer beneath the Site.

In general, the low transmissivity of Aquifer 254 beneath the Site, deep depth to groundwater and excess evapotranspiration above precipitation in the area appear to be limiting the generation and offsite transport of leachate-impacted groundwater.

9.0 QUALITY ASSURANCE/QUALITY CONTROL

A standardized Quality Assurance/Quality Control (QA/QC) program was implemented to ensure representative samples were collected and that representative analytical data were reported by the laboratory. The following procedures were performed as part of the QA/QC program:

- Calibrated field instruments during each field event;
- Recorded field notes during all stages of the field programs;
- Donned clean, new nitrile gloves at each sampling location;
- Collected samples using dedicated devices to preclude cross-contamination;
- Cleaned non-dedicated sampling equipment (e.g., electric water level) by washing with an Alconox™ (or equivalent)/potable water mixture before initial use and between uses to minimize the potential for cross-contamination; and,
- Submitted field replicates for laboratory analysis.

Specifically, a triplicate sample was collected from MW98-1 in April 2025. The replicate sample analysis ensured laboratory quality control as well as reproducibility of field sampling procedures.

The reproducibility of field sampling techniques was quantified by a parameter referred to as the relative standard deviation (RSD). RSD is calculated using the following formula:

$$RSD = \frac{s}{x} * 100\%$$

Where: RSD = relative standard deviation

s = standard deviation of triplicate samples

x = mean of triplicate samples

RSD values greater than 20% generally suggest further review is required. However, analytical error generally increases near the method reporting limit (MRL); therefore, the RSD calculation was not applied unless the concentration of samples was greater than 5 times the reported detection limit.

As summarized in Appendix D, RSD values were less than 20% or were not calculable (due to concentrations less than 5 times the detection limit) for the triplicate samples collected from MW98-1, suggesting that the sample and duplicate results are reproducible and reliable.

As a conservative measure, the highest concentration of a given parameter in a field triplicate sample set was used for comparison against the applicable standard or guideline.

Samples submitted to CARO are subject to five laboratory QA/QC procedures (i.e., method blanks, laboratory control samples, lab duplicates, surrogate recoveries, and reference materials), which are documented in the laboratory certificates of analysis provided in Appendix E.

10.0 LANDFILL GAS MONITORING

Landfill gas (LFG) is generated by the biodegradation of organic material in landfills and typically comprises equal parts methane (CH₄) and carbon dioxide (CO₂). Other gases generated within a landfill mass include oxygen (O₂), nitrogen (N₂), and traces of hydrogen sulphide (H₂S) and carbon monoxide (CO). Landfill gas constituent concentrations are contingent on the volume and composition of waste material, decomposition rates of waste material, and the degree of atmospheric exchange occurring within the landfill cell.

Methane (CH₄) is the most critical landfill gas constituent, as it becomes explosive at concentrations between approximately 5 and 15 % by volume in air (ENV, 2010). The lower end of this range (5 %) is commonly referred to as the lower explosive limit (LEL), while the upper end is referred to as the upper explosive limit (UEL). Methane is generated at a landfill as waste (organic matter) decomposes under anaerobic conditions (Topp et al., 1997).

Carbon dioxide (CO₂) is denser than air and may displace oxygen from subsurface structures such as wells and manholes. If conditions are not properly monitored beforehand, this could result in asphyxiation for personnel entering a subsurface structure.

Hydrogen sulphide (H₂S) becomes highly toxic at concentrations above 50 ppm but is generally smelled at 0.05 ppm and presents a conspicuous rotten egg-like odour by 3 ppm. As such, H₂S is generally identified by on-site personnel prior to reaching highly toxic levels. Nonetheless, monitoring H₂S is important because concentrations above 10 ppm can cause headaches and nausea.

Carbon monoxide (CO) is an odourless gas that mixes freely with air and is typically produced by the incomplete combustion of fossil fuels (Technical Safety BC, 2020). It has an LEL of 12.5 % (at which point it requires a temperature of 609 °C to ignite) and a UEL of 74 %.

10.1. Landfill Gas Monitoring Network

Landfill gas monitoring well MW98-3 was installed at the southwest corner of the Site in 1998 to a depth of 5.5 mbgs and has been monitored since April 2011.

The gas monitoring probe location is shown on Figure 3.

10.2. Landfill Gas Monitoring Methods

Landfill Gas Monitoring was performed with the Landtec LandGEM, which comes pre-calibrated by the rental supplier. An SKC Universal PCXR8 Sampling Pump- set to 5 L/min flow and a Dwyer 0-20" WC Digital Manometer are also used to collect vapour readings; the manometer is zeroed on-site. Atmospheric pressure, temperature and general conditions are recorded in a logbook.

The following outlines the landfill gas monitoring procedures:

- The Digital Manometer is connected to the sample port, the port is opened, the pressure is recorded, and the valve is closed;
- The LandGEM is then connected to the sample port, the port is opened and the LandGEM is run for 1 minute. Initial values for CH₄, CO, O₂ and Balance Gases are recorded in percent. The port is closed and the LandGEM removed;
- The SKC Pump is then connected to the sample port, the port is opened and the SKC pump run for the required purge time. The port is closed and the SKC pump is removed;
- The LandGEM is connected again to the sample port, the port is opened and the LandGEM is run for 1 minute and the final values for CH₄, CO, O₂ and Balance Gases are recorded in percent;
- The sample port is removed after final values are recorded, and the static water levels measured; and,
- The sample port is reinstalled (with the sample port closed), and lithium grease is applied to improve the seal on the PVC port.

10.3. Landfill Gas Monitoring Results

The ENV Landfill Criteria stipulates that combustible gas concentrations must not exceed the LEL in soil at the Site boundary and must not exceed 25% of the LEL in any structure or facility on or offsite.

MW98-03 was monitored four (4) times in 2025: February 19, June 19, August 20, and December 4. Consistent with previous years, CH₄ was not detected during the 2025 monitoring events, indicating that gases associated with landfill waste decomposition are likely not migrating through the subsurface near the southwest corner of the Site. CO and H₂S were detected at 1 ppm during the June and August monitoring events, respectively.

The 2025 soil gas monitoring results along with the historical results are provided in Appendix F.

11.0 SUMMARY AND CONCLUSIONS

In accordance with the OC requirements, RDOS personnel conducted groundwater sampling events in the spring, summer, and fall of 2025. The samples were analyzed for analytical parameters intended to illustrate potential groundwater effects from landfilling activities. Based on the sampling and analytical program findings, the following conclusions are made:

- The Site is a natural attenuation landfill that relies on its small size, relatively low leachate generation potential (based on climatic conditions), deep groundwater conditions and the use of proper operating and closure procedures to protect the receiving environment from potential leachate impacts. Nonetheless, concentrations of key landfill-leachate indicator parameters, including nitrate, TDS, manganese, and iron exceeded applicable guidelines/standards in one or more samples collected from cross- to downgradient monitoring wells MW98-1, MW98-2 and/or MW08-2. Given no other potential contaminating activities or anthropogenic sources were observed near the wells, these impacts are likely associated with current and historical landfilling operations;
- Concentrations were typically highest in samples from MW98-1, which is likely affected by preferential flow of leachate-impacted groundwater through bedrock fractures. Leachate parameter concentrations decreased in samples from MW98-1 between 2019 and 2021, but some have since rebounded and should therefore be carefully monitored moving forward.
- Leachate indicator parameter concentrations have also been elevated in samples from downgradient monitoring wells MW98-2 and MW08-2, but are generally low with respect to applicable water quality guidelines and standards, indicating limited groundwater impacts from landfill operations at the southern Site boundary.
 - Exceedances of applicable standards at these locations generally appear to be associated with naturally occurring weathering of the bedrock aquifer.
- Downgradient well Black Sage Well #2 does not appear to be impacted by landfill leachate and is therefore inferred to represent background groundwater quality.
- In general, the low transmissivity of Aquifer 254 beneath the Site, deep depth to groundwater and excess evapotranspiration above precipitation in the area appear to be limiting the generation and offsite transport of leachate-impacted groundwater.
- Gas monitoring completed at MW98-3 showed no signs of landfill gas migration through the subsurface at the Site's southwest corner.

12.0 RECOMMENDATIONS

Based on the annual monitoring program results and conclusions, we respectfully provide the following recommendations:

- Continue monitoring and sampling the five (5) existing onsite monitoring wells and offsite Black Sage Well #2 because leachate indicator parameters remain elevated in groundwater near the landfill. Monitoring well sampling should occur tri-annually to evaluate seasonal water quality trends and impacts over time. Black Sage Well #2 should continue to be sampled when accessible.

13.0 LIMITATIONS

This report has been prepared by Ecoscape Environmental Consultants Ltd. (Ecoscape) for the Regional District of Okanagan-Similkameen (the Client) and is intended for the sole and exclusive use of the Client. Except for the Client, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Ecoscape.

Nothing in this report is intended to constitute or provide a legal opinion. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

This report has been prepared for specific application to the Site, based on Client requests, and Site conditions present at the time work for the report was completed. The conclusions provided herein are based on the specific areas investigated on the Site by soil and groundwater sampling, and analytical testing of selected soil samples and groundwater samples and cannot be extrapolated extensively away from sample locations. Ecoscape does not warranty information from third-party sources used in this report.

If additional information becomes available that is inconsistent with the information provided herein or suggests that the potential for environmental concern may be present, Ecoscape should be contacted to reassess the conclusions provided in this report.

14.0 CLOSURE

We trust that this report satisfies your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted

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Attachments: Figures

Appendices

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FIGURES

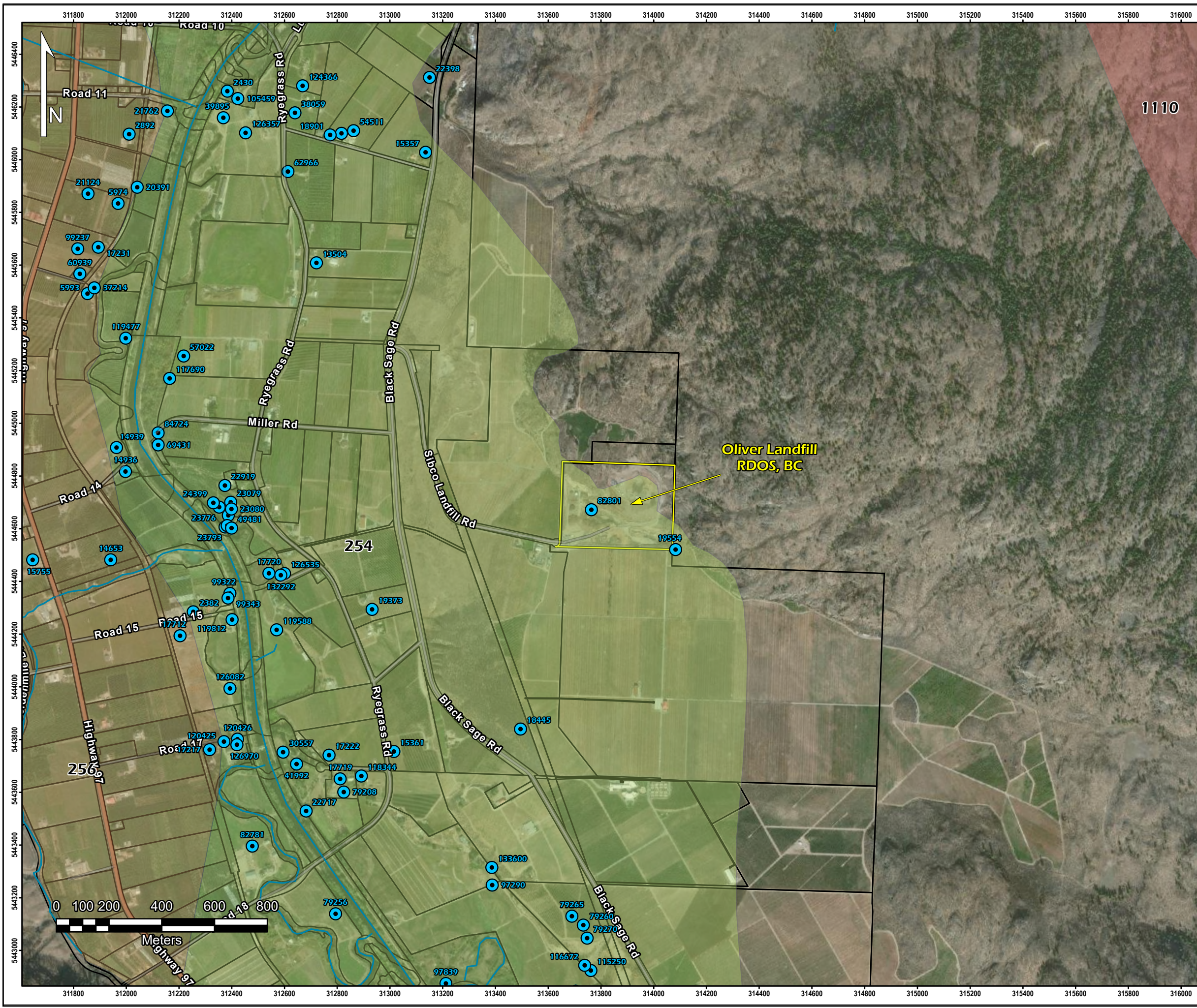


FIGURE 1
Site Location

Project: Annual Environmental Monitoring Report
 Location: RDOS
 Project No.: 22-4504
 Prepared for: RDOS
 Prepared by: Ecoscape Environmental Consultants Ltd.
 Mike Schutten, M.A.Sc., P.Geo

Coordinate System: NAD83-UTM Zone 11
 Imagery: ESRI World Imagery
 Map Date: February 9, 2026

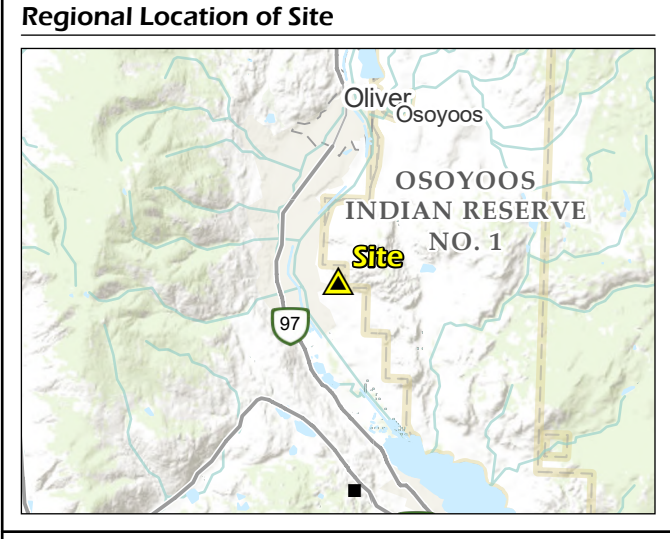
LEGEND

- Site
- Cadastre


ENV-Mapped Aquifers

- 254
- 256
- 1110

- Streams and Rivers
- ENV-Mapped Well (WTN)



DISCLAIMER
 The data displayed is for conceptual purposes only and should not be interpreted as a legal survey or for legal purposes. If discrepancies are found between the data portrayed in this report and that of a legal survey, the legal survey will supersede any data presented herein.



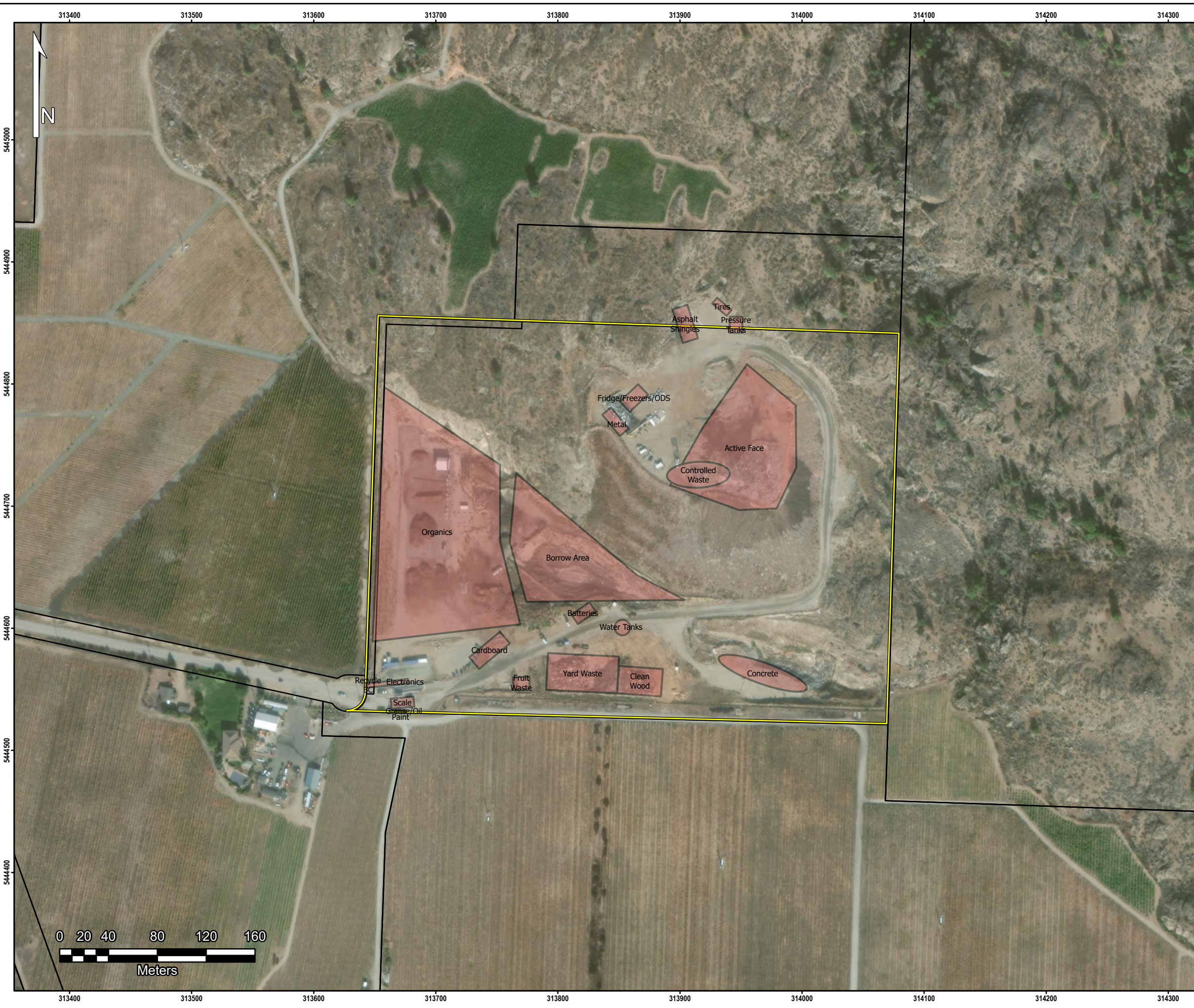


FIGURE 2 Site Plan

Project: Annual Environmental Monitoring Report
Location: RDOS
Project No.: 22-4504
Prepared for: RDOS
Prepared by: Ecoscape Environmental Consultants Ltd.
 Mike Schutten, M.A.Sc., P.Geo.
Coordinate System: NAD83-UTM Zone 11
Imagery: ESRI World Imagery
Map Date: February 9, 2026

LEGEND

- Site Feature (approx.)
- Approximate Site Boundary
- Cadastre

DISCLAIMER
 The data displayed is for conceptual purposes only and should not be interpreted as a legal survey or for legal purposes. If discrepancies are found between the data portrayed in this report and that of a legal survey, the legal survey will supersede any data presented herein.






FIGURE 3
Environmental Monitoring and Sampling Locations

Project: Annual Environmental Monitoring Report
 Location: RDOS
 Project No.: 22-4504
 Prepared for: RDOS
 Prepared by: Ecoscape Environmental Consultants Ltd.
 Mike Schutten, M.A.Sc., P.Geo.

Coordinate System: NAD83-UTM Zone 11
 Imagery: ESRI World Imagery
 Map Date: February 9, 2026

- LEGEND**
- Inferred GW Flow Direction
 - Gas Probe
 - Sampled Water Supply Well
 - Monitoring Well (active)
 - BC Well Database (WTN)
 - Streams and Rivers
 - Approximate Site Boundary
 - Cadastre

DISCLAIMER
 The data displayed is for conceptual purposes only and should not be interpreted as a legal survey or for legal purposes. If discrepancies are found between the data portrayed in this report and that of a legal survey, the legal survey will supersede any data presented herein.



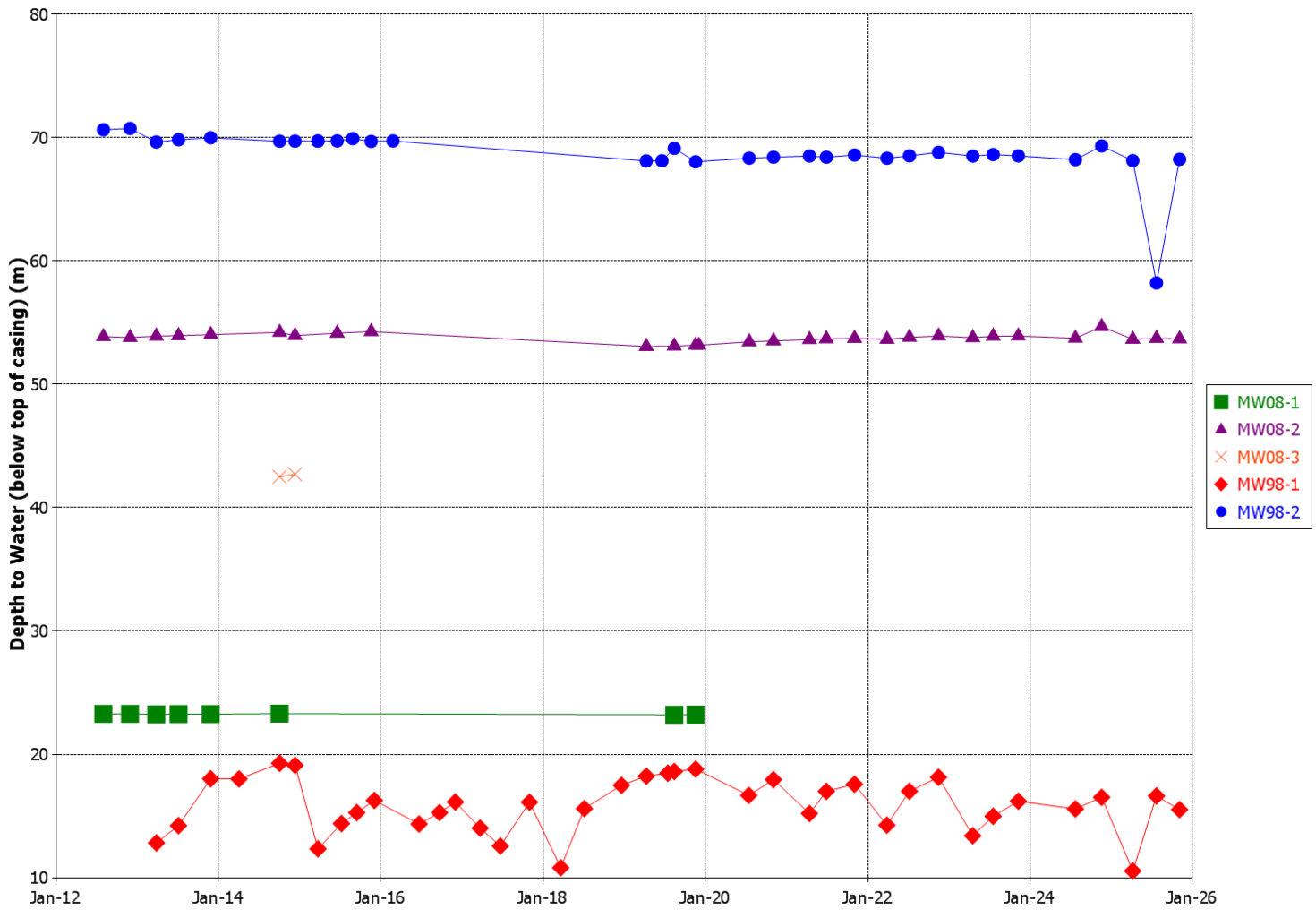


Figure 4: Depth to Water Times Series Plot

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2025

Dwn by: MPS

Ckd by: MPS

Scale: N/A



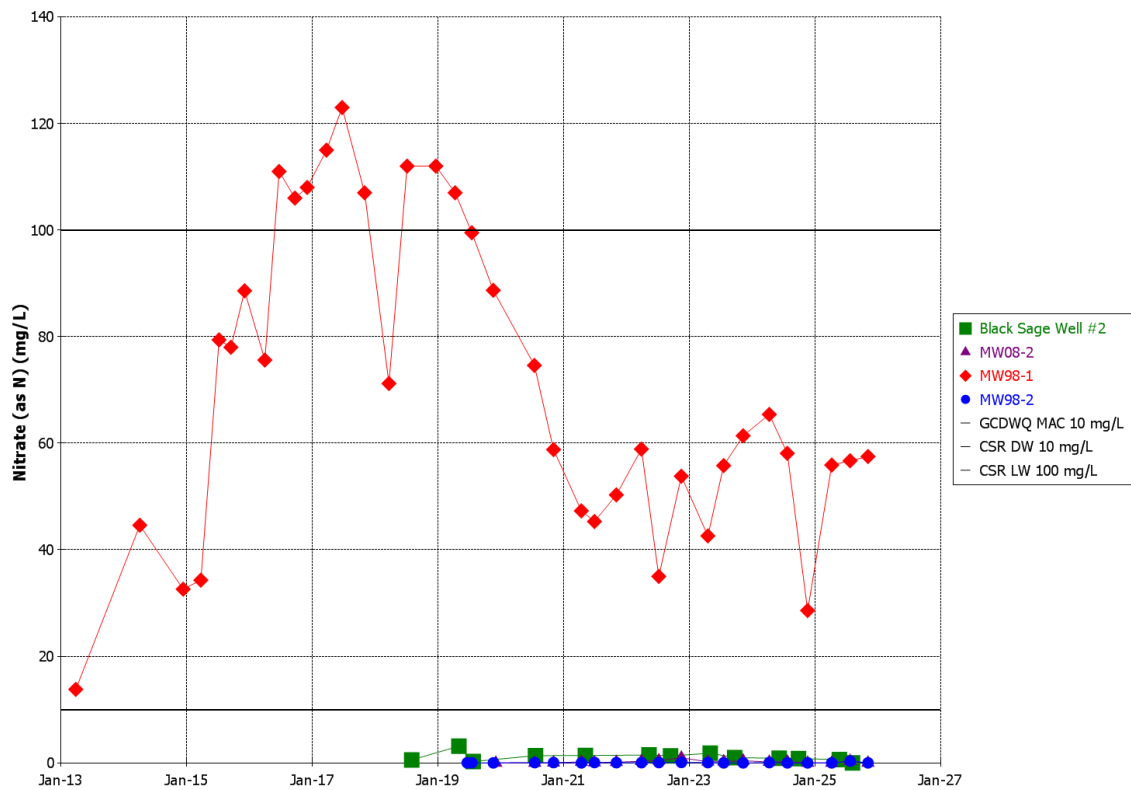
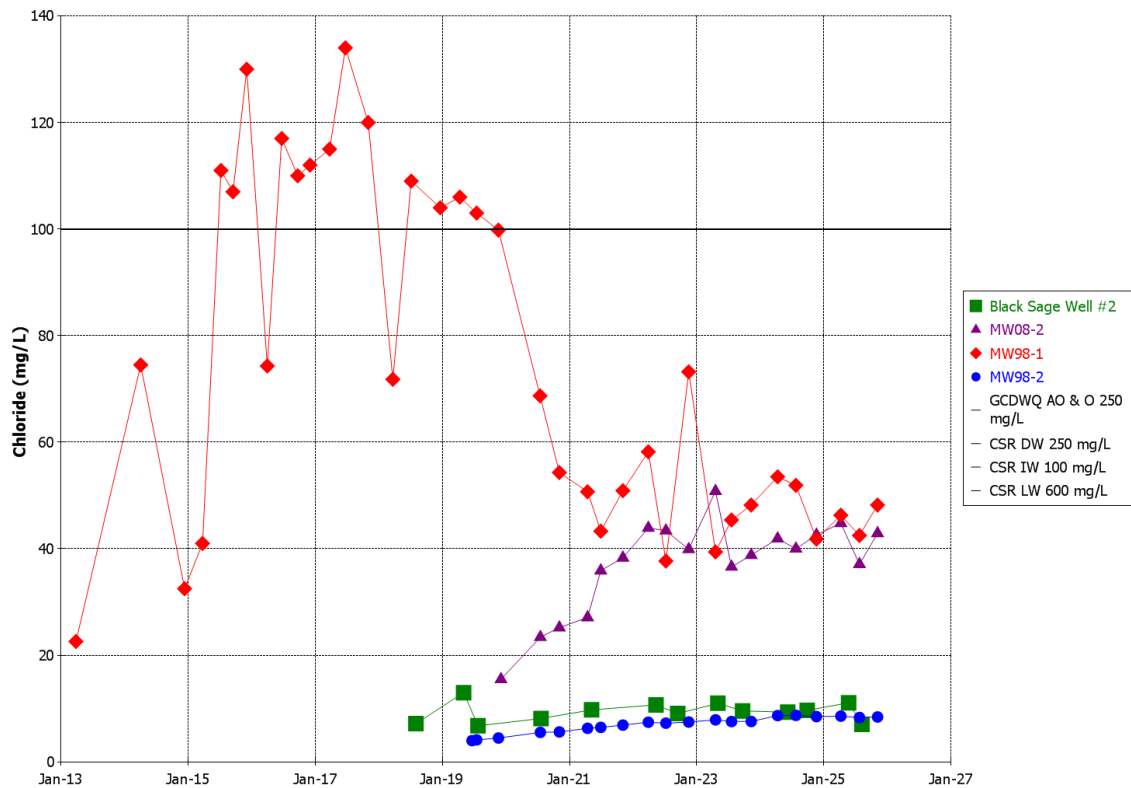


Figure 5: Chloride (Top) and Nitrate (Bottom) in Groundwater Time Series Plot

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2026

Dwn by: MPS

Ckd by: MPS

Scale: N/A



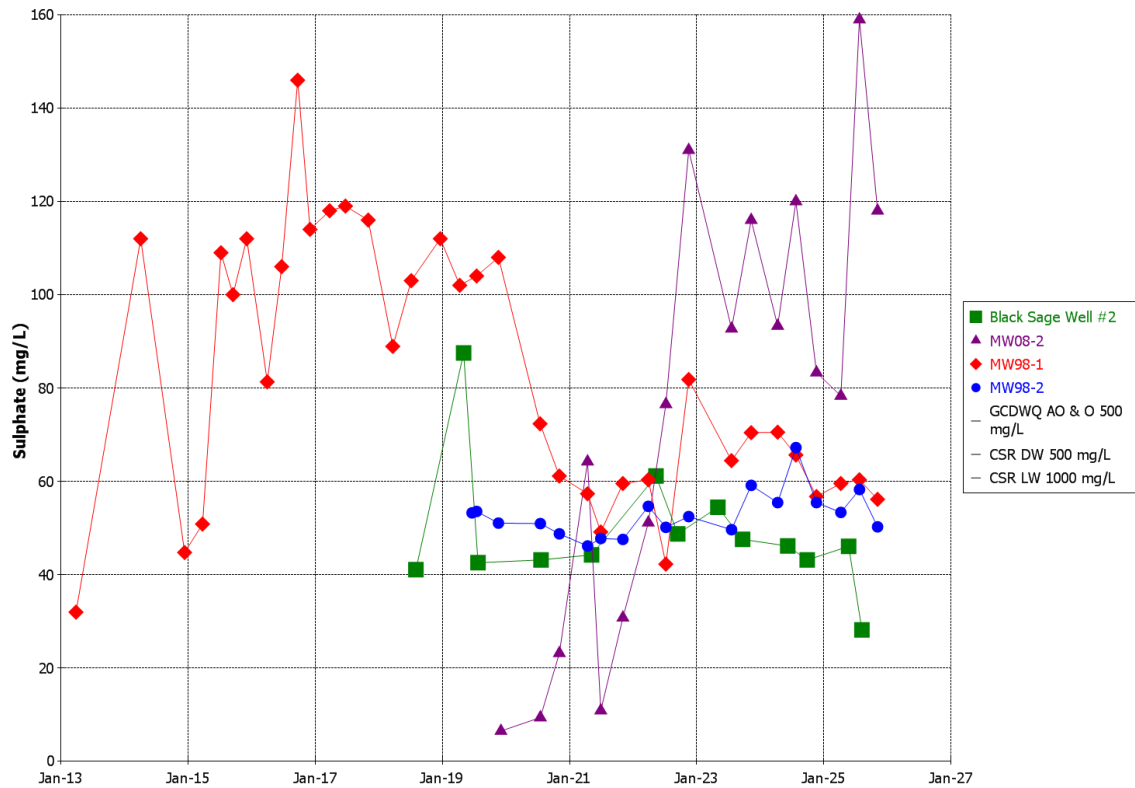
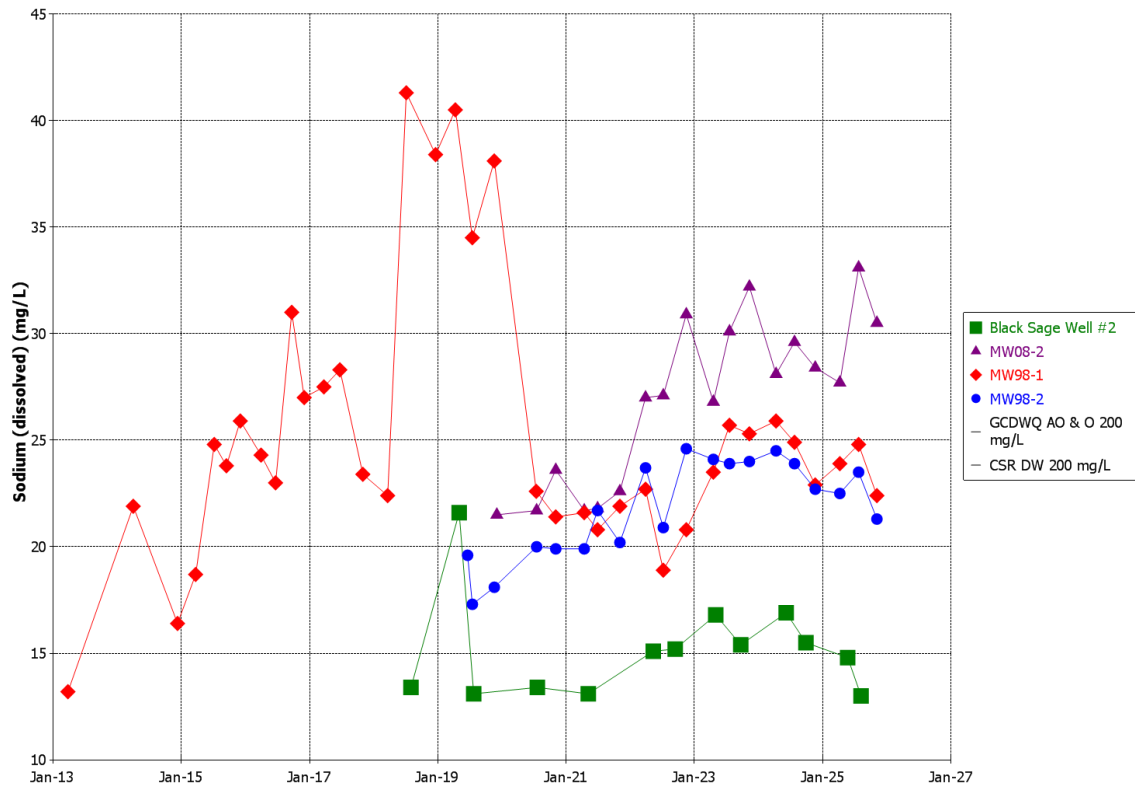


Figure 6: Dissolved Sodium (Top) and Sulfate (Bottom) in Groundwater Time Series Plot

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2026

Dwn by: MPS

Ckd by: MPS

Scale: N/A



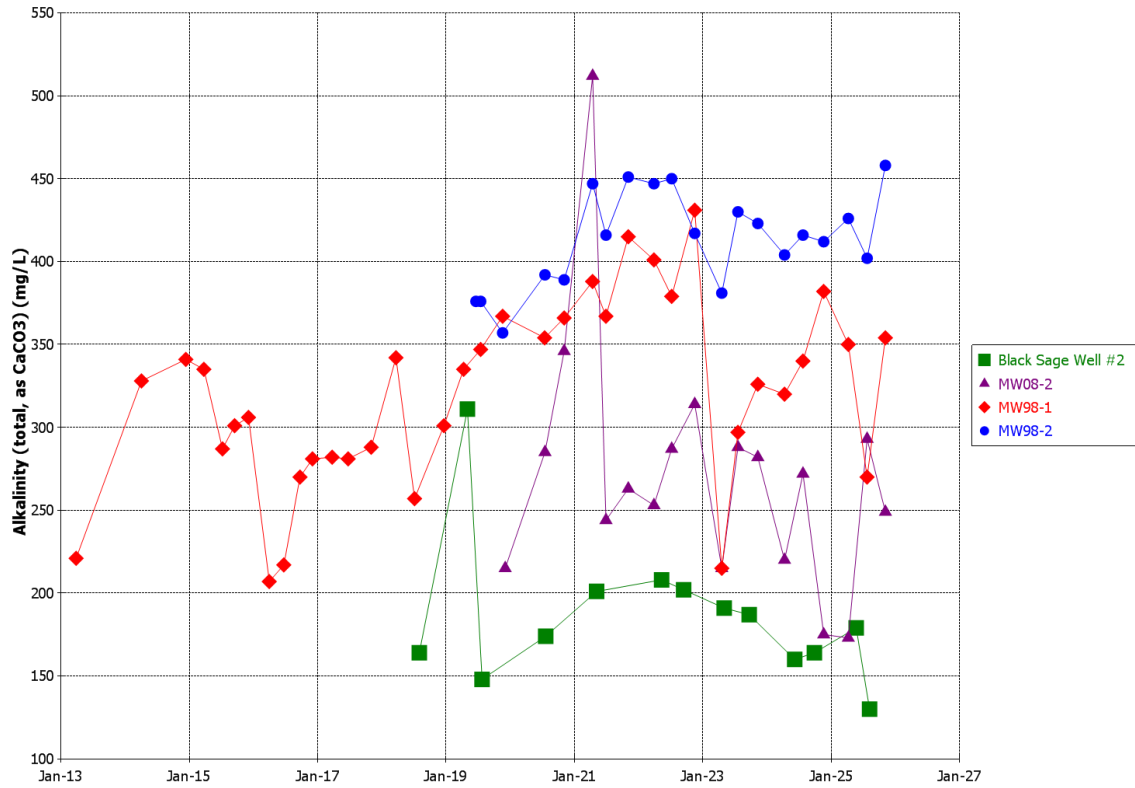
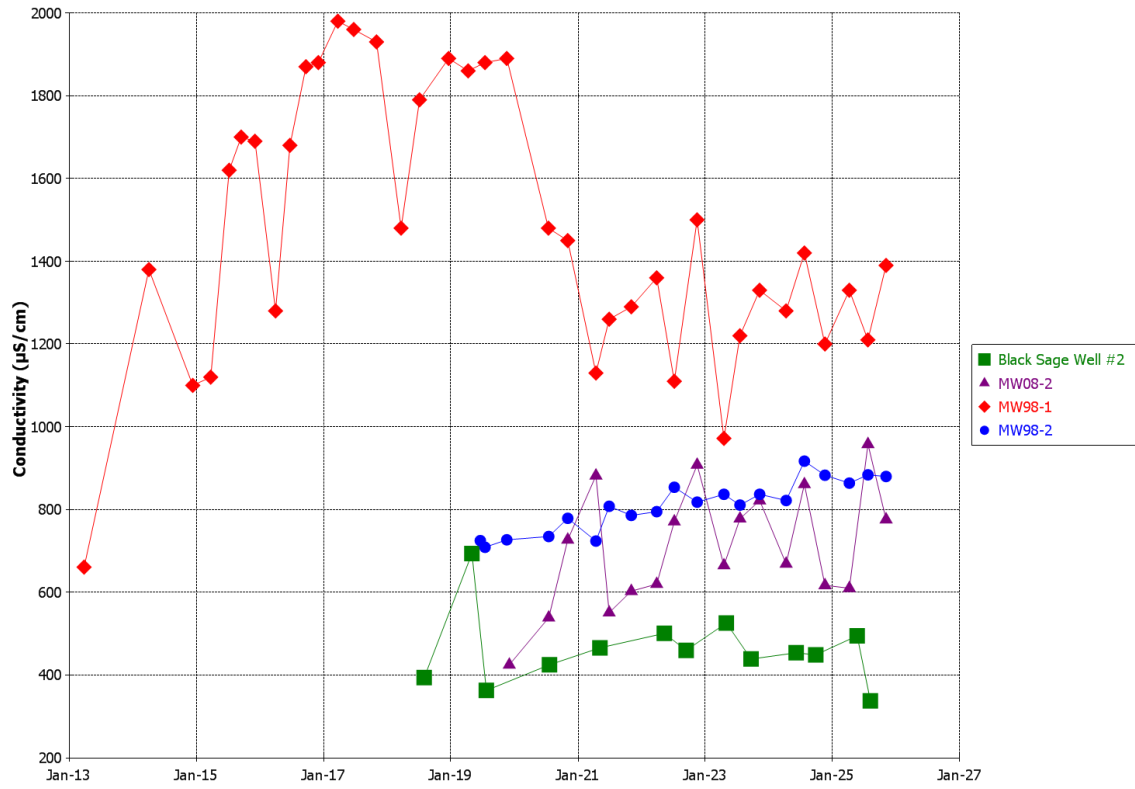


Figure 7: Conductivity (Top) and Total Alkalinity (Bottom) in Groundwater Time Series Plot

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2026

Dwn by: MPS

Ckd by: MPS

Scale: N/A



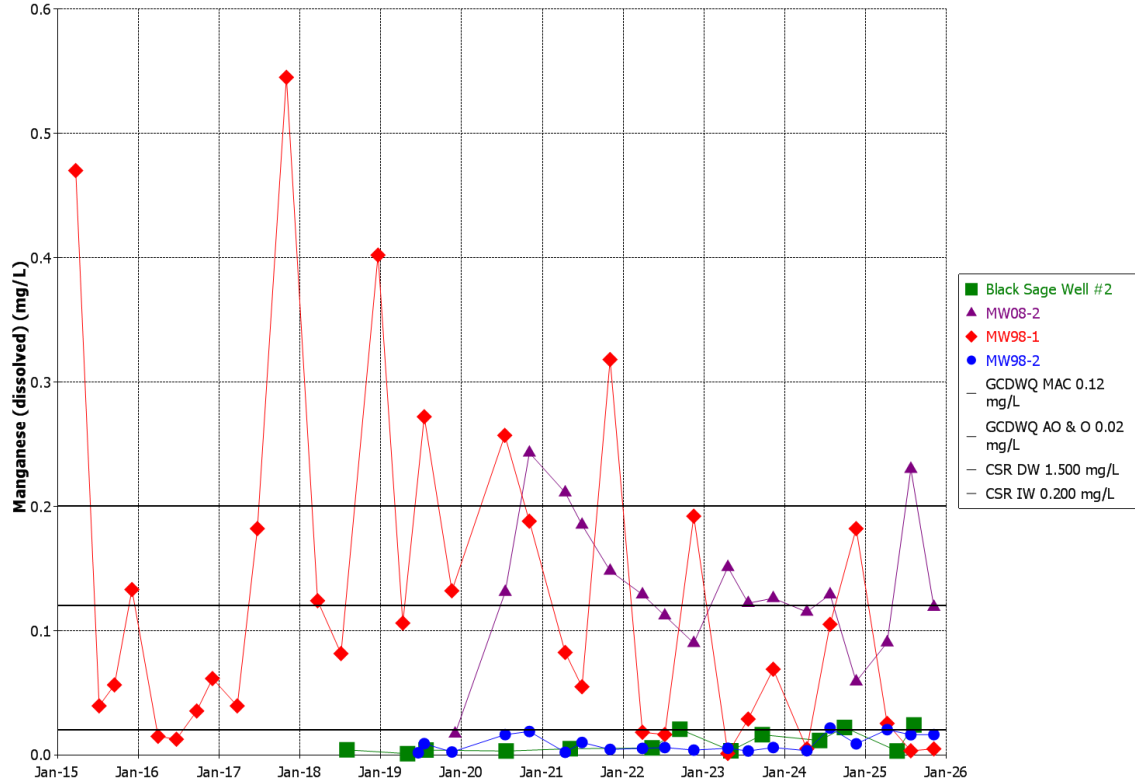
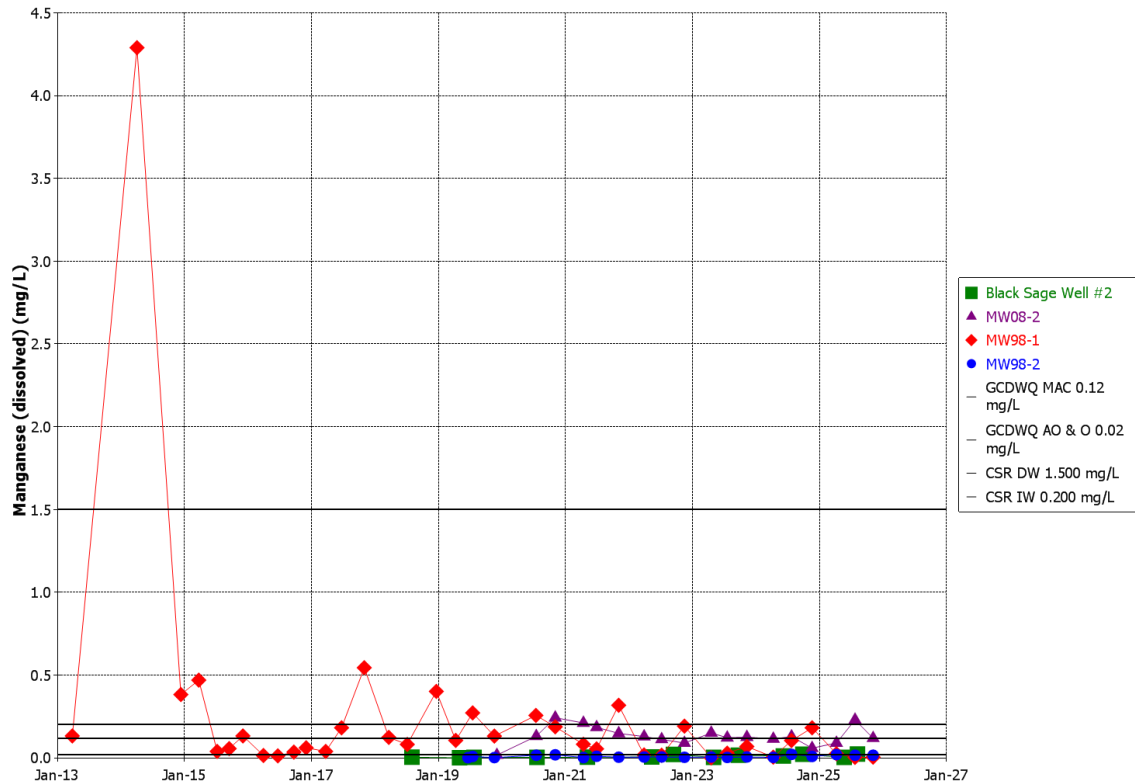


Figure 8: Dissolved Manganese (Top) and Dissolved Manganese Post-2014 (Bottom) in Groundwater Time Series Plot

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2026

Dwn by: MPS

Ckd by: MPS

Scale: N/A



- Black Sage Well #2
- ▲ MW08-2
- ◆ MW98-1
- MW98-2

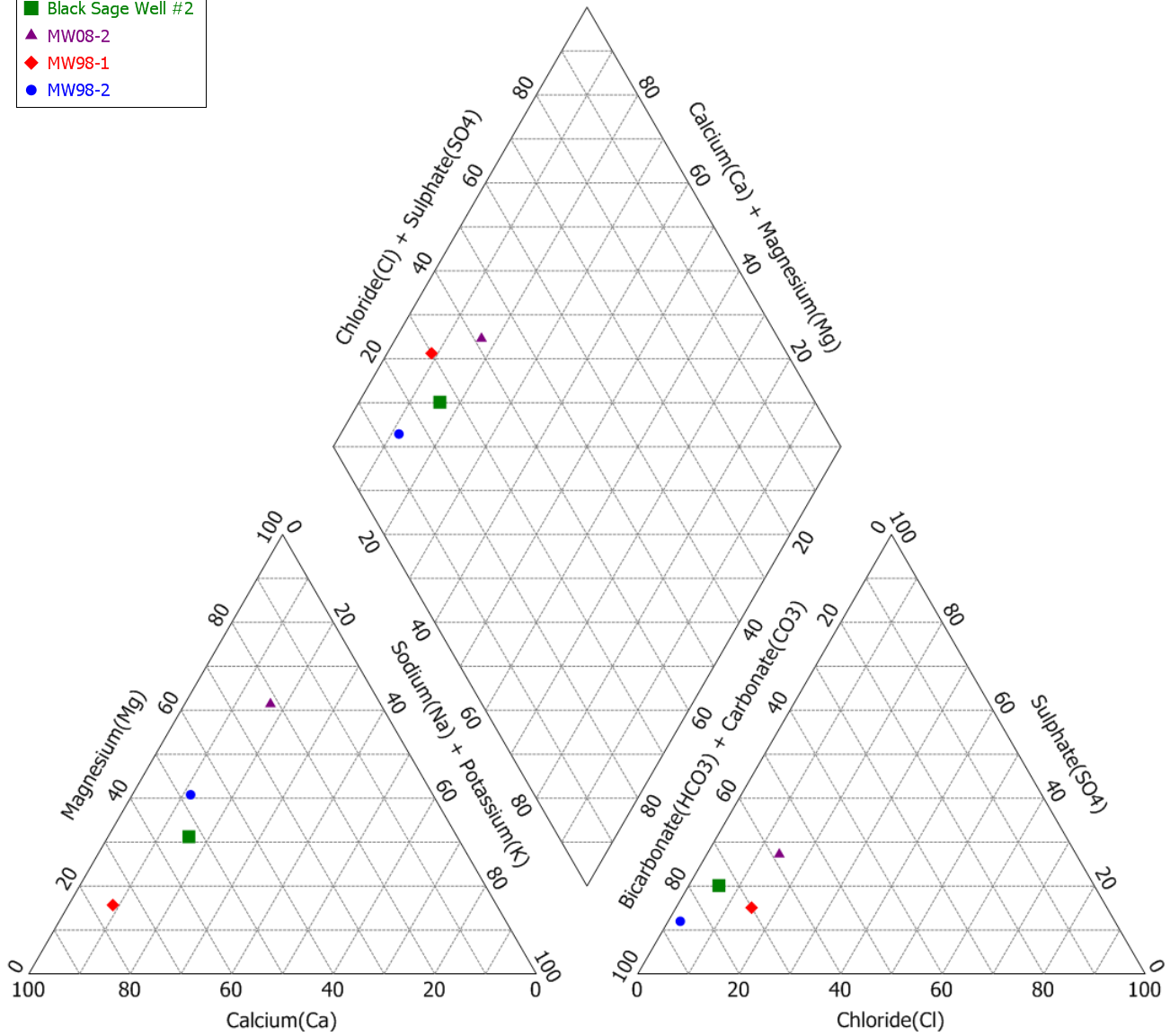


Figure 9: Piper Diagram based on Average Results from 2023 to 2025

Project: 2025 Annual Environmental Monitoring Report

Client: RDOS

Location: Oliver Landfill

File No: 22-4504

Date: January 7, 2026

Dwn by: MPS

Ckd by: MPS

Scale: N/A



APPENDIX A: General Terms and Conditions

GENERAL CONDITIONS

This report applies and is subject to these “General Conditions”.

1.0 Use of Report

This report concerns a specific site and a specific scope of work, and is therefore not applicable to any other sites or any other developments not referred to in the report. Any deviation from the specific site or scope or work would require a supplementary investigation and assessment.

Conclusions and recommendations contained in this report are solely intended for the use of Ecoscape’s client. Ecoscape bears no responsibility for the accuracy of information, the analysis of data or recommendations contained or referenced in this report when the report is utilized by or relied upon by any party other than Ecoscape’s client, unless otherwise authorized in writing by Ecoscape. Any unauthorized application of this report is at the discretion and sole risk of its user.

This report is subject to copyright, and therefore shall not be reproduced in part or in whole without prior written consent by Ecoscape. Additional copies of this report may be available upon request, if required, and will be supplied after receipt of payment for expenses associated with report production.

2.0 Limitations of Report

This report was derived solely from the conditions that were present on site during Ecoscape’s investigation. The client, and any other parties making use of this report with the express written consent of the Ecoscape and the client, are aware that conditions affecting the environmental condition of the site can vary both temporally and spatially, and that the conclusions and recommendations included in this report are temporally sensitive.

The client, and any other parties making use of this report with the express written consent of the Ecoscape and the client, are also aware that conclusions and recommendations included within this report emanate from limited observations and information, and that both on-site and off-site conditions may vary, which in turn could affect the conclusions and recommendations that were made.

The client is aware that Ecoscape is not qualified to, nor is it making any recommendations in terms of purchase, sale, investment or development of the subject property, as such decisions are the sole responsibility of the client.

2.1 Information Provided to Ecoscape by Others

During the extent of the preparation and work carried out in this report, Ecoscape may have relied upon information

provided by parties other than the client. While Ecoscape strives to validate the accuracy of such information when instructed to do so by the client, Ecoscape accepts no responsibility for the validity of such information which may affect the report.

3.0 Limitation of Liability

The client acknowledges that property containing hazardous wastes and contaminants poses a high risk of claims brought by third parties stemming from the presence of those materials. Accounting for these risks, and in consideration of Ecoscape providing the requested services, the client agrees that Ecoscape’s liability to the client, with respect to any issues relating to hazardous wastes or contaminants located on the subject property shall be limited to the following:

(1) With respect to any claims brought against Ecoscape by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to Ecoscape under this Agreement, whether the action is based on breach of contract or tort;

(2) With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject property, the client agrees to indemnify, defend and hold harmless Ecoscape from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by Ecoscape, whether the claim be brought against Ecoscape for breach of contract or tort.

4.0 Disclosure of Information by Client

The client agrees to fully cooperate with Ecoscape with respect to the provision of all available information on the past, current, or proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for Ecoscape to properly provide the service, Ecoscape is relying on full disclosure and accuracy of any such information. Ecoscape does not accept any responsibility for conclusions drawn from erroneous, invalid, or inaccurate data provided to us by another party and used in the preparation of this report.

5.0 Standard of Care

Services performed by Ecoscape for this report have been completed in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgement has been applied in developing the conclusions and/or recommendations made in this report. No warranty or guarantee, express or implied, is made concerning the

results, comments, recommendations, or any other portion of this report.

6.0 Notification of Authorities

The client acknowledges that in certain instances the discovery of hazardous materials, contaminants or conditions and materials may require that regulatory agencies and other parties be informed and the client agrees that notification to such parties or persons as required may be done by Ecoscape in its reasonably exercised discretion. Further, Ecoscape reserves the right to notify Provincial agencies when rare or endangered flora or fauna are observed, whether the species classifications are identified as such at the local, Provincial, or Federal levels of government.

7.0 Ownership of Instruments of Professional Service

The client acknowledges that all reports, plans, and data generated by Ecoscape during the performance of the work and other documents prepared by Ecoscape are considered its professional work product and shall remain the copyright property of Ecoscape.

8.0 Interpretation of the Report

8.1 Soil Description

Soils, rocks and geological units have been identified and logged using commonly accepted methods in professional geoscience practice; however, soil, rock and geological unit classification and identification are subject to the observers' and Report author's judgement. As such, Ecoscape does not warrant or guarantee the exactness of the insitu subsurface conditions described in this Report.

8.2 Test Pit and Borehole Logs

Test pit and borehole logs are an interpretive record of field observations and in some cases laboratory testing of select samples. It is not uncommon for sample recovery to be incomplete, even when using normal sampling procedures. Soil, rock and geological units described on the logs are based on interpretation of available data, and may therefore vary from actual insitu subsurface conditions.

8.3 Geological Cross-sections

Geological cross-sections were constructed based on information provided in test pit and borehole logs, topographic information, and information available online. Stratigraphy between logged locations were inferred based on hydrogeological and geological principles; however, actual geology and stratigraphy may vary from that drawn on our cross-sections.

8.4 Hydrogeological Conditions

Groundwater conditions described in the report and shown on borehole and test pit logs are a record of observed

conditions at the time of their measurement. Groundwater conditions may vary between tested locations, and are affected by natural seasonal fluctuations. Groundwater conditions can also be affected by anthropogenic activities.

9.0 Alternate Report Format

Where Ecoscape submits both an electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Ecoscape's instruments of professional service), the client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by Ecoscape shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the client agrees and waives all future right to dispute that the original hard copy signed version archived by Ecoscape shall be deemed to be the overall original for the Project.

The client agrees that both electronic file and hard copy versions of Ecoscape's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party other than Ecoscape. The client warrants that Ecoscape's instruments of professional service will be used only and exactly as submitted by Ecoscape.

The client recognizes and agrees that electronic files submitted by Ecoscape have been prepared and submitted using specific software and hardware systems. Ecoscape makes no representation about the compatibility of these files with the client's current or future software and hardware systems.

APPENDIX B: Operational Certificate



April 26, 2011

Tracking Number: 95
Authorization Number: 15280

REGISTERED MAIL

REGIONAL DISTRICT OKANAGAN SIMILKAMEEN
101 MARTIN STREET
PENTICTON, BC V2A 5J9

Dear Operational Certificate Holder:

Enclosed is Operational Certificate 15280 issued under the provisions of the *Environmental Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual fee will be determined according to the Permit Fees Regulation.

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

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

Administration of this operational certificate will be carried out by staff from the Okanagan Region. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Manager, Environmental Protection, at Ministry of Environment, Regional Operations, Okanagan Region, 102 Industrial Pl., Penticton, BC V2A 7C8.

Yours truly,

Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Enclosure

15280

page 2

Date: April 26, 2011

cc: Environment Canada



**MINISTRY OF
ENVIRONMENT**

OPERATIONAL CERTIFICATE

15280

*Under the Provisions of the Environmental Management Act and in accordance with the
Regional District of Okanagan Similkameen's Solid Waste Management Plan*

**REGIONAL DISTRICT of OKANAGAN SIMILKAMEEN
101 MARTIN STREET
PENTICTON, BC V2A 5J9**

is authorized to manage and discharge Municipal Solid Waste and manage recyclable material from the Regional District of Okanagan Similkameen and environs at the Oliver landfill located near Oliver, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Environmental Management Act* and may result in prosecution. This authorization supersedes any previously issued authorization for this landfill.

1. AUTHORIZED DISCHARGES

1.1 Authorized source

This section applies to the discharge of refuse from a Sanitary Landfill. The site reference number for this discharge is E212370.

- 1.1.1 The maximum rate of discharge is 12000 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 Director.
- 1.1.3 The authorized works are sanitary landfill and related appurtenances approximately located as shown on Site Plan A.

Date issued: April 26, 2011

Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

- 1.1.4 The location of the facilities used to manage and discharge the Municipal Solid Waste, and from which the discharge originates, is located at Lot 954, District Lot 2450s, Similkameen Division of Yale District, Plan 14590, except Plan 31702, as shown on Site Plan A.
- 1.1.5 The authorized facilities are signs, weigh scales, recyclable material and waste drop-off and storage facilities and related appurtenances approximately located as shown on Site Plan A.

2. **DEFINITIONS**

- a) "Director" means the Director or a person delegated to act on behalf of the Director, as defined in the Environmental Management Act;
- b) "Regional Manager" means Regional Manager, Environmental Protection;
- c) "Qualified Professional (QP)" means an applied scientist or technologist specializing in a particular applied science including, but not necessarily limited to: agronomy, biology, chemistry, engineering, geology, or hydrogeology; and 1) who is registered in British Columbia with their appropriate professional organization, acting under that association's Code of Ethics and subject to disciplinary action by that association; and 2) who, through suitable education, experience, accreditation and knowledge, may be reasonably relied on to provide advice within their area of expertise.

3. **GENERAL REQUIREMENTS**

3.1 **Maintenance of Works and Emergency Procedures**

The Operational Certificate Holder must inspect the authorized works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the Operational Certificate Holder which prevents effective operation of the authorized works or leads to unauthorized discharge, the Operational Certificate Holder shall comply with all applicable statutory requirements, immediately notify the Regional Manager and take appropriate remedial action for the prevention or mitigation of pollution. The Director may reduce or suspend operations to protect the environment until the authorized works have been restored and/or corrective steps have been taken to prevent unauthorized discharges.

Date issued: April 26, 2011



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for Director, *Environmental Management Act*
Okanagan Region

3.2 **Process Modifications**

The Regional Manager must be notified by the Operational Certificate holder prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge.

3.3 **Plans - New Works**

Plans and specifications of the works must be certified by a Qualified Professional licensed to practice in the Province of British Columbia, and submitted to the Regional Manager, Environmental Protection. A Qualified Professional must certify that the works have been constructed in accordance with the plans before discharge commences

3.4 **Landfill Gas Management**

The Operational Certificate holder must comply with the requirements of the BC Landfill Gas Management Regulation.

3.4.1 **Gas Venting or Recovery and Management Systems**

If the emission of non-methane organic compounds (NMOCs) exceeds 150 tonnes/year, the installation and operation of a landfill gas recovery system is required.

3.4.2 **Lower Explosive Limit**

The landfill shall be operated such that combustible gas concentrations do not exceed the lower explosive limit in soils at the property boundary or 25% of the lower explosive limit in any on-site or off-site structure or facility, including any services (water, sewer, electrical, etc.). This provision does not apply to leachate or landfill gas works where appropriate signage and maintenance controls have been established to protect health and safety. Such provisions must be specified in an approved Design and Operating Plan.

3.4.3 **Landfill Gas Assessment**

When 100,000 tonnes of waste have been discharged at the landfill, or the annual waste acceptance rate exceeds 10,000 tonnes an assessment

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

of the potential for landfill gas generation must be submitted to the Director, in accordance with the requirements of the BC Landfill Gas Management Regulation.

3.5 **Additional Facilities or Works**

The Director may require investigations, surveys, and the construction of additional facilities or works including, but not limited to, additional leachate, bear-proof and landfill gas facilities. The Director may also amend the requirements of any of the information required by this operational certificate including plans, programs, assessments and reports.

3.6 **Spill Reporting**

All spills to the environment (as defined in the Spill Reporting Regulation) shall be reported immediately in accordance with the Spill Reporting Regulation. Notification shall be via the Provincial Emergency Program at 1-800-663-3456.

3.7 **Waste Asbestos**

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

- a. The asbestos waste may not be mixed with any other hazardous waste;
- b. The RDOS must approve the disposal before disposal takes place; and
- c. All other applicable requirements of the Hazardous Waste Regulation, including but limited to manifesting and waste record keeping, must also be complied with.

3.8 **Landfill Design and Operation Plan**

3.8.1 A Landfill Design and Operational Plan, prepared by a QP was submitted (as part of the Operations and Closure Plan) for approval by the Regional Manager, in June 2010.

- 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; and,

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

- Rodent and nuisance wildlife control procedures;

- 3.8.3 Terms of reference for the Design and Operation Plan are subject to approval by the Director.
- 3.8.4 The Director may request revisions to the Design and Operation Plan. Terms of reference for the revisions to the Design and Operation Plan are subject to approval by the Director.
- 3.8.5 Operation of this landfill is to be in accordance with the approved Design and Operation Plan.
- 3.8.6 If there should be an inconsistency between this Operational Certificate and the authorized Design and Operation Plan, the Operational Certificate shall take precedence.

3.9 Closure Plan

A Closure Plan was submitted (as part of the Operations and Closure Plan) for approval by the Regional Manager in June 2010. Among other information it included the following:

- 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;
- Proposed end use of the property after closure;
- A plan and implementation schedule for monitoring groundwater, surface water and landfill gas, erosion and settlement for a minimum post closure period of 25 years; and,
- Provisions for maintenance and corrective measures for a minimum 25-year post-closure period.

- 3.9.1 Terms of reference for the Closure Plan are subject to approval by the Director.
- 3.9.2 The Director may request revisions to the Closure Plan.

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for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

3.10 **Protection of Groundwater and Surface Water Quality**

3.10.1 The Landfill must be managed such that both groundwater and surface water quality at or beyond the landfill property boundary meets the British Columbia Water Quality Guidelines (Criteria) and the landfill must be managed such that both groundwater and surface water quality at or beyond the landfill property boundary meets the British Columbia Water Quality Guidelines (Criteria) and the most recent applicable Working Water Quality guidelines for British Columbia.

3.10.2 If results of groundwater or surface monitoring indicate any exceedance of the above-noted water quality criteria, the Director may require additional leachate management control measures including improvement/modification of the works. Terms of reference for any leachate management study and/or design work will be subject to the approval of the Director.

3.11 **Property Boundary**

The buffer zone between any municipal solid waste discharged 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 Director.

3.12 **Setbacks**

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. The distance between the discharged municipal solid waste and the nearest surface water is to be a minimum of 100 metres. Greater or lesser separation distances may be authorized by the Director 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.

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Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

3.13 **Natural Control Landfill**

- 3.13.1 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.
- 3.13.2 There is to be at least a 2 metres thick layer of low permeability soil with a hydraulic conductivity of 1×10^{-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.

3.14 **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.

3.15 **Odour Control**

Should objectionable odours, attributable to operations of the facilities, occur beyond the property boundary, measures or additional works will be required to reduce odour to acceptable levels.

3.16 **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.

3.17 **Fencing and Access**

Fencing is required to be installed around the perimeter of the landfill. The type and extent of fencing will depend on the existing natural vegetation, topographic features and the type of material being accepted, is to be authorized by the Director. All access points are to have locking gates.

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Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

3.18 **Design by Qualified Professional**

Any further expansion or development is to be designed by a Qualified Professional. All plans, specifications, and reports are to be signed and sealed by a Qualified Professional.

3.19 **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 an impact on groundwater and any future vegetation on the site.

3.19 **Designated Areas**

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

When a separated recyclable material is a Hazardous Waste, it is to be stored and managed in accordance with the Hazardous Waste Regulation.

3.20 **Signs**

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

Site name; Owner and operator; Contact information for owner and operator, and phone number in case of emergency (such as fire); Hours of operation (if applicable); Materials/wastes accepted for landfill and recycling; Materials/wastes banned; and 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.

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for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

3.21 Supervision

Fulltime, trained operators are required to be present 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 Operational and Closure Plan and all annual reports.

3.22 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.

3.23 Dust Control

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

3.24 Waste Compaction and Covering

3.24.1 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 Director, 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 Director. Under specific circumstances, such as during bear season, the Director 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 Director.

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Okanagan Region

- 3.24.2 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.
- 3.24.3 Final cover for landfill sites is to consist of a minimum of 1 metre of low permeability ($<1 \times 10^{-5}$ 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.

The Director may approve the alternate, Evapotransportative type of Final Cover (ET), as described in the Operation and Closure Plan prepared by Conestoga-Rovers and Associates, June 2010, provided that it can be demonstrated to the satisfaction of the Director that the ET cover offers equivalent or better performance than the traditional Final Cover described above.

3.25 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 Director.

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

3.26 **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 Manager.

3.27 **Wildlife**

The Operational Certificate holder is required to monitor wildlife (medium and large carnivores) activity at the facility and keep records of occurrences and observations of wildlife (medium and large carnivores). 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 Director.

3.28 **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 as to not constitute a fire hazard.

3.29 **Ozone Depleting Substances**

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

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

4. **MONITORING AND REPORTING REQUIREMENTS**

4.1 **Municipal Solid Waste Measurement**

The Operational Certificate Holder shall provide a complete record of the quantity of waste received in the Annual Report data in a form suitable for inspection by the Director and submit the data, suitably tabulated, to the Regional Manager, for the previous year.

- 4.1.1 Provide and maintain a weigh scale and record the weight of refuse discharged to the landfill over a 24-hour period or provide a volume measurement system and record the volume and a weight conversion of refuse discharged to the landfill over a 24-hour period.
- 4.1.2 Record the weight or volume of recyclable and reusable materials not being discharged and that are being separated, stored or processed at the landfill over a 24-hour period.
- 4.1.3 If possible, density tests should 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.

4.2 **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, and take appropriate remedial action if necessary.

4.3 **Monitoring Program**

- 4.3.1 A monitoring program must be developed to identify any impacts to the environment and public health from the landfill.

The monitoring program must address, but not be limited to, subsections 4.1, 4.2 and 7.15 of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills.

- 4.3.2 Monitoring must be conducted in accordance with the monitoring program.

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

4.3.3 Sampling is to be carried out in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples, 2003 Edition (Permittee)", or most recent edition, or by suitable alternative procedures as authorized by the Director.

4.3.4 Analyses are to be carried out in accordance with procedures described in the "British Columbia Laboratory Manual (2009 Permittee Edition)", or the most recent edition, or by suitable alternative procedures as authorized by the Director.

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

4.3.5 An hydrogeological assessment report, which also includes location of ground water monitoring well sites ground and surface water monitoring data and analysis, and background reference information for the Operational and Closure Plan, was submitted to the Director for authorization, in June 2009.

4.3.6 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.

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

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

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

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

4.4 Annual Operating and Monitoring Report

4.4.1 Annual Report

The Operation Certificate Holder shall submit an Annual Report to the Director on or before March 31, each year for the previous calendar year. The report shall contain at least the following information:

- a. The type and tonnage of waste received, recycled and discharged for the proceeding 12-month period;
- b. A current topographic map of the active landfill area and soil stockpiles;
- c. Updated estimates for the remaining capacity, closure date for the current phase and closure date for the current landfill footprint;
- d. Any new information or proposed changes relating to the facilities and Design and Operation Plan;
- e. Open burning activity, if applicable, including amount of material received for burning, number of burns and updates from a wood waste audit;
- f. Occurrences or observations of wildlife (medium and large carnivores) at the facility;
- g. A statement regarding progress in reducing the waste stream, in accordance with the hierarchy of reduce, reuse and recycle principles; and,
- h. The results of all monitoring programs as specified in this Operational Certificate. Data interpretation and trend analysis, as well as an evaluation of the impacts of the discharges on the receiving environment in the previous year shall be carried out by a qualified professional;
- i. The methods and amounts of leachate collection, treatment and disposal, if applicable.

4.5 Future Monitoring

The Director may specify in writing a monitoring program if the Director feels it is necessary for the protection of the environment. This may include sampling of environmental media and the preparation and submission of related reports.

Date issued: April 26, 2011



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for Director, *Environmental Management Act*
Okanagan Region

4.6 **Changes to Sampling and Monitoring Program**

On the basis of findings during routine inspections and, the review of the annual report, and any other information related to the affect of the discharge on the receiving environment, the Director may require modifications to the sampling and monitoring of the discharge and receiving environment.

4.7 **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 Manager.

4.8 **Declaration of Landfill**

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

4.9 **Buildings and Structures**

The construction of buildings and other structures on landfill areas 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 a QP. The report is to be submitted for authorization to the Director prior to initiating construction activities.

4.10 **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.

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

4.11 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 Director.

4.12 Prohibited Wastes

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

- Hazardous Wastes other than those specifically authorized in the Hazardous 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 Director 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 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.

Date issued: April 26, 2011



Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

Operational Certificate Number: 15280

SITE PLAN A



The location of the discharge is on Lot 954, District Lot 2450^s
Similkameen Division of the Yale District Plan 14590, Except Plan B1702

Operational Certificate No. 15280

April 2011



Date issued: April 26, 2011

Sajid A. Barlas, Ph.D. , P.Ag.
for Director, *Environmental Management Act*
Okanagan Region

APPENDIX C: Well Logs



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Oliver Landfill
 PROJECT NUMBER: 49846-10-02
 CLIENT: Regional District of Okanagan-Similkameen
 LOCATION: Oliver, BC

HOLE DESIGNATION: MW08-1
 DATE COMPLETED: April 23, 2008
 DRILLING METHOD: Dual Rotary
 FIELD PERSONNEL: AK, ZF

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66	SP- SAND, f. grained, poorly graded, grey, dry SM-silty SAND, trace clay, f. grained sand, slight plasticity, brown-grey SP-SAND, with gravel, f. grained sand, f. grained and sub-rounded gravel, poorly graded, brown-grey - No gravel at 15.24m BGS SM-Silty SAND, trace gravel, f. grained sand, f. grained and sub-rounded gravel, brown-grey - Bedrock at 23.16m BGS END OF BOREHOLE @ 23.16m BGS Easting 0313901 Northing 5444620 (GPS Handheld Unit)	6.10 12.19 20.42 23.16		1 2 3 4 5 6 7 8			
				WELL DETAILS Screened interval: 21.64 to 23.16m BGS Length: 1.52m Diameter: 127mm Slot Size: 6 Material: Stainless steel Seal: 0.00 to 6.10m BGS Material: Bentonite Chips			

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

OVERBURDEN LOG #49846-10 BH LOGS (APRIL 2008), GPJ CRA CORP. GDT 8/11/08



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Oliver Landfill
 PROJECT NUMBER: 49846-10-02
 CLIENT: Regional District of Okanagan-Similkameen
 LOCATION: Oliver, BC

HOLE DESIGNATION: MW08-2
 DATE COMPLETED: April 24, 2008
 DRILLING METHOD: Dual Rotary
 FIELD PERSONNEL: AK, ZF

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	SAMPLE				
				NUMBER	INTERVAL	REC (m)	N' VALUE	
68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100 102 104 106 108 110 112 114 116 118 120 122 124 126 128 130 132	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> - Bedrock at 118.87m BGS END OF BOREHOLE @ 118.87m BGS Easting 0313788 Northing 5444541 (GPS Handheld Unit) </div>	118.87						

WELL DETAILS
 Screened interval:
 53.19 to 54.71m BGS
 Length: 1.52m
 Diameter: 127mm
 Slot Size: 5
 Material: Stainless steel
 Seal:
 0.00 to 6.10m BGS
 Material: Bentonite Chips

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS



GRAIN SIZE ANALYSIS



OVERBURDEN LOG 49846-10.BH.LOGS (APRIL 2008).GPJ CRA_CORP.GDT 6/3/09



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Oliver Landfill
 PROJECT NUMBER: 49846-10-02
 CLIENT: Regional District of Okanagan-Similkameen
 LOCATION: Oliver, BC

HOLE DESIGNATION: MW08-3
 DATE COMPLETED: April 23, 2008
 DRILLING METHOD: Dual Rotary
 FIELD PERSONNEL: AK, ZF

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITOR INSTALLATION	SAMPLE			
				NUMBER	INTERVAL	REC (m)	'N' VALUE
2	SP-SAND, f. grained, poorly graded, light brown		<p>WELL DETAILS Screened interval: 40.54 to 42.06m BGS Length: 1.52m Diameter: 127mm Slot Size: 6 Material: Stainless steel Seal: 0.00 to 6.10m BGS Material: Bentonite Chips</p>	1			
4				2			
6				3			
8	SW-SAND trace fine gravel, well graded, brown	7.62		4			
10				5			
12	SP-SAND, f. grained, poorly graded, light brown	10.67		6			
14				7			
16				8			
18				9			
20				10			
22				11			
24				12			
26				13			
28				14			
30				15			
32	- 1.2m clay/silt lens at 32.00m BGS			16			
34							
36							
38							
40							
42	ML - Clayey Silt trace sand, brown	42.06					
44							
46							
48	- Bedrock at 47.24m BGS END OF BOREHOLE @ 47.24m BGS	47.24					
50							
52	Easting 0313945 Northing 5444540 (GPS Handheld Unit)						
54							
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60							
62							
64							
66							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS

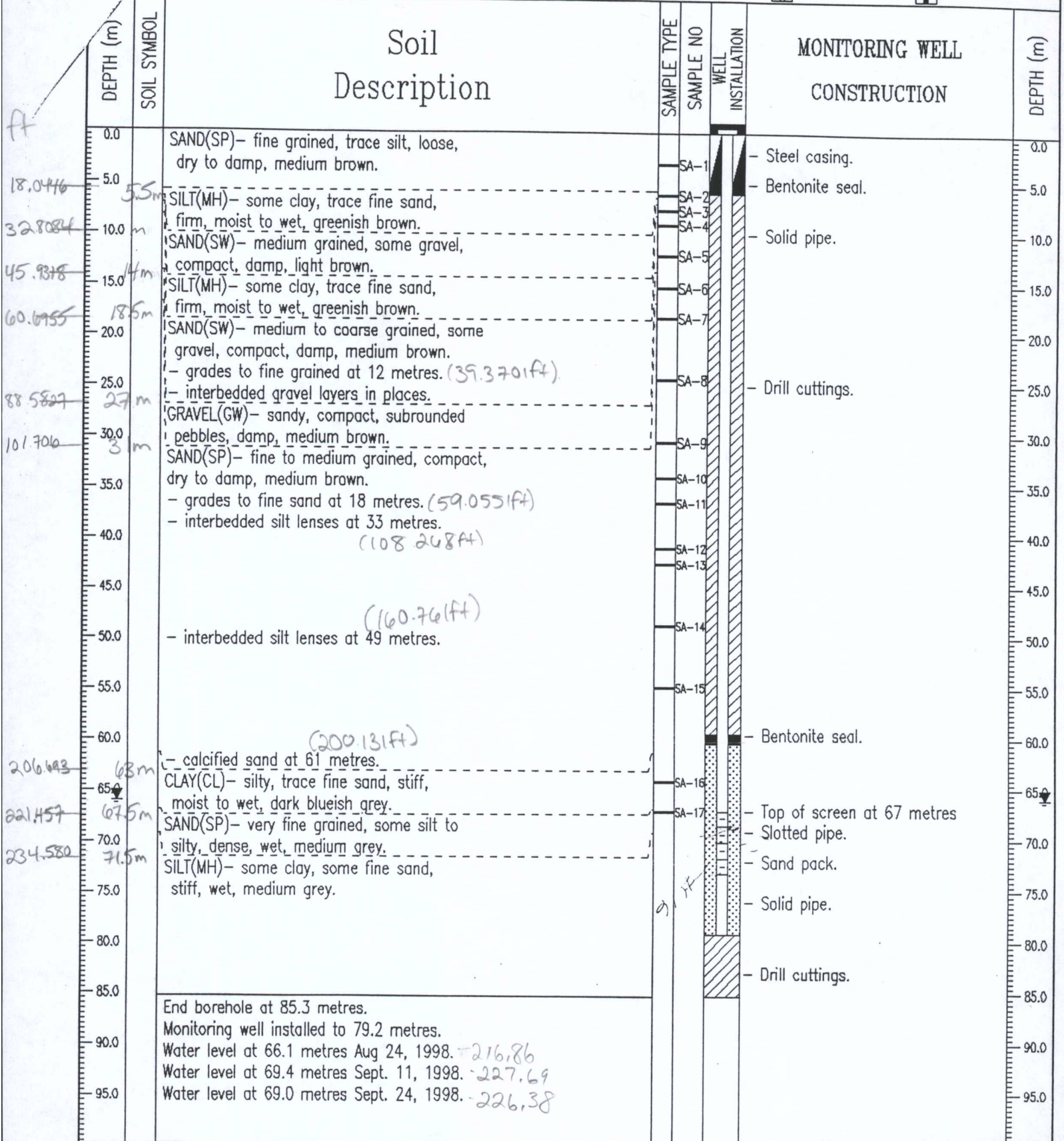


GRAIN SIZE ANALYSIS



OVERBURDEN LOG 49846-10 BH LOGS (APRIL 2008), GPJ, CRA, CORP. GDT 8/11/08

Biological Assessment	Client: Reg. Dist. Okanagan Similkameen	BOREHOLE NO: MW-2
Oliver Landfill	Driller: Cascade Drilling	PROJECT NO: 0808-98-89838
east of gate house.	Rig: TH60, Ingersol Rand	ELEVATION:
TYPE <input checked="" type="checkbox"/> GRAB <input checked="" type="checkbox"/> SPLIT SPOON <input checked="" type="checkbox"/>		



Black Sage Well #2



Report 1 - Detailed Well Record

<p>Well Tag Number: 24513</p> <p>Owner: SOLID</p> <p>Address: OLIVER</p> <p>Area: OLIVER</p> <p>WELL LOCATION: SIMILKAMEEN Land District District Lot: Plan: Lot: Township: Section: Range: Indian Reserve: Meridian: Block: Quarter: Island BCGS Number (NAD 27): 082E013132 Well: 5</p> <p>Class of Well: Subclass of Well: Orientation of Well: Status of Well: New Well Use: Unknown Well Use Observation Well Number: Observation Well Status: Construction Method: Unknown Constru Diameter: 16.0 inches Well Depth: 49.0 feet Elevation: 0 Bedrock Depth: UNK feet</p>	<p>Construction Date: 1971-02-01 00:00:00.0</p> <p>Driller: Osoyoos Tile Works Well Identification Plate Number: Plate Attached By: Where Plate Attached:</p> <p>PRODUCTION DATA AT TIME OF DRILLING: Well Yield: 400 (Driller's Estimate) U. Artesian Flow: Static Level: 8 feet</p> <p>Water Utility: Water Supply System Name: Water Supply System Well Name:</p> <p>Surface Seal Flag: Surface Seal Material: Surface Seal Method: Surface Seal Depth: Surface Seal Thickness:</p> <p>Lithology Info Flag: Pump Test Info Flag: File Info Flag: Sieve Info Flag: Screen Info Flag: Water Chemistry Info Flag: Field Chemistry Info Flag: Site Info (SEAM): Site Info Details: Other Info Flag: Other Info Details:</p>																																				
<p>GENERAL REMARKS:</p> <table> <tr> <td>From</td> <td>0 to</td> <td>0 Ft.</td> <td>screened for 1200 US GPM</td> </tr> <tr> <td>From</td> <td>0 to</td> <td>0 Ft.</td> <td>null</td> </tr> <tr> <td>From</td> <td>0 to</td> <td>0 Ft.</td> <td>S.C. 500 US GPM/ht at 400 US GPM</td> </tr> <tr> <td>From</td> <td>0 to</td> <td>0 Ft.</td> <td>400 " " at 1200 " "</td> </tr> <tr> <td>From</td> <td>0 to</td> <td>0 Ft.</td> <td>null</td> </tr> <tr> <td>From</td> <td>0 to</td> <td>3 Ft.</td> <td>silt and sand</td> </tr> <tr> <td>From</td> <td>3 to</td> <td>23 Ft.</td> <td>sand - glacial</td> </tr> <tr> <td>From</td> <td>23 to</td> <td>46 Ft.</td> <td>sand and coarse glacial</td> </tr> <tr> <td>From</td> <td>46 to</td> <td>50 Ft.</td> <td>sand glacial</td> </tr> </table>		From	0 to	0 Ft.	screened for 1200 US GPM	From	0 to	0 Ft.	null	From	0 to	0 Ft.	S.C. 500 US GPM/ht at 400 US GPM	From	0 to	0 Ft.	400 " " at 1200 " "	From	0 to	0 Ft.	null	From	0 to	3 Ft.	silt and sand	From	3 to	23 Ft.	sand - glacial	From	23 to	46 Ft.	sand and coarse glacial	From	46 to	50 Ft.	sand glacial
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From	23 to	46 Ft.	sand and coarse glacial																																		
From	46 to	50 Ft.	sand glacial																																		

- [Return to Main](#)

Information Disclaimer

The Province disclaims all responsibility for the accuracy of information provided. Information provided should not be used as a basis for making financial or any other commitments.

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TENS	UNITS	MERIDIAN	TENS	UNITS	TENS	UNITS	QUARTER	TENS	UNITS
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GROUND — WATER DIVISION, WATER INVESTIGATIONS BRANCH, DEPT. OF LANDS, FORESTS, and WATER RESOURCES, VICTORIA, B.C.

LOCATION _____ (COMPLETE LEGAL DESCRIPTION)

OWNER'S NAME SOUTH OCAIOAGAN LAND IRRIGATION DISTRICT ADDRESS OLIVER 72, X8, Y14, #12

DRILLER'S NAME OSCOYOS TILE ADDRESS OSCOYOS DATE OF COMPLETION 2/71

DEPTH 50' ELEVATION OF COLLAR _____ CASING DIAM. _____ LENGTH 51' 8" TYPE _____

METHOD OF DIGGING _____ SCREEN SIZE 16" LENGTH 21 1/2" TYPE _____

LOCATION OF SCREEN 30' to 29' DEVELOPED DESCRIBE _____

PERFORATED CASING LENGTH _____ LOCATION OF PERFORATIONS _____

GRAVEL PACK LENGTH _____ DIAM. _____ SIZE GRAVEL, ETC. _____

PUMP TYPE _____ POWER _____

CAPACITY _____ OTHER DATA _____

COSTS WELL _____ PUMP _____ PUMP HOUSE, ETC. _____

MAINTENANCE _____

DISTANCE TO WATER FROM TOP OF CASING 8' ESTIMATED MEASURED ELEVATION _____ FLUCTUATION _____

HIGH WATER _____ MONTH _____ LOW WATER _____ MONTH _____ OBSERVATION DATA FILE No. _____

WATER USE _____ ESTIMATED MEASURED

MAX. RATE WITHDRAWAL _____ ESTIMATED MEASURED

TEMPERATURE _____ PUMPS SAND

CLOGS SCREEN TYPE DEPOSIT _____ AQUIFER DATA _____

LICENSE No _____ DATE LICENSE _____ AMOUNT _____

DATE APPLICATION _____ USE _____

SYSTEM #2, Oliver
76:MFR:AA17JD 610 SD 14

ALR+A-2

VISIrecord®

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ANALYSIS
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HIGH SULPHUR
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ALKALINE
SALINE
POLLUTED
INADEQUATE QUALITY

WATER QUALITY

DRY HOLE
INADEQUATE QUANTITY
PUMPING TEST

CAPACITY GPD.

0 - 10 ³
10 ³ - 10 ⁴
10 ⁴ - 10 ⁵
10 ⁵ - 10 ⁶
10 ⁶

SUPPLY AQUIFER		OTHER AQUIFER PRESENT		OTHER AQUIFER PRESENT		OTHER AQUIFER PRESENT		OTHER AQUIFER PRESENT	
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SCHEDULE 2

REPORTING REQUIREMENTS FOR WELL IDENTIFICATION FOR A WELL THAT IS FOR THE PURPOSE OF SUPPLYING A WATER SUPPLY SYSTEM

1. Well Identification Plate Information

Date of Attachment (YYYY/MM/DD): 2007/08/12 Well Identification Plate Number: 22911

Plate attached by (individual): Arvid Bensler

Description of where plate is attached (usually attached to the well casing or well cap): On pump discharge manifold.

2. Water Well Information

Name for the Water Supply System Well (e.g., "Township of Langley #8"): Black Sage Well #2 - Oliver Sys. #2

Well location description or address: This well is located approximately 154m from 87th street between 316th Avenue and Watters Road.

Latitude: (degrees/minutes/seconds OR decimal degrees) 49 deg. 7 min. 31.910548 sec

Longitude: (degrees/minutes/seconds OR decimal degrees) 119 deg. 34 min. 18.283008 sec.

OR

UTM Zone:

UTM Easting to within 33 feet (10 m):

UTM Northing to within 33 feet (10 m):

Source of Latitude/Longitude or UTM coordinates (check one):

GPS [x] 1:20,000 map [] 1:50,000 map [] Other (please specify below) []

Table with 3 columns: Township, District Lot, Lot; Section, Range, Block; Plan, PID. Values include Similkameen Div. of Yale, 2450S, parcel A, Portion L 904, PL A1272, 37485, 006-513-531.

If well construction report is attached to this form, please check []

3. Water Supply System Information

Water Supply System Name: Oliver (Rural)

Owner Name: Town of Oliver

Mailing Address: PO Box 638

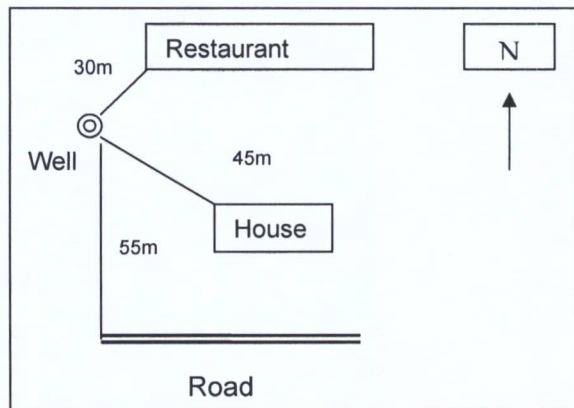
City or Town: Oliver Postal Code: V0H 1T0

Phone Number: 250-485-6200 E-Mail: admin@oliver.ca

Well Details:

Well Depth: 49ft/33.53m (ft / m)

Well Diameter: 16in/40.64cm (in / cm)



EXAMPLE

See attached Page 3 for drawing of location...

Please use the space above to sketch the well location and proximity to roads, buildings, waterways, etc.

Schedule 2 Notes:

Well Identification Number

This is the number found on the stainless steel plate attached to the well. It is not the number the well is assigned in the WELLS database, called the "Well Tag Number".

Well Location:

Provide the Land District (e.g. New Westminster) for the well location and include in "Legal Description of Well Location" section.

Geographic Coordinates:

- Ensure the GPS map datum on your GPS is set to "NAD 83"
- If using UTM Coordinates, please include the zone (e.g. Zone 10)
- Latitude and Longitude can be expressed as: degrees minutes seconds (50° 30'40.256") or as decimal degrees (50.514575°)

Supporting Documentation:

Please include copies of any of the following documents, if available:

- Well construction reports/logs
- Pumping test reports
- Documents that include information about the well, local geology, exact location, etc.

Send completed forms to:

**Deputy Comptroller
Ministry of Environment
PO Box 9362 Stn Prov Gov
Victoria BC
V8W 9M2**

Black Sage Wells - Rural Oliver System #2.

ROAD No.14

316TH. AVE.

PLAN 4592

824

N

PLAN 22110

PLAN 19390

PLAN 19390

PLAN A1272

87th. ST.

OKANAGAN RIVER
OKANAGAN FLOOD CONTROL R/W

BLACK SAGE WELLS

Black Sage #2

Approx. 154m from road

15m

24m

Black Sage #1

Black Sage #3

PLAN 17122

PLAN 3534

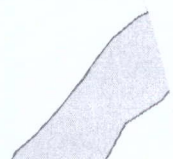
PLAN A1272

902

PLAN A1272

WATTERS RD.

PLAN 3



Golder / TRUE Okanagan Water Systems Inventory Project

BLACK 20678

Sub Facility (DWIMP) Number: 05-02-WAT-1-ES QA/C Complete: RA

Facility Number: "

Date: Dec 6/04 GAL / TRUE Field Person: M

Weather (temperature, cover precipitation): Snowing 0°C

Description: Black Sage ~~Well~~ Well #2
BC Water Source ID 1162

[E - extraction (ie, well/POD), S - storage (ie, tanks, concrete reservoir), T - treatment Plant, M - sampling point]

GPS North: 49 7.5448 GPS West: -119 34.3048

GPS Elevation: 285 m GPS Verified (Y/N): DGPS

Surface Water (Yes / No): N Water License No: _____

Location Legal description: _____

Source Name: Black Sage ~~Well~~ Well #2 Source Water Type: well

Well Tag No.: 24513 Well ID Plate No: NOT ASSIGNED
(make sure you fill out Well ID form and fax to ra)

Aquifer Cross reference (ra only): 254IA

Well Depth (ft): 50ft 15m Construction Method (drill/dug): drilled

Well Deeper than 50 ft (Y/N): N Distance to Surface Water (ft): 220ft 50m

Well Design Capacity: 1100 USgpm Capacity Units (l/s, USgpm, m3/day): 1100 USgpm

Annual Volume: _____ Volume Units (litres, USgals, m3): _____

How Volume determined (estimate, metered, etc): _____

Community Watershed Code: _____
(may be tough to determine - make sure ask for this)

Storage Volume: _____ How determined (estimate, metered, etc): _____
(litres, USgals, m3)

Treated (y/n): N Auto Treat (y/n): _____ Disinfection: _____
(chlorine, chlorine dioxide, chloramine, UV, Ozone)

Chemical treat: _____ Physical treat: _____
(soda ash, hydro peroxide, flouride, polycarb) (membrane, coag, sedimentation, slow/fast filtration)

EMS Number Requested (date): _____ EMS Number Assigned: E258668
[Note: EMS numbers only required for sources that are sampled, ie wells, intakes, PODs or reservoirs, not sampling (M) points]

Other Source ID #: _____ Other Source Type: _____

Comments: COULD ALSO BE WTN ~~23078~~ 23078

Town of Oliver Black Sage Wells 1,2,3



Legend

Contours (TRIM)

- Contour - Index
- Contour - Index.Indefinite
- Contour - Index.Depression
- Contour - Index.Depression Indefinite
- Contour - Intermediate
- Contour - Intermediate.Indefinite
- Contour - Intermediate.Depression
- Contour - Intermediate.Depression Indefinite
- Area of Exclusion
- Area of Indefinite Contours

Annotation (TRIM)

Landmark - Points (TRIM)

- Barn
- Silo
- Station (Communication)
- School
- Fire Lookout - Tower
- Fire Station
- Police Station
- Post Office
- Hospital
- Church
- Building
- Tower/Mast
- Tower/Mast - Microwave
- Tower - Transmission
- Burner
- Crane - Permanent
- Gas Well
- Oil Well
- Beacon
- Lighthouse
- Dock - Pier/Wharf
- Tank

Landmark - Lines (TRIM)

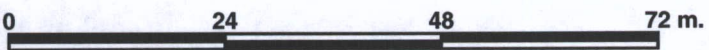
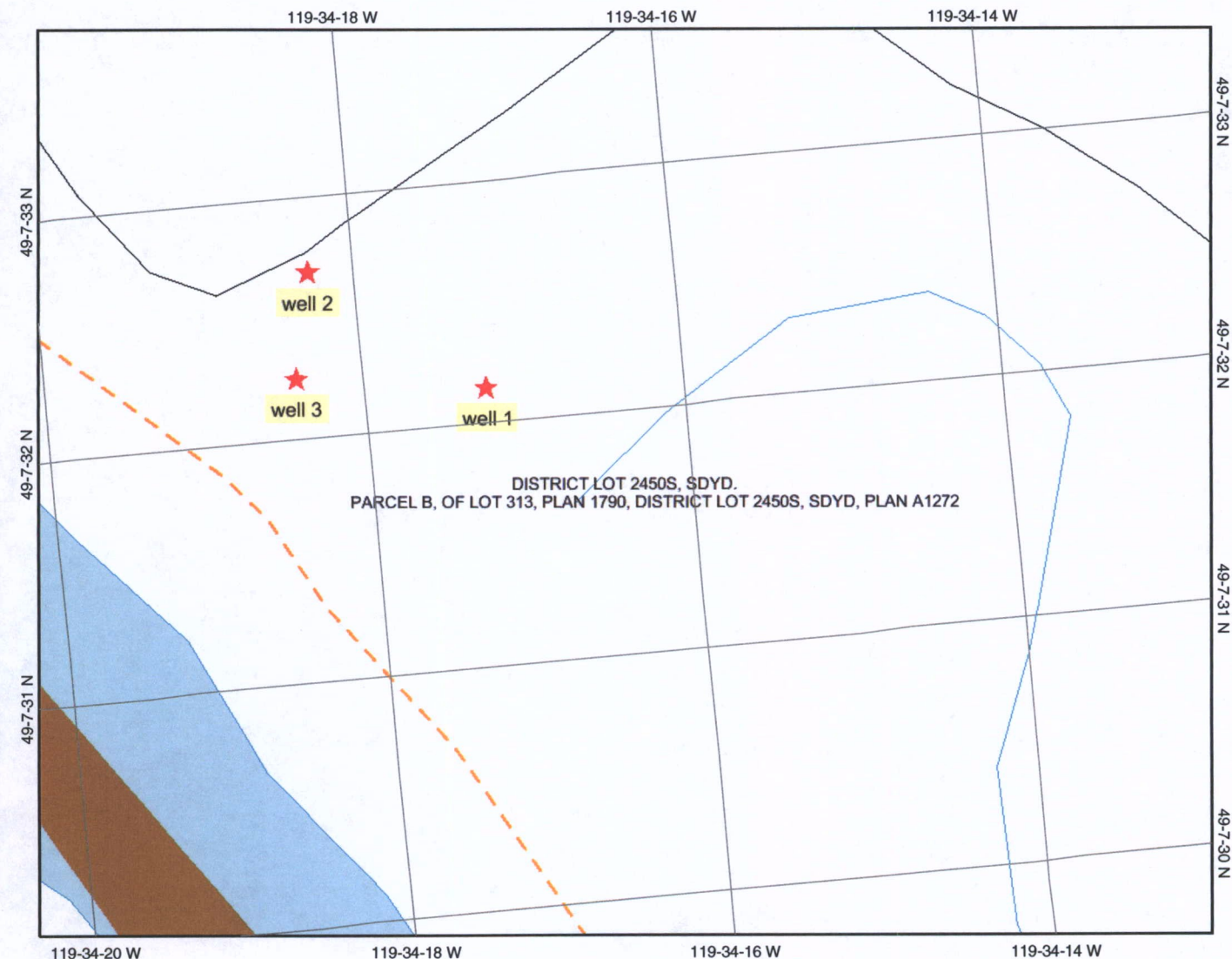
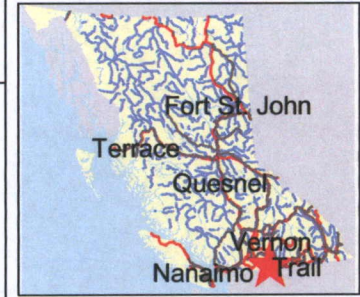


Map center: 49° 7' 31.7" N, 119° 34' 16.4" W

Scale: 1:1,503

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Town of Oliver Black Sage Wells 1,2,3



Map center: 49° 7' 31.71" N, 119° 34' 16.42" W

Legend

- Ice Masses (EBM)**
 - Glacier
 - Icefield
- Contours (TRIM)**
 - ~ Contour - Index
 - ~ Contour - Index.Indefinite
 - ~ Contour - Index.Depression
 - ~ Contour - Index.Depression Indefinite
 - ~ Contour - Intermediate
 - ~ Contour - Intermediate.Indefinite
 - ~ Contour - Intermediate.Depression
 - ~ Contour - Intermediate.Depression Indefinite
- ~ Area of Exclusion
- ~ Area of Indefinite Contours
- Annotation (TRIM)**
- Landcover - Points (TRIM)
- Landcover - Lines (TRIM)
- ~ Wooded Area
- ~ Nursery
- ~ Orchard
- Landmark - Points (TRIM)**
 - Barn
 - Silo
 - Station (Communication)
 - School
 - Fire Lookout - Tower
 - Fire Station
 - Police Station
 - Post Office
 - Hospital
 - Church
 - Building
 - Tower/Mast
 - Tower/Mast - Microwave



Scale: 1:805

This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

82F.013.1.3.2

WTN 24513

BLACK SAGE WELL 2 WATER WELL RECORD old well rd 1162

DEPT. OF ENVIRONMENT, WATER RESOURCES SERVICE, WATER INVESTIGATIONS BRANCH **52** VICTORIA, BRITISH COLUMBIA

LEGAL DESCRIPTION: LOT 313 SEC. _____ TP. _____ R. _____ D.L. 24505 LAND DISTRICT SIMILKAMEEN PLAN 11292 1990

DESCRIPTIVE LOCATION PID: 006-513-531 LICENCE NO. _____ DATE _____

Z 111 WELL NO. _____

312379E

5444620N

Z 2 X 9 Y 14 NO. 2

NAT. TOPO. SHEET NO. 82 E/4 NE

OWNER'S NAME TOWN OF OLIVER ADDRESS OLIVER B.C.

DRILLER'S NAME OSOYOOS TILE WORKS ADDRESS OSOYOOS B.C. DATE COMPLETED FEB 1971

DEPTH 49' ELEVATION OF 154 ESTIMATED SURVEYED

CASING DIAM. 16" LENGTH _____

METHOD OF CONSTRUCTION _____ GROUND LEVEL ELEV. 937.29

SCREEN LOCATION _____ SCREEN SIZE 12" #80 slot LENGTH 13' TYPE SS. PIPE SIZE

SANITARY SEAL YES NO SCREEN SIZE 12" 100 slot LENGTH 7' TYPE " "

PERFORATED CASING LENGTH _____ PERFORATIONS FROM _____ TO _____

GRAVEL PACK LENGTH _____ DIAM. _____ SIZE GRAVEL, ETC. _____

DISTANCE TO WATER 8' ESTIMATED WATER LEVEL _____

FROM _____ MEASURED ELEVATION _____ ARTESIAN PRESSURE _____

DATE OF WATER LEVEL MEASUREMENT _____ WATER USE DRINKING WATER SUPPLY SYSTEM

PRODUCTION TEST SUMMARY

DATE FEB, 1971

TEST BY _____

BAIL TEST PUMP TEST DURATION OF TEST _____

RATE _____ DRAWDOWN _____

WATER LEVEL AT COMPLETION OF TEST _____

AVAILABLE DRAWDOWN _____ SPECIFIC CAPACITY _____

PERMEABILITY _____ STORAGE COEFF. 0.2

TRANSMISSIVITY 420,000 456 PD/FT

RECOMMENDED PUMPING RATE _____

RECOMMENDED PUMP SETTING _____

CHEMISTRY

TEST BY _____ DATE _____

TOTAL DISSOLVED SOLIDS _____ mg/l TEMPERATURE _____ °C pH _____ SILICA (SiO₂) _____ mg/l

CONDUCTANCE umhos/cm AT 25°C _____ TOTAL IRON (Fe) _____ mg/l TOTAL HARDNESS (CaCO₃) _____ mg/l

TOTAL ALKALINITY (CaCO₃) _____ mg/l PHEN. ALKALINITY (Ca CO₃) _____ mg/l MANGANESE (Mn) _____ mg/l

COLOUR _____ ODOUR _____ TURBIDITY _____

LITHOLOGY

FROM	TO	DESCRIPTION
		SCREENED FOR 1200 USgpm.
		S.C. 500 USgpm/ft at 400 USgpm.
		445 " " at 1200 " "

ANIONS		CATIONS	
	mg/l		mg/l
CARBONATE (CO ₃)		CALCIUM (Ca)	
BICARBONATE (HCO ₃)		MAGNESIUM (Mg)	
SULPHATE (SO ₄)		SODIUM (Na)	
CHLORIDE (Cl)		POTASSIUM (K)	
NO ₂ + NO ₃ (NITROGEN)		IRON (DISSOLVED)	
* TKN. (NITROGEN)			
PHOSPHORUS (P)			

* TKN = TOTAL KJELDAHL NITROGEN CHEMISTRY SITE NO. _____

NO₂ = NITRITE NO₃ = NITRATE

FROM	TO	DESCRIPTION
0	3	silt and sand
3	23	sand - glacial
23	46	sand and coarse glacial
46	50	sand glacial

CHEMISTRY FIELD TESTS

TEST BY _____ DATE _____ EQUIPMENT USED _____

CONTENTS OF FOLDER

DRILL LOG PUMP TEST DATA CHEMICAL ANALYSIS

SIEVE ANALYSIS GEOPHYSICAL LOGS REPORT

OTHER _____

SOURCES OF INFORMATION SEE OLD CARD

APPENDIX D: Historical Water Quality Data

Oliver Landfill
Water Quality Results

Analyte	Unit	Guideline						Sampling Location																				
		GCDWQ MAC	GCDWQ AO & O	CSR IW	CSR LW	CSR DW	Date Sampled	Lab Sample ID	Sample Type	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	4359 Rye Grass Road	Above Ground Storage Tank	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2
							Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Fluoride	mg/L	NG	NG	1.000	1,000 ^{4,2}	1.500	11-Dec-14	4120779-01	Normal	0.34	0.33	0.26	0.23	0.28	0.33	0.23	0.20	0.15	<10.0	0.28	0.31	0.32	0.38	0.26	0.25	0.31	0.29	
Hardness (as CaCO3), dissolved	mg/L	NG	NG	NG	NG	NG	24-Mar-15	5031601-01	Normal	406	343	431	428	426		364	466	418		169	329	156	190	189	240	189	253	
Hardness (as CaCO3), from total Ca/Mg	mg/L	NG	NG	NG	NG	NG				454	358	442			387				844									
pH		NG	NG	NG	NG	NG				7.88	7.88	7.86	7.81	7.81	7.86	7.88	7.86	7.83	4.24	7.27	8.09	7.97	7.85	7.94	7.30	7.89	7.50	
Sulphate	mg/L	NG	NG	NG	1000	500 ^{3,10}				114	113	142	130	138	125	132	144	149	54.5	41.0	87.5	42.5	43.1	44.2	61.1	48.7	54.4	
Microbiological																												
Total coliforms (counts)	CFU/100 mL	NG	NG	NG	NG	NG				3	<1				2													
E. coli (counts)	CFU/100 mL	NG	NG	NG	NG	NG				<1	<1				<1													
Fecal coliforms (MPN)	MPN/100 mL	NG	NG	NG	NG	NG																						
Nutrients																												
Ammonia (total, as N)	mg/L	NG	NG	NG	NG	NG				0.024	0.021	<0.020	<0.020	<0.020	<0.020	0.027	<0.020	<0.020	34.6	0.026	0.022	<0.020	<0.050	<0.050	<0.050	<0.050	<0.050	
Nitrate (as N)	mg/L	NG	NG	NG	100 ^{4,3}	10 ^{5,11}				8.01	9.85	11.1	10.8	11.5	11.4	11.3	12.9	11.5	<0.250	0.563	3.13	0.248	1.36	1.39	1.48	1.31	1.83	
Nitrate + Nitrite (as N)	mg/L	NG	NG	NG	100 ^{4,4}	10 ^{5,12}				8.01	9.85	11.1	10.8	11.5	11.4	11.3	12.9	11.5	<0.250	0.563	3.13	0.248	1.36	1.39	1.48	1.31	1.83	
Nitrate + Nitrite (as N) (calculated)	mg/L	NG	NG	NG	100 ^{4,5}	10 ^{5,13}				8.01	9.85	11.1	10.8	11.5	11.4	11.3	12.9	11.5	<0.250	0.563	3.13	0.248	1.36	1.39	1.48	1.31	1.83	
Nitrite (as N)	mg/L	NG	NG	NG	10.000	1				<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.250	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	
Total nitrogen	mg/L	NG	NG	NG	NG	NG				8.09	9.85	11.1		11.5					60.9									
Total kjeldahl nitrogen	mg/L	NG	NG	NG	NG	NG				0.08	<0.05	<0.05		<0.05					60.9									
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	NG	NG	NG	NG	NG				<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	72.9	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Phosphorus (total, by ICPMS/ICPOES)	mg/L	NG	NG	NG	NG	NG				<0.020	<0.020	0.03		<0.02														
Potassium (dissolved)	mg/L	NG	NG	NG	NG	NG				5.59	4.56	5.28	5.27	5.71	5.08	4.54	6.00	5.75		3.41	5.57	3.32	4.02	3.04	3.89	3.99	4.17	
Potassium (total)	mg/L	NG	NG	NG	NG	NG				5.42	4.59	5.40			5.13				887									
Total Metals																												
Aluminum (total)	mg/L	NG	NG	5.000	5.000	9.500 ^{5,14}				<0.005	<0.005	0.007			<0.005				2.18									
Antimony (total)	mg/L	NG	NG	NG	NG	0.006				0.0001	<0.0001	0.0001			0.0001				0.00316									
Arsenic (total)	mg/L	NG	NG	0.100	0.025	0.010				0.0009	0.0009	0.0009			0.0010				0.0203									
Barium (total)	mg/L	NG	NG	NG	NG	1.000				0.126	0.096	0.123			0.118				0.200									
Beryllium (total)	mg/L	NG	NG	0.100	0.100	0.008				<0.0001	<0.0001	<0.0001			<0.0001				<0.00050									
Bismuth (total)	mg/L	NG	NG	NG	NG	NG				<0.0001	<0.0001	<0.0001			<0.0001				<0.00050									
Boron (total)	mg/L	NG	NG	0.500 ^{3,10}	5.000	5.000				0.021	0.023	0.028			0.028				1.11									
Cadmium (total)	mg/L	NG	NG	0.005	0.080	0.005				0.00005	0.00003	0.00003			0.00004				0.000623									
Calcium (total)	mg/L	NG	NG	NG	1000	NG				111	85.8	110			96.0				216									
Chromium (total)	mg/L	NG	NG	0.005 ^{3,11}	0.050 ^{4,8}	0.050 ^{5,15}				0.0035	0.0036	0.0028			0.0040				0.0233									
Cobalt (total)	mg/L	NG	NG	0.050	1.000	0.001 ^{5,16}				<0.00005	<0.00005	<0.00005			<0.00005				0.0173									
Copper (total)	mg/L	NG	NG	0.200	0.300	1.500 ^{5,17}				0.0025	0.0019	0.0023			0.0029				0.0459									
Iron (total)	mg/L	NG	NG	5.000 ^{3,12}	NG	6.500 ^{5,18}				<0.01	<0.01	<0.01			<0.01				16.9									
Lead (total)	mg/L	NG	NG	0.200	0.100	0.010				<0.0001	0.0006	0.0002			0.0003				0.00668									
Lithium (total)	mg/L	NG	NG	2.500 ^{3,13}	5.000	0.008				0.0110	0.0094	0.0106			0.0109				0.0245									
Magnesium (total)	mg/L	NG	NG	NG	NG	NG				42.7	34.7	40.7			38.9				73.9									
Manganese (total)	mg/L	NG	NG	0.200 ^{3,14}	NG	1.500 ^{5,19}				0.0008	0.0002	0.0029			0.0020				3.01									
Mercury (total)	mg/L	NG	NG	0.001	0.002	0.001				<0.00002	<0.00002	<0.00002			<0.00002				<0.000200									
Molybdenum (total)	mg/L	NG	NG	0.010 ^{3,15}	0.050	0.010				0.0130	0.0124	0.0098			0.0119				0.0126									
Nickel (total)	mg/L	NG	NG	0.200	1.000	0.080				0.0008	0.0005	0.0004			0.0013				0.0310									
Selenium (total)	mg/L	NG	NG	0.020 ^{3,16}	0.030	0.010				0.0193	0.0191	0.0402			0.0380				<0.00250									
Silicon (total, as Si)	mg/L	NG	NG	NG	NG	NG				12.0	10.1	11.0			10.5				15.1									
Silver (total)	mg/L	NG	NG	NG	NG	0.020				0.00009	<0.00005	<0.00005			<0.00005				<0.000250									
Sodium (total)	mg/L	NG	NG	NG	NG	200 ^{5,20}				21.2	24.4	23.0			28.9				39.9									
Strontium (total)	mg/L	NG	NG	NG	NG	2.500				1.09	0.843	1.01			0.987				1.94									
Sulphur (total)	mg/L	NG	NG	NG	NG	NG				40	34	44			36				30.3									
Tellurium (total)	mg/L	NG	NG	NG	NG	NG				<0.0002	<0.0002	<0.0002			<0.0002				<0.00250									
Thallium (total)	mg/L	NG	NG	NG	NG	NG				<0.00002	<0.00002	<0.00002			<0.00002				<0.000100									
Thorium (total)	mg/L	NG	NG	NG	NG	NG				<0.0001	<0.0001	<0.0001			<0.0001				<0.00050									
Tin (total)	mg/L	NG	NG	NG	NG	2.500				<0.0002	<0.0002	<0.0002			<0.0002				<0.00100									
Titanium (total)	mg/L	NG	NG	NG	NG	NG				<0.005	<0.005	<0.005			<0.005				0.156									
Tungsten (total)	mg/L	NG	NG	NG	NG	0.003													<0.0050									
Uranium (total)	mg/L	NG	NG	0.010	0.200	0.020				0.0102	0.0143	0.																

Oliver Landfill
Water Quality Results

Analyte	Unit	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1
		21-Sep-23 23I2773-01 Normal	06-Jun-24 24F0901-01 Normal	26-Sep-24 24I3624-01 Normal	22-May-25 25E3155-01 Normal	06-Aug-25 25H0838-01 Normal	01-Aug-12	29-Nov-12	27-Mar-13	05-Jul-13	27-Nov-13	03-Oct-14	10-Apr-19	14-Aug-19	18-Nov-19	01-Aug-12	29-Nov-12	27-Mar-13	05-Jul-13	27-Nov-13	03-Oct-14	11-Dec-14	MW08-2
Field Results																							
Conductivity	µS/cm	447.3	437.9	432.8	473.1	335.4																	
Depth to Water (below top of casing)	m						23.28	23.27	23.241	23.26	23.255	23.30											
Field measured depth to bottom	m												23.33	23.33	23.33								
Oxidation reduction potential	mV	83.4	275.5	299.4	173.4	90.9																	
Dissolved oxygen	mg/L	3.39	5.03	3.73	5.34	4.66																	
pH		7.32	7.46	7.43	7.53	7.49																	
Total dissolved solids	mg/L	290.6	284.7	281.5	307.5	273.7																	
Temperature	°C	16.9	12.9	16.8	12.3	15.4																	
Turbidity	NTU	0.20	0.22	0.07	0.33																		
Volume Purged	L																						
Lab Results																							
Dissolved Metals																							
Aluminum (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050																	
Antimony (dissolved)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020																	
Arsenic (dissolved)	mg/L	0.00075	0.00079	0.00075	0.00075	0.00069																	
Barium (dissolved)	mg/L	0.0466	0.0473	0.0440	0.0435	0.0314																	
Beryllium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010																	
Bismuth (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010																	
Boron (dissolved)	mg/L	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500																	
Cadmium (dissolved)	mg/L	0.000020	0.000012	0.000016	0.000015	0.000026																	
Calcium (dissolved)	mg/L	47.4	55.7	53.1	46.0	37.7																	
Chromium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050																	
Cobalt (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010																	
Copper (dissolved)	mg/L	0.00946	0.00583	0.00772	0.00940	0.0389																	
Iron (dissolved)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010																	
Lead (dissolved)	mg/L	0.00280	0.00027	0.00024	<0.00020	0.00078																	
Lithium (dissolved)	mg/L	0.00606	0.00704	0.00653	0.00510	0.00381																	
Magnesium (dissolved)	mg/L	17.5	24.7	17.7	17.0	11.4																	
Manganese (dissolved)	mg/L	0.0162	0.0116	0.0221	0.00317	0.0240																	
Mercury (dissolved)	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010																	
Molybdenum (dissolved)	mg/L	0.00444	0.00336	0.00458	0.00323	0.00381																	
Nickel (dissolved)	mg/L	0.00051	<0.00040	<0.00040	0.00046	0.00041																	
Selenium (dissolved)	mg/L	0.00063	0.00081	0.00059	0.00083	<0.00050																	
Silicon (dissolved, as Si)	mg/L	7.4	7.6	7.7	6.9	6.4																	
Silver (dissolved)	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050																	
Sodium (dissolved)	mg/L	15.4	16.9	15.5	14.8	13.0																	
Strontium (dissolved)	mg/L	0.574	0.623	0.586	0.596	0.410																	
Sulphur (dissolved)	mg/L	15.0	15.9	15.4	16.3	9.2																	
Tellurium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050																	
Thallium (dissolved)	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020																	
Thorium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010																	
Tin (dissolved)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020																	
Titanium (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050																	
Tungsten (dissolved)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010																	
Uranium (dissolved)	mg/L	0.00523	0.00434	0.00475	0.00494	0.00183																	
Vanadium (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050																	
Zinc (dissolved)	mg/L	0.0109	<0.0040	0.0054	0.0064	0.0214																	
Zirconium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010																	
General																							
Bicarbonate alkalinity (as HCO3)	mg/L	229	195	200	219	158																	
Carbonate alkalinity (as CO3)	mg/L	<0.600	<0.600	<0.600	<0.600	<0.600																	
Hydroxide alkalinity (as OH)	mg/L	<0.340	<0.340	<0.340	<0.340	<0.340																	
Alkalinity (bicarbonate, as CaCO3)	mg/L	187	160	164	179	130																	
Alkalinity (carbonate, as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0																	
Alkalinity (hydroxide, as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0																	
Alkalinity (phenolphthalein, as CaCO3)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0																	
Alkalinity (total, as CaCO3)	mg/L	187	160	164	179	130																	
Biochemical oxygen demand	mg/L																						
Bromide	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10																	
Chemical oxygen demand	mg/L	<20	<20	<20	<20	<20																	
Chloride	mg/L	9.57	9.33	9.67	11.1	7.03																	
Conductivity	µS/cm	439	454	449	495	338																	

Oliver Landfill
Water Quality Results

Analyte	Unit	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	Black Sage Well #2	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-1	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2		
		21-Sep-23 23I2773-01 Normal	06-Jun-24 24F0901-01 Normal	26-Sep-24 24I3624-01 Normal	22-May-25 25E3155-01 Normal	06-Aug-25 25H0838-01 Normal		01-Aug-12	29-Nov-12	27-Mar-13	05-Jul-13	27-Nov-13	03-Oct-14	10-Apr-19	14-Aug-19	18-Nov-19	01-Aug-12	29-Nov-12	27-Mar-13	05-Jul-13	27-Nov-13	03-Oct-14	11-Dec-14	19-Jun-15	19-Nov-15		
Fluoride	mg/L	0.50	0.25	0.39	0.16	0.19																					
Hardness (as CaCO3), dissolved	mg/L	190	241	205	185	141																					
Hardness (as CaCO3), from total Ca/Mg	mg/L																										
pH		7.79	7.59	7.85	7.95	7.69																					
Sulphate	mg/L	47.5	46.1	43.1	46.0	28.1																					
Microbiological																											
Total coliforms (counts)	CFU/100 mL																										
E. coli (counts)	CFU/100 mL																										
Fecal coliforms (MPN)	MPN/100 mL																										
Nutrients																											
Ammonia (total, as N)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050																					
Nitrate (as N)	mg/L	0.989	0.866	0.809	0.628	<0.010																					
Nitrate + Nitrite (as N)	mg/L	0.989	0.866	0.809	0.628	<0.0100																					
Nitrate + Nitrite (as N) (calculated)	mg/L	0.989	0.866	0.809	0.628	<0.010																					
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010																					
Total nitrogen	mg/L					<0.0500																					
Total kjeldahl nitrogen	mg/L					<0.050																					
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050																					
Phosphorus (total, by ICPMS/ICPOES)	mg/L																										
Potassium (dissolved)	mg/L	3.95	3.81	4.12	3.57	3.24																					
Potassium (total)	mg/L																										
Total Metals																											
Aluminum (total)	mg/L																										
Antimony (total)	mg/L																										
Arsenic (total)	mg/L																										
Barium (total)	mg/L																										
Beryllium (total)	mg/L																										
Bismuth (total)	mg/L																										
Boron (total)	mg/L																										
Cadmium (total)	mg/L																										
Calcium (total)	mg/L																										
Chromium (total)	mg/L																										
Cobalt (total)	mg/L																										
Copper (total)	mg/L																										
Iron (total)	mg/L																										
Lead (total)	mg/L																										
Lithium (total)	mg/L																										
Magnesium (total)	mg/L																										
Manganese (total)	mg/L																										
Mercury (total)	mg/L																										
Molybdenum (total)	mg/L																										
Nickel (total)	mg/L																										
Selenium (total)	mg/L																										
Silicon (total, as Si)	mg/L																										
Silver (total)	mg/L																										
Sodium (total)	mg/L																										
Strontium (total)	mg/L																										
Sulphur (total)	mg/L																										
Tellurium (total)	mg/L																										
Thallium (total)	mg/L																										
Thorium (total)	mg/L																										
Tin (total)	mg/L																										
Titanium (total)	mg/L																										
Tungsten (total)	mg/L																										
Uranium (total)	mg/L																										
Vanadium (total)	mg/L																										
Zinc (total)	mg/L																										
Zirconium (total)	mg/L																										



Oliver Landfill
Water Quality Results

Analyte	Unit	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-3	MW08-3	
		10-Apr-19	14-Aug-19	18-Nov-19	03-Dec-19	16-Jul-20	02-Nov-20	13-Apr-21	28-Jun-21	02-Nov-21	28-Mar-22	07-Jul-22	15-Nov-22	18-Apr-23	19-Jul-23	09-Nov-23	09-Apr-24	23-Jul-24	18-Nov-24	07-Apr-25	23-Jul-25	04-Nov-25	03-Oct-14	11-Dec-14
		Field Only	Field Only	Field Only	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal			
Field Results																								
Conductivity	µS/cm				420.1	650	726	981	615	621.2	673	825	937	663	809	984	778	1016	678	870	1000	819		
Depth to Water (below top of casing)	m	53.06	53.095	53.16	53.16	53.44	53.515	53.62	53.68	53.72	53.642	53.8	53.91	53.775	53.89	53.905		53.73	54.67	53.645	53.712	53.675	42.50	42.70
Field measured depth to bottom	m		55.5	55.5																				
Oxidation reduction potential	mV				115.8	-29.5	-51.2	-20.5	39.5	-139.7	-83.2	11.7	5.1	135.8	72.8	10.4	-37.4	-26.8	115.4	-86.2	229.2	-162.9		
Dissolved oxygen	mg/L				5.24	1.87	2.74	1.81	2.02	2.46	2.49	1.16	1.5	3.20	2.39	2.69	2.33	6.46	1.85	5.51	1.48	7.31		
pH					8.54	8.01	7.16	7.45	7.80	7.86	7.86	7.80	7.93	8.14	7.81	7.82	8.30	7.79	8.88	8.08	7.89	8.25		
Total dissolved solids	mg/L				273.0	422.5	474.5	637.0	396.5	486.3	435.5	539.5	611.0	429.0	526.5	637.0	507.0	663.0	442.0	565.5	650	533.0		
Temperature	°C				9.4	17.9	13.7	15.8	22.6	12.7	15.2	12.2	12.5	19.1	11.7			14.8	17.0	14.8	22.4	15.2		
Turbidity	NTU				168	51.0		98.7	50.9	68.6	86.5	80.8	88.4	76.3			100	101	18.6		156	34.0		
Volume Purged	L				1			1	1	1	1	1	1	1	0.9		1							
Lab Results																								
Dissolved Metals																								
Aluminum (dissolved)	mg/L				<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<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
Antimony (dissolved)	mg/L				<0.00020	<0.00020	<0.00020	0.00025	<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
Arsenic (dissolved)	mg/L				<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	<0.00050	<0.00050	<0.00050	<0.00050
Barium (dissolved)	mg/L				0.0097	0.0317	0.0554	0.0342	0.0263	0.0314	0.0275	0.0390	0.0491	0.0234	0.0350	0.0430	0.0178	0.0250	<0.0050	0.0077	0.0235	0.0071		
Beryllium (dissolved)	mg/L				<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	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (dissolved)	mg/L				<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	<0.00010	<0.00010	<0.00010	<0.00010
Boron (dissolved)	mg/L				0.0141	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium (dissolved)	mg/L				<0.000010	0.000014	0.000015	<0.000010	<0.000010	0.000018	0.000012	0.000027	0.0000100	<0.000010	0.000037	0.000040	<0.000010	<0.000010	0.000028	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Calcium (dissolved)	mg/L				11.2	25.6	50.4	33.9	23.1	33.8	34.0	55.7	75.3	34.9	54.6	77.2	32.0	50.9	5.20	12.5	57.2	11.1		
Chromium (dissolved)	mg/L				<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	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (dissolved)	mg/L				<0.00010	<0.00010	0.00029	<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	<0.00010
Copper (dissolved)	mg/L				<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	0.00247	0.00041	0.00085	<0.00040	0.00049	0.00041	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Iron (dissolved)	mg/L				<0.010	<0.010	0.062	1.42	1.77	2.49	1.38	0.878	0.030	0.354	<0.010	<0.010	0.227	1.13	<0.010	<0.010	0.013	0.016		
Lead (dissolved)	mg/L				<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	<0.00020	<0.00020	<0.00020	<0.00020
Lithium (dissolved)	mg/L				0.0246	0.0338	0.0361	0.0341	0.0339	0.0374	0.0340	0.0475	0.0436	0.0452	0.0481	0.0481	0.0453	0.0489	0.0477	0.0436	0.0555	0.0474	0.0474	
Magnesium (dissolved)	mg/L				34.5	45.1	52.5	52.2	52.6	46.7	47.8	59.6	67.5	54.1	62.4	75.7	62.7	67.9	61.1	59.1	75.1	58.0		
Manganese (dissolved)	mg/L				0.0170	0.131	0.243	0.211	0.185	0.148	0.129	0.112	0.0899	0.151	0.122	0.126	0.115	0.129	0.0590	0.0904	0.230	0.119		
Mercury (dissolved)	mg/L				<0.000040	<0.000040	<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	<0.000010	<0.000010
Molybdenum (dissolved)	mg/L				0.00100	0.00068	0.00088	0.00057	0.00055	0.00056	0.00072	0.00081	0.00049	0.00062	0.00084	0.00049	0.00060	0.00038	0.00034	0.00034	0.00067	0.00040		
Nickel (dissolved)	mg/L				<0.00040	0.00067	0.00104	0.00065	0.00047	<0.00040	<0.00040	0.00044	0.00083	<0.00040	0.00054	0.00070	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Selenium (dissolved)	mg/L				<0.00050	<0.00050	0.00053	0.00110	0.00058	0.00237	0.00360	0.00754	0.0130	0.00386	0.00848	0.0152	0.00436	0.00871	<0.00050	0.00057	0.0108	0.00069		
Silicon (dissolved, as Si)	mg/L				<1.0	2.0	4.7	3.4	1.9	3.1	2.8	5.0	7.3	3.0	5.1	7.5	2.9	4.8	1.1	5.2	1.1			
Silver (dissolved)	mg/L				<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	<0.000050	<0.000050	<0.000050	<0.000050
Sodium (dissolved)	mg/L				21.5	21.7	23.6	21.7	21.8	22.6	27.0	30.9	27.1	26.8	30.0	32.2	28.1	29.6	28.4	27.7	33.1	30.5		
Strontium (dissolved)	mg/L				0.147	0.319	0.618	0.391	0.256	0.374	0.420	0.718	1.04	0.489	0.753	1.20	0.444	0.766	0.0453	0.130	0.761	0.117		
Sulphur (dissolved)	mg/L				<3.0	4.0	10.0	6.6	3.8	11.3	16.8	32.4	47.8	24.0	37.3	55.1	32.6	47.7	28.5	27.8	54.7	32.5		
Tellurium (dissolved)	mg/L				<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	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (dissolved)	mg/L				<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thorium (dissolved)	mg/L				<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	<0.00010	<0.00010	<0.00010	<0.00010
Tin (dissolved)	mg/L				<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	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (dissolved)	mg/L				<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	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (dissolved)	mg/L				<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	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (dissolved)	mg/L				0.00867	0.0171	0.0473	0.0278	0.0128	0.0223	0.0246	0.0519	0.0823	0.0229	0.0572	0.107	0.0225	0.						

Oliver Landfill
Water Quality Results

Analyte	Unit	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-2	MW08-3	MW08-3
		10-Apr-19	14-Aug-19	18-Nov-19	03-Dec-19	16-Jul-20	02-Nov-20	13-Apr-21	28-Jun-21	02-Nov-21	28-Mar-22	07-Jul-22	15-Nov-22	18-Apr-23	19-Jul-23	09-Nov-23	09-Apr-24	23-Jul-24	18-Nov-24	07-Apr-25	23-Jul-25	04-Nov-25	03-Oct-14
		Field Only	Field Only	Field Only	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal		
Fluoride	mg/L				<0.10	0.34	0.21	0.26	0.19	0.12	0.24	0.14	0.16	0.10	0.11	0.15	0.19	0.10	<0.10	<0.10	0.17	<0.10	
Hardness (as CaCO3), dissolved	mg/L				170	250	342	300	274	277	282	385	466	310	394	505	338	407	264	274	452	267	
Hardness (as CaCO3), from total Ca/Mg	mg/L																						
pH					8.73	8.13	8.17	7.97	8.25	8.05	8.12	8.10	8.09	8.08	8.20	8.08	8.33	7.77	9.01	8.64	8.01	8.23	
Sulphate	mg/L				6.4	9.3	23.1	64.2	10.8	30.7	51.1	76.5	131		92.7	116	93.3	120	83.3	78.3	159	118	
Microbiological																							
Total coliforms (counts)	CFU/100 mL																						
E. coli (counts)	CFU/100 mL																						
Fecal coliforms (MPN)	MPN/100 mL																						
Nutrients																							
Ammonia (total, as N)	mg/L				0.023	<0.050	0.088	0.092	0.098	<0.050	0.149	0.224	0.218	0.062	<0.050	<0.050	<0.050	<0.050	<0.050	0.062		<0.050	
Nitrate (as N)	mg/L				<0.010	<0.010	0.021	0.191	0.058	0.139	0.311	0.447	0.948	0.215	0.237	0.409	0.175	0.223	<0.010	<0.010	0.338	<0.010	
Nitrate + Nitrite (as N)	mg/L				<0.0200	<0.0200	0.0208	0.237	0.0584	0.151	0.323	0.478	0.948	0.247	0.269	0.425	0.175	0.244	<0.0100	<0.0100	0.338	<0.0100	
Nitrate + Nitrite (as N) (calculated)	mg/L				<0.010	0.011	0.021	0.237	0.058	0.151	0.323	0.478	0.948	0.247	0.269	0.425	0.175	0.243	<0.010	<0.010	0.338	<0.010	
Nitrite (as N)	mg/L				<0.010	0.011	<0.010	0.046	<0.010	0.012	0.012	0.031	<0.010	0.032	0.032	0.016	<0.010	0.020	<0.010	<0.010	<0.010	<0.010	
Total nitrogen	mg/L																				0.546		
Total kjeldahl nitrogen	mg/L																				0.208		
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	
Phosphorus (total, by ICPMS/ICPOES)	mg/L																						
Potassium (dissolved)	mg/L				4.60	4.84	5.12	4.53	4.58	4.45	4.47	5.18	6.10	5.55	5.88	6.74	5.67	6.72	6.16	5.92	7.59	6.96	
Potassium (total)	mg/L																						
Total Metals																							
Aluminum (total)	mg/L																						
Antimony (total)	mg/L																						
Arsenic (total)	mg/L																						
Barium (total)	mg/L																						
Beryllium (total)	mg/L																						
Bismuth (total)	mg/L																						
Boron (total)	mg/L																						
Cadmium (total)	mg/L																						
Calcium (total)	mg/L																						
Chromium (total)	mg/L																						
Cobalt (total)	mg/L																						
Copper (total)	mg/L																						
Iron (total)	mg/L																						
Lead (total)	mg/L																						
Lithium (total)	mg/L																						
Magnesium (total)	mg/L																						
Manganese (total)	mg/L																						
Mercury (total)	mg/L																						
Molybdenum (total)	mg/L																						
Nickel (total)	mg/L																						
Selenium (total)	mg/L																						
Silicon (total, as Si)	mg/L																						
Silver (total)	mg/L																						
Sodium (total)	mg/L																						
Strontium (total)	mg/L																						
Sulphur (total)	mg/L																						
Tellurium (total)	mg/L																						
Thallium (total)	mg/L																						
Thorium (total)	mg/L																						
Tin (total)	mg/L																						
Titanium (total)	mg/L																						
Tungsten (total)	mg/L																						
Uranium (total)	mg/L																						
Vanadium (total)	mg/L																						
Zinc (total)	mg/L																						
Zirconium (total)	mg/L																						



Oliver Landfill
Water Quality Results

Analyte	Unit	MW08-3	MW08-3	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	
		14-Aug-19	18-Nov-19	27-Mar-13 3031383-01	05-Jul-13	27-Nov-13	03-Apr-14 4040379-01	03-Oct-14	11-Dec-14 4120778-01	24-Mar-15 5031600-01	08-Jul-15 5070591-01	15-Sep-15 5091195-01	03-Dec-15 5120358-01	30-Mar-16 6032040-01	21-Jun-16 6061835-01	21-Sep-16 6091627-01	01-Dec-16 6120103-01	23-Mar-17 7031736-01	22-Jun-17 7062248-01	31-Oct-17 7110109-01	MW98-1 8031763-03 Duplicate	MW98-1 8031763-01 Normal	MW98-1 8031763-02 Duplicate	MW98-1 8031763-01 Normal	
Field Results																									
Conductivity	µS/cm			596	865		1397		1108	1113	1644	1717	1725		1706	1888	1893	1974	1977	1909		1487		1809	
Depth to Water (below top of casing)	m			12.822	14.22	18.018	18.002	19.27	19.105	12.34	14.39	15.275	16.285		14.35	15.275	16.14	14.02	12.57	16.12		10.81		15.60	
Field measured depth to bottom	m	42.71	42.69																						
Oxidation reduction potential	mV			44.4	82		201.4		217.2	153.1	162.5	302.4	153.6		147.5	204.5	270.8	231.3	170.2	183.7		146.2		121.6	
Dissolved oxygen	mg/L			6.00	6.71		3.15		3.93	1.05	0.39	0.37	1.0		0.78	0.53	0.62	2.34	1.23	0.26		0.23		1.61	
pH				7.07	7.09		6.78		6.68	6.59	6.58	6.51	6.50		6.62	6.50	6.48	6.63	6.67	6.57		6.43		6.71	
Total dissolved solids	mg/L			388	559		910.0		721.5	721.5	1066.0	1118.0	1124.6		1111.5	1228.5	1228.5	1280.5	1287.0	1241.5		968.5		1176.5	
Temperature	°C			14.08	19.2		13.2		13.1	13.9	16.3	15.1	12.2		15.1	14.5	13.2	14	15.7	13.6		13.9		15.8	
Turbidity	NTU			50.2			7.13		25.2	6.79	2.59	2.53	3.66		1.81	2.33	1.97	3.84	2.60		3.04		1.29		
Volume Purged	L			210	100		2.4		5.0	7.35	7	7.5	10.0		12.4	9	18	9	9.45	13.5		16.8		29.3	
Lab Results																									
Dissolved Metals																									
Aluminum (dissolved)	mg/L			<0.005			<0.005		<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0052	
Antimony (dissolved)	mg/L			0.0006			0.0002		0.0004	<0.0001	0.0001	0.0002	<0.0001		<0.0001	<0.0001	0.0003	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Arsenic (dissolved)	mg/L			<0.0005			<0.0005		<0.0005	<0.0005	<0.0005	0.0008	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium (dissolved)	mg/L			0.009			0.083		0.042	0.026	0.032	0.041	0.041		0.029	0.029	0.045	0.042	0.041	0.0437	0.0471	0.0291	0.0282	0.0280	0.0337
Beryllium (dissolved)	mg/L			<0.0001			<0.0001		<0.0001	<0.0001	<0.0001	0.0004	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Bismuth (dissolved)	mg/L			<0.0001			<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Boron (dissolved)	mg/L			0.005			0.010		0.013	0.008	0.007	0.011	0.007		0.009	0.008	0.017	0.015	0.008	0.019	0.0229	0.0063	0.0094	0.0071	0.0220
Cadmium (dissolved)	mg/L			<0.00001			0.00003		0.00004	0.00003	0.00004	0.00038	0.00004		0.00001	0.00002	0.00005	0.00005	0.00002	0.000031	0.000045	0.000038	0.000026	0.000038	0.000039
Calcium (dissolved)	mg/L			87.3			212		176	177	291	271	278		186	241	318	292	341	343	303	245	247	243	240
Chromium (dissolved)	mg/L			<0.0005			<0.0005		<0.0005	<0.0005	0.0006	0.0011	<0.0005		<0.0005	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00433
Cobalt (dissolved)	mg/L			0.00162			0.00367		0.00044	0.00042	0.00012	0.00033	0.00016		0.00013	0.00038	0.00015	0.00015	0.00011	0.00015	0.00027	0.00012	0.00012	0.00012	0.00020
Copper (dissolved)	mg/L			0.0005			0.0010		0.0029	0.0006	0.0015	0.0027	0.0015		0.0014	0.0017	0.0016	0.0014	0.0017	0.00109	0.00138	<0.00040	<0.00040	<0.00040	0.00230
Iron (dissolved)	mg/L			0.242			<0.010		<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.038
Lead (dissolved)	mg/L			<0.0001			<0.0001		<0.0001	<0.0001	<0.0001	0.0003	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Lithium (dissolved)	mg/L			0.0172			0.0291		0.0258	0.0234	0.0283	0.0315	0.0315		0.0255	0.0341	0.0360	0.0343	0.0350	0.0365	0.0330	0.0283	0.0285	0.0279	0.0215
Magnesium (dissolved)	mg/L			10.4			25.9		17.9	20.2	32.1	31.9	34.2		30.0	29.3	42.6	37.1	38.1	39.7	32.6	26.9	27.3	27.2	51.3
Manganese (dissolved)	mg/L			0.133			4.29		0.383	0.470	0.0394	0.0563	0.133		0.0149	0.0126	0.0353	0.0614	0.0394	0.182	0.545	0.126	0.124	0.124	0.0815
Mercury (dissolved)	mg/L			<0.00002			<0.00002		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002		<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Molybdenum (dissolved)	mg/L			0.0021			0.0029		0.0005	0.0004	0.0010	0.0013	0.0008		0.0005	0.0004	0.0003	0.0003	0.0003	0.00028	0.00031	0.00018	0.00017	0.00018	0.00043
Nickel (dissolved)	mg/L			0.0021			0.0041		0.0021	0.0012	0.0012	<0.0002	0.0015		0.0007	0.0067	0.0015	0.0014	0.0011	0.00095	0.00125	<0.00040	<0.00040	<0.00040	0.00159
Selenium (dissolved)	mg/L			<0.0005			<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Silicon (dissolved, as Si)	mg/L			14.2			12.5		15.5	17.4	15.8	16.7	15.3		16.7	14.6	17.4	15.6	18.7	17.0	14.6	16.4	16.5	16.0	16.7
Silver (dissolved)	mg/L			<0.00005			<0.00005		0.00123	0.00012	<0.00005	0.00033	0.00007		<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Sodium (dissolved)	mg/L			13.2			21.9		18.7	24.8	23.8	25.9	24.3		31.0	23.0	27.0	28.3	22.1	23.4	22.1	22.4	22.3	41.3	
Strontium (dissolved)	mg/L			0.364			1.01		0.742	0.783	1.04	1.08	1.08		0.843	1.33	1.34	1.17	1.35	1.34	1.28	0.988	0.969	0.956	1.18
Sulphur (dissolved)	mg/L			10			37		10	36	34	36	37		28	32	47	40	43	44.4	35.6	29.6	30.7	30.2	36.1
Tellurium (dissolved)	mg/L			<0.0002			<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00050	<0.00050	<0.00050	<0.00050	
Thallium (dissolved)	mg/L			<0.00002			<0.00002		0.00003	0.00003	0.00003	0.00009	0.00003		<0.00002	<0.00002	0.00003	0.00004	<0.00002	0.000032	0.000057	0.000025	0.000023	0.000023	0.000028
Thorium (dissolved)	mg/L			<0.0001			<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin (dissolved)	mg/L			<0.0002			<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (dissolved)	mg/L			<0.005			<0.005		<0.005	<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (dissolved)	mg/L																				<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (dissolved)	mg/L			0.0196			0.0383</																		

Oliver Landfill
Water Quality Results

Analyte	Unit	MW08-3	MW08-3	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	
		14-Aug-19	18-Nov-19	27-Mar-13	05-Jul-13	27-Nov-13	03-Apr-14	03-Oct-14	11-Dec-14	24-Mar-15	08-Jul-15	15-Sep-15	03-Dec-15	30-Mar-16	21-Jun-16	21-Sep-16	01-Dec-16	23-Mar-17	22-Jun-17	31-Oct-17	21-Mar-18	21-Mar-18	21-Mar-18
		Well dry	Well dry	Normal			Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Duplicate	Normal	Duplicate	Normal
Fluoride	mg/L			0.11			<0.10	0.29	0.23	<0.10	<0.10	0.16	0.15	0.10	<0.10	<0.10	0.12	0.14	0.18	0.18	0.22	0.19	0.18
Hardness (as CaCO3), dissolved	mg/L			261			637	514	525	859	808	836		722	969	882	1010	1020	892	724	729	719	811
Hardness (as CaCO3), from total Ca/Mg	mg/L												589										
pH				7.51			7.18	7.22	7.25	7.25	7.20	7.03	7.28	7.22	7.30	7.18	7.38	7.40	7.26	7.40	7.45	7.37	7.28
Sulphate	mg/L			31.9			112	44.7	50.8	109	100	112	81.3	106	146	114	118	119	116	89.2	88.9	89.0	103
Microbiological																							
Total coliforms (counts)	CFU/100 mL																						
E. coli (counts)	CFU/100 mL																						
Fecal coliforms (MPN)	MPN/100 mL																						
Nutrients																							
Ammonia (total, as N)	mg/L			6.57			5.12	0.091	1.20	<0.020	0.197	<0.020	0.031	0.038	<0.020	<0.020	<0.020	0.099	0.133	0.090	0.072	0.064	0.034
Nitrate (as N)	mg/L			13.8			44.6	32.6	34.3	79.4	78.0	88.6	75.6	111	106	108	115	123	107	71.1	71.2	71.2	112
Nitrate + Nitrite (as N)	mg/L			13.8			44.6	32.7	34.4	79.4	78.0	88.6	75.6	111	106	108	115	123	107	71.1	71.2	71.2	112
Nitrate + Nitrite (as N) (calculated)	mg/L			13.8			44.6	32.7	34.4	79.4	78.0	88.6	75.6	111	106	108	115	123	107	71.1	71.2	71.2	112
Nitrite (as N)	mg/L			0.028			<0.010	0.077	0.076	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total nitrogen	mg/L			20.5			51.4	34.0	36.3	80.5	78.2	89.1											
Total kjeldahl nitrogen	mg/L			6.75			6.82	1.38	1.90	1.14	0.20	0.57											
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L			<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L																						
Potassium (dissolved)	mg/L			4.96			9.63	7.08	6.09	6.06	6.34	7.69	4.43	4.67	7.71	7.47	6.82	7.59	7.07	5.78	5.71	5.79	5.38
Potassium (total)	mg/L																						
Total Metals																							
Aluminum (total)	mg/L																						
Antimony (total)	mg/L																						
Arsenic (total)	mg/L																						
Barium (total)	mg/L																						
Beryllium (total)	mg/L																						
Bismuth (total)	mg/L																						
Boron (total)	mg/L																						
Cadmium (total)	mg/L																						
Calcium (total)	mg/L																						
Chromium (total)	mg/L																						
Cobalt (total)	mg/L																						
Copper (total)	mg/L																						
Iron (total)	mg/L																						
Lead (total)	mg/L																						
Lithium (total)	mg/L																						
Magnesium (total)	mg/L																						
Manganese (total)	mg/L																						
Mercury (total)	mg/L																						
Molybdenum (total)	mg/L																						
Nickel (total)	mg/L																						
Selenium (total)	mg/L																						
Silicon (total, as Si)	mg/L																						
Silver (total)	mg/L																						
Sodium (total)	mg/L																						
Strontium (total)	mg/L																						
Sulphur (total)	mg/L																						
Tellurium (total)	mg/L																						
Thallium (total)	mg/L																						
Thorium (total)	mg/L																						
Tin (total)	mg/L																						
Titanium (total)	mg/L																						
Tungsten (total)	mg/L																						
Uranium (total)	mg/L																						
Vanadium (total)	mg/L																						
Zinc (total)	mg/L																						
Zirconium (total)	mg/L																						



Oliver Landfill
Water Quality Results

Analyte	Unit	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	
		19-Dec-18 8121703-01 Normal	10-Apr-19 9041151-01 Normal	10-Apr-19 9041151-02 Duplicate	10-Apr-19 9041151-03 Duplicate	16-Jul-19 9071919-01 Normal	14-Aug-19 Field Only	18-Nov-19 9110173-01 Normal	14-Jul-20 0071421-01 Normal	14-Jul-20 0071421-02 Duplicate	14-Jul-20 0071421-03 Duplicate	02-Nov-20 20K0245-01 Normal	13-Apr-21 21D1567-01 Normal	13-Apr-21 21D1567-02 Duplicate	13-Apr-21 21D1567-03 Duplicate	28-Jun-21 21F3755-01 Normal	02-Nov-21 21K0642-01 Normal	28-Mar-22 22C3879-01 Normal	28-Mar-22 22C3879-02 Duplicate	28-Mar-22 22C3879-03 Duplicate	07-Jul-22 22G0897-01 Normal	15-Nov-22 22K2016-01 Normal	18-Apr-23 23D2066-01 Normal	18-Apr-23 23D2066-02 Duplicate
Fluoride	mg/L	<0.10	0.16	0.17	0.16	0.18		0.15	<0.10	<0.10	<0.10	<0.10	0.19	0.20	0.21	0.20	0.12	<1.00	<1.00	<1.00	0.10	0.13	0.13	0.11
Hardness (as CaCO3), dissolved	mg/L	810	892	896	891	807		873	743	753	741		678	594	599	611	555	678	651	650	659	534	576	457
Hardness (as CaCO3), from total Ca/Mg	mg/L																							
pH		7.31	7.35	7.46	7.44	7.36		7.28	7.34	7.26	7.22		7.17	7.36	7.31	7.34	7.55	7.42	7.55	7.41	7.44	7.32	7.21	7.29
Sulphate	mg/L	112	102	101	103	104		108	72.3	72.3	72.2		61.1	57.3	54.5	54.6	49.1	59.5	60.3	59.4	62.5	42.2	81.8	
Microbiological																								
Total coliforms (counts)	CFU/100 mL																							
E. coli (counts)	CFU/100 mL																							
Fecal coliforms (MPN)	MPN/100 mL																							
Nutrients																								
Ammonia (total, as N)	mg/L	0.041	<0.020	<0.020	<0.020	0.083		0.082	0.193	0.197	0.196		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.093	<0.050	<0.050	<0.050
Nitrate (as N)	mg/L	112	107	110	109	99.5		88.7	74.6	74.8	74.6		58.8	47.3	52.2	52.1	45.3	50.3	58.9	58.4	61.4	35.0	53.8	42.5
Nitrate + Nitrite (as N)	mg/L	112	107	110	109	99.6		88.8	74.7	74.8	74.7		58.8	47.5	52.3	52.2	45.3	50.3	58.9	58.4	61.4	35.0	53.8	42.5
Nitrate + Nitrite (as N) (calculated)	mg/L	112	107	110	109	99.6		88.7	74.6	74.8	74.6		58.8	47.5	52.3	52.2	45.3	50.3	58.9	58.4	61.4	35.0	53.8	42.5
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	0.099		0.018	0.044	0.045	0.044		<0.010	0.152	0.094	0.077	<0.010	<0.010	<0.100	<0.100	<0.100	<0.010	<0.010	<0.010
Total nitrogen	mg/L																							
Total kjeldahl nitrogen	mg/L																							
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L																							
Potassium (dissolved)	mg/L	6.11	7.49	7.52	7.51	7.05		8.60	5.53	5.50	5.59		5.93	4.85	4.90	4.90	4.75	6.31	5.02	5.00	5.13	4.19	5.81	3.44
Potassium (total)	mg/L																							
Total Metals																								
Aluminum (total)	mg/L																							
Antimony (total)	mg/L																							
Arsenic (total)	mg/L																							
Barium (total)	mg/L																							
Beryllium (total)	mg/L																							
Bismuth (total)	mg/L																							
Boron (total)	mg/L																							
Cadmium (total)	mg/L																							
Calcium (total)	mg/L																							
Chromium (total)	mg/L																							
Cobalt (total)	mg/L																							
Copper (total)	mg/L																							
Iron (total)	mg/L																							
Lead (total)	mg/L																							
Lithium (total)	mg/L																							
Magnesium (total)	mg/L																							
Manganese (total)	mg/L																							
Mercury (total)	mg/L																							
Molybdenum (total)	mg/L																							
Nickel (total)	mg/L																							
Selenium (total)	mg/L																							
Silicon (total, as Si)	mg/L																							
Silver (total)	mg/L																							
Sodium (total)	mg/L																							
Strontium (total)	mg/L																							
Sulphur (total)	mg/L																							
Tellurium (total)	mg/L																							
Thallium (total)	mg/L																							
Thorium (total)	mg/L																							
Tin (total)	mg/L																							
Titanium (total)	mg/L																							
Tungsten (total)	mg/L																							
Uranium (total)	mg/L																							
Vanadium (total)	mg/L																							
Zinc (total)	mg/L																							
Zirconium (total)	mg/L																							



Oliver Landfill
Water Quality Results

Analyte	Unit	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-1	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	
		18-Apr-23 23D2066-03 Duplicate	19-Jul-23 23G2729-01 Normal	09-Nov-23 23K1419-01 Normal	09-Apr-24 24D1767-01 Normal	09-Apr-24 24D1767-03 Duplicate	09-Apr-24 24D1767-04 Duplicate	23-Jul-24 24G3261-01 Normal	18-Nov-24 24K2084-01 Normal	07-Apr-25 25D1181-01 Normal	07-Apr-25 25D1181-04 Duplicate	07-Apr-25 25D1181-05 Duplicate	23-Jul-25 25G3510-01 Normal	04-Nov-25 25K0678-01 Normal	01-Aug-12	29-Nov-12	27-Mar-13	05-Jul-13	27-Nov-13	03-Oct-14	11-Dec-14	24-Mar-15 Field Only	24-Mar-15 Normal	19-Jun-15 Field Only
Fluoride	mg/L	0.13	0.12	0.14	0.23	0.23	0.23	0.13	0.14	<0.10	0.10	<0.10	0.16	0.11										
Hardness (as CaCO3), dissolved	mg/L	457	637	664	687	686	688	691	571	683	684	677	596	618										
Hardness (as CaCO3), from total Ca/Mg	mg/L																							
pH		7.30	7.31	7.23	7.30	7.39	7.54	6.94	7.34	7.35	7.48	7.45	7.26	7.19										
Sulphate	mg/L		64.4	70.4	70.5	69.9	70.2	65.6	56.7	59.5	59.4	59.7	60.3	56.1										
Microbiological																								
Total coliforms (counts)	CFU/100 mL																							
E. coli (counts)	CFU/100 mL																							
Fecal coliforms (MPN)	MPN/100 mL																							
Nutrients																								
Ammonia (total, as N)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.058	<0.050	<0.050	<0.050										
Nitrate (as N)	mg/L	43.5	55.8	61.4	65.4	64.4	67.3	58.1	28.6	55.9	55.1	54.8	56.7	57.5										
Nitrate + Nitrite (as N)	mg/L	43.5	55.8	61.4	65.4	64.4	67.3	58.1	28.6	55.9	55.1	54.8	56.7	57.5										
Nitrate + Nitrite (as N) (calculated)	mg/L	43.5	55.8	61.4	65.4	64.4	67.3	58.1	28.6	55.9	55.1	54.8	56.7	57.5										
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010										
Total nitrogen	mg/L												56.7											
Total kjeldahl nitrogen	mg/L												<0.050											
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.186	<0.050	<0.050	<0.050	<0.050	<0.050										
Phosphorus (total, by ICPMS/ICPOES)	mg/L																							
Potassium (dissolved)	mg/L	3.46	4.38	5.08	5.13	5.09	5.08	5.97	5.60	4.87	4.88	4.78	3.96	4.55										
Potassium (total)	mg/L																							
Total Metals																								
Aluminum (total)	mg/L																							
Antimony (total)	mg/L																							
Arsenic (total)	mg/L																							
Barium (total)	mg/L																							
Beryllium (total)	mg/L																							
Bismuth (total)	mg/L																							
Boron (total)	mg/L																							
Cadmium (total)	mg/L																							
Calcium (total)	mg/L																							
Chromium (total)	mg/L																							
Cobalt (total)	mg/L																							
Copper (total)	mg/L																							
Iron (total)	mg/L																							
Lead (total)	mg/L																							
Lithium (total)	mg/L																							
Magnesium (total)	mg/L																							
Manganese (total)	mg/L																							
Mercury (total)	mg/L																							
Molybdenum (total)	mg/L																							
Nickel (total)	mg/L																							
Selenium (total)	mg/L																							
Silicon (total, as Si)	mg/L																							
Silver (total)	mg/L																							
Sodium (total)	mg/L																							
Strontium (total)	mg/L																							
Sulphur (total)	mg/L																							
Tellurium (total)	mg/L																							
Thallium (total)	mg/L																							
Thorium (total)	mg/L																							
Tin (total)	mg/L																							
Titanium (total)	mg/L																							
Tungsten (total)	mg/L																							
Uranium (total)	mg/L																							
Vanadium (total)	mg/L																							
Zinc (total)	mg/L																							
Zirconium (total)	mg/L																							



Oliver Landfill
Water Quality Results

Analyte	Unit	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	
		28-Aug-15	19-Nov-15	25-Feb-16	10-Apr-19	19-Jun-19	16-Jul-19	14-Aug-19	18-Nov-19	16-Jun-20	02-Nov-20	13-Apr-21	28-Jun-21	02-Nov-21	28-Mar-22	07-Jul-22	15-Nov-22	18-Apr-23	19-Jul-23	09-Nov-23	MW98-2	MW98-2	MW98-2	MW98-2
		Field Only	Field Only	Field Only	Field Only	Normal	Normal	Field Only	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Field Results																								
Conductivity	µS/cm					735	770		716	767	765	786	849	807	855	843	823	843	585	840	863	896	842	881
Depth to Water (below top of casing)	m	69.915	69.68	69.72	68.1	68.11		69.125	68.03	68.32	68.405	68.50	68.405	68.575	68.315	68.515	68.795	68.493	68.62	68.51		68.204	69.315	68.12
Field measured depth to bottom	m																							
Oxidation reduction potential	mV				92	145.0			152.3	81.2	64.7	-15.8	68.2	58.5	77.8	70.4	50.6	140.5	101.0	70.7	152.1	314.4	217.1	210.5
Dissolved oxygen	mg/L				4.94	5.60			4.32	5.77	6.85	2.11	2.81	5.25	2.41	2.93	4.27	6.18	3.17	4.98	3.40	2.82	2.05	1.98
pH					7.42	7.70			7.59	7.55	7.64	7.44	7.33	7.48	7.65	7.38	7.55	7.39	7.28	7.36	7.33	7.33	7.43	7.43
Total dissolved solids	mg/L				474.5	500.5			468.0	500.5	500.5	513.5	552.5	526.5	559.0	546.0	533.0	546.0	559.0	546.0	559.0	585.0	546.0	572.0
Temperature	°C				18.6	21.4			12.3	20.2	14.4	16.3	23.8	14.6	15.1	12.4	13.4	18.8	12.5	15.9	20.7	12.4	15.1	
Turbidity	NTU										>1000													
Volume Purged	L				1	1			1		1.25	1	1	1	1	1	1	1	1	1.5				
Lab Results																								
Dissolved Metals																								
Aluminum (dissolved)	mg/L				<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	<0.0050	
Antimony (dissolved)	mg/L				<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	<0.00020	
Arsenic (dissolved)	mg/L				0.00141	0.00067			0.00082	0.00100	0.00077	0.00104	0.00067	0.00067	0.00080	0.00050	0.00071	0.00069	0.00065	0.00054	0.00071	0.00060	0.00058	0.00056
Barium (dissolved)	mg/L				0.110	0.103			0.100	0.0943	0.0882	0.0914	0.0822	0.0914	0.0938	0.0990	0.0961	0.108	0.110	0.0903	0.103	0.0679	0.0944	0.0836
Beryllium (dissolved)	mg/L				<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	<0.00010	<0.00010
Bismuth (dissolved)	mg/L				<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	<0.00010	<0.00010
Boron (dissolved)	mg/L				0.0224	0.0117			0.0184	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Cadmium (dissolved)	mg/L				0.000055	0.000056			0.000044	0.000125	0.000076	0.000015	0.000043	0.000064	0.000085	0.000049	0.000126	0.000051	0.000062	0.000071	0.000073	0.000076	0.000065	0.000085
Calcium (dissolved)	mg/L				76.3	68.9			70.9	88.2	87.6	81.8	85.5	92.0	93.4	93.2	94.0	97.6	99.5	95.6	98.0	104	95.1	102
Chromium (dissolved)	mg/L				<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	<0.00050	<0.00050
Cobalt (dissolved)	mg/L				<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	0.00014	<0.00010	0.00017
Copper (dissolved)	mg/L				0.00107	0.00116			0.00064	0.00120	0.00198	0.00058	0.00057	0.00085	0.00061	0.00071	0.00179	0.00086	0.00076	0.00088	0.00134	0.00123	0.00100	0.00110
Iron (dissolved)	mg/L				<0.010	<0.010			<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (dissolved)	mg/L				<0.00020	<0.00020			<0.00020	<0.00020	<0.00020	0.00126	<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)	mg/L				0.0289	0.0251			0.0238	0.0307	0.0279	0.0278	0.0278	0.0308	0.0305	0.0340	0.0307	0.0339	0.0339	0.0324	0.0331	0.0339	0.0315	0.0304
Magnesium (dissolved)	mg/L				42.8	38.7			38.2	39.7	42.0	43.5	48.6	45.3	49.1	47.1	49.3	48.5	50.5	52.6	53.0	53.3	49.6	51.2
Manganese (dissolved)	mg/L				0.00170	0.00903			0.00231	0.0163	0.0188	0.00208	0.0100	0.00440	0.00527	0.00590	0.00385	0.00532	0.00314	0.00593	0.00337	0.0216	0.00899	0.0203
Mercury (dissolved)	mg/L				<0.000040	<0.000040			<0.000040	<0.000040	<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)	mg/L				0.0114	0.0115			0.00954	0.0101	0.00946	0.00810	0.00947	0.00837	0.00824	0.00752	0.00739	0.00747	0.00733	0.00755	0.00721	0.00759	0.00756	0.00857
Nickel (dissolved)	mg/L				0.00074	0.00063			0.00066	0.00134	0.00089	0.00097	0.00080	0.00109	0.00082	0.00076	0.00148	0.00076	0.00079	0.00078	0.00103	0.00093	0.00104	0.00109
Selenium (dissolved)	mg/L				0.00137	0.00062			0.00073	0.00094	0.00122	0.00094	0.00109	0.00084	0.00175	0.00148	0.00169	0.00165	0.00147	0.00150	0.00087	0.00113	0.00052	0.00067
Silicon (dissolved, as Si)	mg/L				13.8	13.6			14.5	14.1	13.5	13.0	13.1	13.0	12.7	13.0	13.2	13.9	12.9	12.5	13.2	12.8	12.8	12.8
Silver (dissolved)	mg/L				<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	<0.000050	<0.000050
Sodium (dissolved)	mg/L				19.6	17.3			18.1	20.0	19.9	20.2	21.7	20.9	24.6	24.1	23.9	24.0	24.0	23.9	24.0	22.7	22.9	22.5
Strontium (dissolved)	mg/L				1.06	0.982			0.989	1.06	1.04	0.937	0.984	0.980	1.08	1.12	1.15	1.26	1.20	1.23	1.31	1.26	1.24	1.16
Sulphur (dissolved)	mg/L				23.8	19.2			17.4	18.4	18.0	14.9	13.9	18.1	17.8	17.1	19.0	17.2	20.2	18.7	25.5	18.7	19.4	19.4
Tellurium (dissolved)	mg/L				<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	<0.00050	<0.00050
Thallium (dissolved)	mg/L				<0.000020	<0.000020			<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Thorium (dissolved)	mg/L				<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	<0.00010	<0.00010
Tin (dissolved)	mg/L				0.00033	0.00026			0.00020	0.00042	<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
Titanium (dissolved)	mg/L				<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	<0.0050	<0.0050
Tungsten (dissolved)	mg/L				<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	<0.0010	<0.0010
Uranium (dissolved)	mg/L				0.0145	0.0102			0.00977	0.0110	0.0142	0.0189	0.0167	0.0171	0.0154	0.0167	0.0207	0.0140	0.0188	0.0215	0.0175	0.0146	0.0167	0.0167
Vanadium (dissolved)	mg/L				0.0013	0.0012			0.0010	<0.0010	0.0011	<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
Zinc (dissolved)	mg/L																							

Oliver Landfill
Water Quality Results

Analyte	Unit	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2	MW98-2		
		28-Aug-15	19-Nov-15	25-Feb-16	10-Apr-19	19-Jun-19	16-Jul-19	14-Aug-19	18-Nov-19	16-Jul-20	02-Nov-20	13-Apr-21	28-Jun-21	02-Nov-21	28-Mar-22	07-Jul-22	15-Nov-22	18-Apr-23	19-Jul-23	09-Nov-23	09-Apr-24	23-Jul-24	18-Nov-24	07-Apr-25
		Field Only	Field Only	Field Only	Field Only	Normal	Normal	Field Only	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	
Fluoride	mg/L					0.58	0.54		0.47	0.76	0.43	0.55	0.59	0.40	0.68	0.42	0.46	0.41	0.39	0.47	0.42	0.38	0.41	0.35
Hardness (as CaCO3), dissolved	mg/L					367	332		335	384	392	384	414	417	436	427	438	444	457	456	463	479	442	466
Hardness (as CaCO3), from total Ca/Mg	mg/L																							
pH						8.07	8.17		8.07	8.09	8.18	8.03	8.14	7.94	7.97	7.99	7.90	7.86	7.99	8.02	7.84	7.61	7.90	7.89
Sulphate	mg/L					53.2	53.5		51.0	50.9	48.7	46.1	47.7	47.5	54.6	50.1	52.4		49.6	59.1	55.4	67.2	55.4	53.3
Microbiological																								
Total coliforms (counts)	CFU/100 mL																							
E. coli (counts)	CFU/100 mL																							
Fecal coliforms (MPN)	MPN/100 mL																							
Nutrients																								
Ammonia (total, as N)	mg/L					0.121	0.115		0.172	0.079	0.102	0.149	0.060	0.143	0.068	0.156	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.060	0.098
Nitrate (as N)	mg/L					0.014	0.020		<0.010	0.053	0.060	<0.010	0.067	0.037	<0.042	0.054	0.083	0.048	<0.010	<0.010	0.048	<0.010	<0.010	<0.010
Nitrate + Nitrite (as N)	mg/L					<0.0200	<0.0200		<0.0200	0.0529	0.0604	<0.0200	0.0674	0.0366	0.0417	0.0544	0.0830	0.0483	<0.0100	<0.0100	0.0484	<0.0100	<0.0100	<0.0100
Nitrate + Nitrite (as N) (calculated)	mg/L					0.014	0.020		<0.010	0.053	0.060	<0.010	0.067	0.037	0.042	0.054	0.083	0.048	<0.010	<0.010	0.048	<0.010	<0.010	<0.010
Nitrite (as N)	mg/L					<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Total nitrogen	mg/L																							
Total kjeldahl nitrogen	mg/L																							
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L					<0.050	<0.050		<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L																							
Potassium (dissolved)	mg/L					6.02	5.16		5.59	5.94	6.12	5.43	5.90	6.18	6.26	5.83	6.51	6.84	6.73	6.90	6.39	7.44	6.57	6.71
Potassium (total)	mg/L																							
Total Metals																								
Aluminum (total)	mg/L																							
Antimony (total)	mg/L																							
Arsenic (total)	mg/L																							
Barium (total)	mg/L																							
Beryllium (total)	mg/L																							
Bismuth (total)	mg/L																							
Boron (total)	mg/L																							
Cadmium (total)	mg/L																							
Calcium (total)	mg/L																							
Chromium (total)	mg/L																							
Cobalt (total)	mg/L																							
Copper (total)	mg/L																							
Iron (total)	mg/L																							
Lead (total)	mg/L																							
Lithium (total)	mg/L																							
Magnesium (total)	mg/L																							
Manganese (total)	mg/L																							
Mercury (total)	mg/L																							
Molybdenum (total)	mg/L																							
Nickel (total)	mg/L																							
Selenium (total)	mg/L																							
Silicon (total, as Si)	mg/L																							
Silver (total)	mg/L																							
Sodium (total)	mg/L																							
Strontium (total)	mg/L																							
Sulphur (total)	mg/L																							
Tellurium (total)	mg/L																							
Thallium (total)	mg/L																							
Thorium (total)	mg/L																							
Tin (total)	mg/L																							
Titanium (total)	mg/L																							
Tungsten (total)	mg/L																							
Uranium (total)	mg/L																							
Vanadium (total)	mg/L																							
Zinc (total)	mg/L																							
Zirconium (total)	mg/L																							



Analyte	Unit	MW98-2	MW98-2
		23-Jul-25 25G3510-03 Normal	04-Nov-25 25K0678-03 Normal
Field Results			
Conductivity	µS/cm	910	885
Depth to Water (below top of casing)	m	58.205	68.23
Field measured depth to bottom	m		
Oxidation reduction potential	mV	224.4	197.0
Dissolved oxygen	mg/L	3.62	4.87
pH		7.65	7.30
Total dissolved solids	mg/L	592	578.5
Temperature	°C	21.4	13.4
Turbidity	NTU		
Volume Purged	L		
Lab Results			
Dissolved Metals			
Aluminum (dissolved)	mg/L	<0.0050	<0.0050
Antimony (dissolved)	mg/L	<0.00020	<0.00020
Arsenic (dissolved)	mg/L	0.00060	0.00054
Barium (dissolved)	mg/L	0.0954	0.0967
Beryllium (dissolved)	mg/L	<0.00010	<0.00010
Bismuth (dissolved)	mg/L	<0.00010	<0.00010
Boron (dissolved)	mg/L	<0.0500	<0.0500
Cadmium (dissolved)	mg/L	0.000063	0.000079
Calcium (dissolved)	mg/L	103	96.5
Chromium (dissolved)	mg/L	<0.00050	<0.00050
Cobalt (dissolved)	mg/L	0.00016	0.00016
Copper (dissolved)	mg/L	0.00077	0.00101
Iron (dissolved)	mg/L	<0.010	<0.010
Lead (dissolved)	mg/L	<0.00020	<0.00020
Lithium (dissolved)	mg/L	0.0360	0.0315
Magnesium (dissolved)	mg/L	55.2	47.8
Manganese (dissolved)	mg/L	0.0162	0.0163
Mercury (dissolved)	mg/L	<0.000010	<0.000010
Molybdenum (dissolved)	mg/L	0.00844	0.00821
Nickel (dissolved)	mg/L	0.00117	0.00126
Selenium (dissolved)	mg/L	0.00053	<0.00050
Silicon (dissolved, as Si)	mg/L	13.7	12.8
Silver (dissolved)	mg/L	<0.000050	<0.000050
Sodium (dissolved)	mg/L	23.5	21.3
Strontium (dissolved)	mg/L	1.22	1.20
Sulphur (dissolved)	mg/L	19.9	17.8
Tellurium (dissolved)	mg/L	<0.00050	<0.00050
Thallium (dissolved)	mg/L	<0.000020	<0.000020
Thorium (dissolved)	mg/L	<0.00010	<0.00010
Tin (dissolved)	mg/L	<0.00020	<0.00020
Titanium (dissolved)	mg/L	<0.0050	<0.0050
Tungsten (dissolved)	mg/L	<0.0010	<0.0010
Uranium (dissolved)	mg/L	0.0116	0.0200
Vanadium (dissolved)	mg/L	<0.0050	<0.0050
Zinc (dissolved)	mg/L	0.103	0.0905
Zirconium (dissolved)	mg/L	<0.00010	<0.00010
General			
Bicarbonate alkalinity (as HCO3)	mg/L	491	558
Carbonate alkalinity (as CO3)	mg/L	<0.600	<0.600
Hydroxide alkalinity (as OH)	mg/L	<0.340	<0.340
Alkalinity (bicarbonate, as CaCO3)	mg/L	402	458
Alkalinity (carbonate, as CaCO3)	mg/L	<1.0	<1.0
Alkalinity (hydroxide, as CaCO3)	mg/L	<1.0	<1.0
Alkalinity (phenolphthalein, as CaCO3)	mg/L	<1.0	<1.0
Alkalinity (total, as CaCO3)	mg/L	402	458
Biochemical oxygen demand	mg/L		
Bromide	mg/L	<0.10	<0.10
Chemical oxygen demand	mg/L	54	68
Chloride	mg/L	8.33	8.43
Conductivity	µS/cm	884	880

Analyte	Unit	MW98-2	MW98-2
		23-Jul-25 25G3510-03 Normal	04-Nov-25 25K0678-03 Normal
Fluoride	mg/L	0.48	0.37
Hardness (as CaCO3), dissolved	mg/L	485	438
Hardness (as CaCO3), from total Ca/Mg	mg/L		
pH		7.87	7.72
Sulphate	mg/L	58.2	50.2
Microbiological			
Total coliforms (counts)	CFU/100 mL		
E. coli (counts)	CFU/100 mL		
Fecal coliforms (MPN)	MPN/100 mL		
Nutrients			
Ammonia (total, as N)	mg/L	0.370	<0.050
Nitrate (as N)	mg/L	0.332	<0.010
Nitrate + Nitrite (as N)	mg/L	0.332	<0.0100
Nitrate + Nitrite (as N) (calculated)	mg/L	0.332	<0.010
Nitrite (as N)	mg/L	<0.010	<0.010
Total nitrogen	mg/L	0.876	
Total kjeldahl nitrogen	mg/L	0.545	
Phosphorus (dissolved, by ICPMS/ICPOES)	mg/L	<0.050	<0.050
Phosphorus (total, by ICPMS/ICPOES)	mg/L		
Potassium (dissolved)	mg/L	7.09	6.21
Potassium (total)	mg/L		
Total Metals			
Aluminum (total)	mg/L		
Antimony (total)	mg/L		
Arsenic (total)	mg/L		
Barium (total)	mg/L		
Beryllium (total)	mg/L		
Bismuth (total)	mg/L		
Boron (total)	mg/L		
Cadmium (total)	mg/L		
Calcium (total)	mg/L		
Chromium (total)	mg/L		
Cobalt (total)	mg/L		
Copper (total)	mg/L		
Iron (total)	mg/L		
Lead (total)	mg/L		
Lithium (total)	mg/L		
Magnesium (total)	mg/L		
Manganese (total)	mg/L		
Mercury (total)	mg/L		
Molybdenum (total)	mg/L		
Nickel (total)	mg/L		
Selenium (total)	mg/L		
Silicon (total, as Si)	mg/L		
Silver (total)	mg/L		
Sodium (total)	mg/L		
Strontium (total)	mg/L		
Sulphur (total)	mg/L		
Tellurium (total)	mg/L		
Thallium (total)	mg/L		
Thorium (total)	mg/L		
Tin (total)	mg/L		
Titanium (total)	mg/L		
Tungsten (total)	mg/L		
Uranium (total)	mg/L		
Vanadium (total)	mg/L		
Zinc (total)	mg/L		
Zirconium (total)	mg/L		



Legend for Reports for RDOS Landfill and Wastewater Treatment Sites Water Quality Results

<	Less than reported detection limit
>	Greater than reported upper detection limit
>=	Greater than or equal to
A	Absent
Calc	Calculated guideline or standard. The guideline or standard is dependent on the value of one or more other analytes, and is calculated from a formula or table.
CSR DW	BC CSR Generic Numerical Water Standards for Drinking Water
CSR IW	BC CSR Generic Numerical Water Standards for Irrigation
CSR LW	BC CSR Generic Numerical Water Standards for Livestock
GCDWQ AO & O	Guidelines for Canadian Drinking Water Quality - Aesthetic Objectives and Other
GCDWQ MAC	Guidelines for Canadian Drinking Water Quality - Maximum Acceptable Concentrations
L	Laboratory reading type (Lab result)
m asl	metres above sea level
N	Narrative type of guideline or standard, or Result Note.
ND	Non-detect. Result is less than lower detection limit.
NG	No Guideline
NR	No Result
NS	No Standard
NT	Not Tested
OG	Overgrown
P	Present
PR	Presumptive
TK	Test kit reading type (Field result)
TNTC	Too numerous to count

	Highlighted value has a lower detection limit that is greater than the guideline/standard maximum and/or the guideline/standard minimum, or has an upper detection limit that is less than the guideline/standard maximum and/or the guideline/standard minimum.
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100	The maximum guideline/standard value cannot be determined because a result for a dependent analyte is not available for the sample.
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CSR DW	Highlighted value exceeds CSR DW
<u>CSR IW</u>	Highlighted value exceeds CSR IW
<u>CSR LW</u>	Highlighted value exceeds CSR LW
GCDWQ AO & O	Highlighted value exceeds GCDWQ AO & O
GCDWQ MAC	Highlighted value exceeds GCDWQ MAC
<u>SL Criteria Override</u>	Highlighted value exceeds sampling location criteria override

Guideline Notes for Reports for RDOS Landfill and Wastewater Treatment Sites Water Quality Results

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

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

General Notes:

Includes Aesthetic Objective, Operational Guidance Value, and Objective types of guidelines. The guidelines are Aesthetic Objectives unless stated otherwise in the guideline note.

3. Notes for BC CSR Generic Numerical Water Standards for Irrigation (CSR IW)

General Notes:

BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 133/2022 March 1, 2023.

Standards for all organic substances are for total substance concentrations. Any water sample to be analyzed for organic substances should not be filtered.

Standards for surface water samples to be analyzed for heavy metals, metalloids and inorganic ions are total substance concentrations. In addition, it is recommended that surface water samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for dissolved substance concentrations.

Standards for groundwater samples for heavy metals, metalloids and inorganic ions are for dissolved substance concentrations. In addition, it is recommended that groundwater samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for total substance concentrations.

Standards apply to irrigation of all soil types, unless otherwise indicated. / There are several different standards for site-specific factors for some analytes. The most stringent standards were used for this criteria set.

Note 3.1 for Boron (dissolved):

Standard varies depending on crop. This standard is for blackberry crop.

Note 3.2 for Chromium (dissolved):

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

Standard is 8 µg/L for chromium, hexavalent. Standard is 5 µg/L for chromium, trivalent. The standard of 5 µg/L was used to identify exceedances for dissolved chromium in order to demonstrate compliance with the standards.

Note 3.3 for Iron (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item A6, A7, A8 or A11
- (b) item C1, C2, C3, C4 or C6,
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 3.4 for Lithium (dissolved):

Standard to protect all types of crops.

Note 3.5 for Manganese (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item B1
- (b) item C1, C3 or C4
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H3 or H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 3.6 for Molybdenum (dissolved):

Standard varies with crop, soil drainage and Mo:Cu ratio. Standard is 10 – 30 µg/L. Consult a director for further advice. The most stringent standard of 10 µg/L has been used.

Note 3.7 for Selenium (dissolved):

Standard varies with type of application; continuous or intermittent. This standard is for continuous applications on crops.

Note 3.8 for Zinc (dissolved):

The standard varies (from 1000 to 5000 µg/L) with soil pH. This standard (which is the most stringent) is for soil pH less than 6.0

Oliver Landfill
Water Quality Results

Note 3.9 for Chloride:

Standard to protect all types of crops.

Note 3.10 for Boron (total):

Standard varies depending on crop. This standard is for blackberry crop.

Note 3.11 for Chromium (total):

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

Standard is 8 µg/L for chromium, hexavalent. Standard is 5 µg/L for chromium, trivalent. The standard of 5 µg/L was used to identify exceedances for total chromium in order to demonstrate compliance with the standards.

Note 3.12 for Iron (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item A6, A7, A8 or A11
- (b) item C1, C2, C3, C4 or C6,
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 3.13 for Lithium (total):

Standard to protect all types of crops.

Note 3.14 for Manganese (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item B1
- (b) item C1, C3 or C4
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H3 or H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

Note 3.15 for Molybdenum (total):

Standard varies with crop, soil drainage and Mo:Cu ratio. Standard is 10 – 30 µg/L. Consult a director for further advice. The most stringent standard of 10 µg/L has been used.

Note 3.16 for Selenium (total):

Standard varies with type of application; continuous or intermittent. This standard is for continuous applications on crops.

Note 3.17 for Zinc (total):

The standard varies (from 1000 to 5000 µg/L) with soil pH. This standard (which is the most stringent) is for soil pH less than 6.0

4. Notes for BC CSR Generic Numerical Water Standards for Livestock (CSR LW)

General Notes:

BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 133/2022 March 1, 2023.

Standards for all organic substances are for total substance concentrations. Any water sample to be analyzed for organic substances should not be filtered.

Standards for surface water samples to be analyzed for heavy metals, metalloids and inorganic ions are total substance concentrations. In addition, it is recommended that surface water samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for dissolved substance concentrations.

Standards for groundwater samples for heavy metals, metalloids and inorganic ions are for dissolved substance concentrations. In addition, it is recommended that groundwater samples being analyzed for heavy metals, metalloids and inorganic ions should also be analyzed for total substance concentrations.

Note 4.1 for Chromium (dissolved):

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

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

Note 4.2 for Fluoride:

Standard varies with type of livestock. Consult a director for further advice.

Note 4.3 for Nitrate (as N):

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

Note 4.4 for Nitrate + Nitrite (as N):

Oliver Landfill
Water Quality Results

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

Note 4.5 for Nitrate + Nitrite (as N) (calculated):

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

Note 4.6 for Chromium (total):

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

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

5. Notes for BC CSR Generic Numerical Water Standards for Drinking Water (CSR DW)

General Notes:

BC Contaminated Sites Regulation, Generic Numerical Water Standards, Schedule 3.2; includes amendments up to B.C. Reg. 133/2022 March 1, 2023.

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

Note 5.1 for Aluminum (dissolved):

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

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

Note 5.2 for Chromium (dissolved):

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

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

Note 5.3 for Cobalt (dissolved):

The standard in Schedule 3.2 is 1 µg/L. However, BC CSR Protocol 9 has background concentrations in groundwater for cobalt in µg/L for regions of BC as follows.

“Lower Mainland Sub-Region 1: 62

Lower Mainland Sub-Region 2: 18

Thompson Okanagan Region: 16

Southern Vancouver Island Region: 14

The interim cobalt value of 20 µg/L for the remaining regions of the province remains in effect.”

Reference: BC CSR Protocol 9 for Contaminated Sites, Establishing Local Background Concentrations in Groundwater, BC Ministry of Environment and Climate Change Strategy, February 1, 2023.

Note 5.4 for Copper (dissolved):

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

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

Note 5.5 for Iron (dissolved):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item A6, A7, A8 or A11
- (b) item C1, C2, C3, C4 or C6,
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

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

Note 5.6 for Manganese (dissolved):

Oliver Landfill

Water Quality Results

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item B1
- (b) item C1, C3 or C4
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H3 or H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

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

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

Note 5.7 for Sodium (dissolved):

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

Note 5.8 for Zinc (dissolved):

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

Note 5.9 for Chloride:

Standard to protect against taste and odour concerns.

Note 5.10 for Sulphate:

Standard to protect against taste and odour concerns.

Note 5.11 for Nitrate (as N):

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

Note 5.12 for Nitrate + Nitrite (as N):

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

Note 5.13 for Nitrate + Nitrite (as N) (calculated):

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

Note 5.14 for Aluminum (total):

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

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

Note 5.15 for Chromium (total):

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

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

Note 5.16 for Cobalt (total):

The standard in Schedule 3.2 is 1 µg/L. However, BC CSR Protocol 9 has background concentrations in groundwater for cobalt in ug/L for regions of BC as follows.

“Lower Mainland Sub-Region 1: 62

Lower Mainland Sub-Region 2: 18

Thompson Okanagan Region: 16

Southern Vancouver Island Region: 14

The interim cobalt value of 20 ug/L for the remaining regions of the province remains in effect.”

Reference: BC CSR Protocol 9 for Contaminated Sites, Establishing Local Background Concentrations in Groundwater, BC Ministry of Environment and Climate Change Strategy, February 1, 2023.

Note 5.17 for Copper (total):

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

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

Note 5.18 for Iron (total):

Oliver Landfill
Water Quality Results

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item A6, A7, A8 or A11
- (b) item C1, C2, C3, C4 or C6,
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

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

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

Note 5.19 for Manganese (total):

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item B1
- (b) item C1, C3 or C4
- (c) item D2, D3, D5, or D6
- (d) item E4, or
- (e) item H3 or H14.

Standard applies to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as item H11 or H20, but only if the site was used for the purpose or activity in conjunction with or as a result of the site also being used for at least one of the purposes or activities set out above.

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

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

Note 5.20 for Sodium (total):

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

Note 5.21 for Zinc (total):

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

Triplicate Analysis

Oliver Landfill
Duplicate Water Samples Report

Sampling Location	MW98-1	MW98-1	MW98-1		
Date Sampled	07-Apr-25	07-Apr-25	07-Apr-25		
Lab Sample ID	25D1181-01	25D1181-04	25D1181-05		
Sample Type	Normal	Duplicate	Duplicate		
Analyte	Unit			RPD/RSD	
Field Results					
Conductivity	µS/cm	1356			
Depth to Water (below top of casing)	m	10.548			
Oxidation reduction potential	mV	211.5			
Dissolved oxygen	mg/L	5.16			
pH		6.73			
Total dissolved solids	mg/L	884.0			
Temperature	°C	13.7			
Turbidity	NTU	3.07			
Volume Purged	L	5.125			
Lab Results					
Dissolved Metals					
Aluminum (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	
Antimony (dissolved)	mg/L	<0.00020	<0.00020	<0.00020	
Arsenic (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	
Barium (dissolved)	mg/L	0.0218	0.0223	0.0219	1.2%
Beryllium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	
Bismuth (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	
Boron (dissolved)	mg/L	<0.0500	<0.0500	<0.0500	
Cadmium (dissolved)	mg/L	0.000029	0.000025	0.000023	11.9%
Calcium (dissolved)	mg/L	229	229	227	0.5%
Chromium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	
Cobalt (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	
Copper (dissolved)	mg/L	0.00169	0.00167	0.00171	1.2%
Iron (dissolved)	mg/L	<0.010	<0.010	<0.010	
Lead (dissolved)	mg/L	<0.00020	<0.00020	<0.00020	
Lithium (dissolved)	mg/L	0.0261	0.0269	0.0268	1.6%
Magnesium (dissolved)	mg/L	27.2	27.0	26.6	1.1%
Manganese (dissolved)	mg/L	0.0253	0.0257	0.0243	2.9%
Mercury (dissolved)	mg/L	<0.000010	<0.000010	<0.000010	
Molybdenum (dissolved)	mg/L	0.00024	0.00024	0.00023	2.4%
Nickel (dissolved)	mg/L	0.00045	0.00048	0.00045	3.8%
Selenium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	
Silicon (dissolved, as Si)	mg/L	15.9	15.9	16.0	0.4%
Silver (dissolved)	mg/L	<0.000050	<0.000050	<0.000050	
Sodium (dissolved)	mg/L	23.9	23.8	23.5	0.9%
Strontium (dissolved)	mg/L	0.892	0.886	0.878	0.8%
Sulphur (dissolved)	mg/L	21.2	21.3	21.9	1.8%
Tellurium (dissolved)	mg/L	<0.00050	<0.00050	<0.00050	
Thallium (dissolved)	mg/L	0.000021	<0.000020	0.000023	9.1%
Thorium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	
Tin (dissolved)	mg/L	<0.00020	<0.00020	<0.00020	
Titanium (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	
Tungsten (dissolved)	mg/L	<0.0010	<0.0010	<0.0010	
Uranium (dissolved)	mg/L	0.0172	0.0171	0.0171	0.3%
Vanadium (dissolved)	mg/L	<0.0050	<0.0050	<0.0050	
Zinc (dissolved)	mg/L	0.0340	0.0348	0.0336	1.8%
Zirconium (dissolved)	mg/L	<0.00010	<0.00010	<0.00010	
General					
Bicarbonate alkalinity (as HCO3)	mg/L	427	427	429	0.3%
Carbonate alkalinity (as CO3)	mg/L	<0.600	<0.600	<0.600	
Hydroxide alkalinity (as OH)	mg/L	<0.340	<0.340	<0.340	
Alkalinity (bicarbonate, as CaCO3)	mg/L	350	350	351	0.2%
Alkalinity (carbonate, as CaCO3)	mg/L	<1.0	<1.0	<1.0	
Alkalinity (hydroxide, as CaCO3)	mg/L	<1.0	<1.0	<1.0	
Alkalinity (phenolphthalein, as CaCO3)	mg/L	<1.0	<1.0	<1.0	
Alkalinity (total, as CaCO3)	mg/L	350	350	351	0.2%
Bromide	mg/L	<0.10	<0.10	<0.10	
Chemical oxygen demand	mg/L	<20	26	<20	
Chloride	mg/L	46.3	45.8	45.4	1.0%
Conductivity	µS/cm	1330	1350	1360	1.1%
Fluoride	mg/L	<0.10	0.10	<0.10	
Hardness (as CaCO3), dissolved	mg/L	683	684	677	0.6%
pH		7.35	7.48	7.45	0.9%
Sulphate	mg/L	59.5	59.4	59.7	0.3%
Nutrients					
Ammonia (total, as N)	mg/L	<0.050	0.058	<0.050	
Nitrate (as N)	mg/L	55.9	55.1	54.8	1.0%
Nitrate + Nitrite (as N)	mg/L	55.9	55.1	54.8	1.0%
Nitrate + Nitrite (as N) (calculated)	mg/L	55.9	55.1	54.8	1.0%
Nitrite (as N)	mg/L	<0.010	<0.010	<0.010	
Phosphorus (dissolved, by IC/PMS/ICPOES)	mg/L	<0.050	<0.050	<0.050	
Potassium (dissolved)	mg/L	4.87	4.88	4.78	1.1%



Summary Statistics

Oliver Landfill
Water Quality Results

Analyte	Sampling Location	Unit	Average	Median	Minimum	Maximum	95% Percentile	Standard Deviation	Number of Results	Number of Numerical Results	Number of Results with Exceedances
Boron (dissolved)	4359 Rye Grass Road	mg/L	0.022	0.021	0.019	0.027	0.026	0.003	9	9	0
	Black Sage Well #2	mg/L	0.0310	0.0250	0.0333	0.0823	0.0552	0.0159	13	3	0
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	0.0244	0.0250	0.0141	0.0141	0.0250	0.0026	18	1	0
	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	0.0194	0.0250	0.005	0.0229	0.0250	0.0072	53	24	0
Calcium (dissolved)	MW98-2	mg/L	0.0239	0.0250	0.0117	0.0224	0.0250	0.0033	20	3	0
	4359 Rye Grass Road	mg/L	97.6	98.1	83.2	111	110.2	9.3	9	9	0
	Black Sage Well #2	mg/L	51.8	48.4	37.7	80.4	71.9	11.8	13	13	0
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	37.70	33.95	5.20	77.2	75.58	21.48	18	18	0
	MW08-3	mg/L							0	0	0
Manganese (dissolved)	MW98-1	mg/L	228.3	227.0	87.3	343	309.0	48.3	53	53	0
	MW98-2	mg/L	91.2	93.7	68.9	104	103.1	10.1	20	20	0
	4359 Rye Grass Road	mg/L	0.0008	0.0005	0.0002	0.0025	0.0022	0.0008	9	8	0
	Black Sage Well #2	mg/L	0.00951	0.00495	0.00095	0.0240	0.02286	0.00832	13	13	3
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	0.1337	0.1275	0.0170	0.243	0.2320	0.0567	18	18	17
Sodium (dissolved)	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	0.19455	0.08150	0.00110	4.29	0.42920	0.58726	53	53	39
	MW98-2	mg/L	0.00903	0.00592	0.00170	0.0216	0.02037	0.00668	20	20	2
	4359 Rye Grass Road	mg/L	23.5	24.1	18.5	28.6	27.6	3.0	9	9	0
	Black Sage Well #2	mg/L	15.2	15.1	13.0	21.6	18.8	2.4	13	13	0
	MW08-1	mg/L							0	0	0
Alkalinity (total, as CaCO3)	MW08-2	mg/L	26.9	27.4	21.5	33.1	32.3	3.9	18	18	0
	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	25.3	23.5	13.2	41.3	40.5	6.2	53	53	0
	MW98-2	mg/L	21.8	22.1	17.3	24.6	24.5	2.2	20	20	0
	4359 Rye Grass Road	mg/L	183	179	165	210	208	16	9	9	0
	Black Sage Well #2	mg/L	186	179	130	311	249	44	13	13	0
Chloride	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	271	268	173	512	371	75	18	18	0
	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	326	335	197	431	401	57	53	53	0
	MW98-2	mg/L	414	416	357	458	451	29	20	20	0
	4359 Rye Grass Road	mg/L	71.2	68.8	53.0	109	103.4	19.5	9	9	1
Conductivity	Black Sage Well #2	mg/L	9.41	9.57	6.78	13.0	11.86	1.81	13	13	0
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	37.1	39.3	15.5	50.8	45.7	8.9	18	18	0
	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	70.5	58.2	22.6	134	118.2	29.9	53	53	15
	MW98-2	mg/L	7.00	7.46	4.00	8.73	8.69	1.53	20	20	0
Sulphate	4359 Rye Grass Road	µS/cm	882	893	802	964	946	52	9	9	0
	Black Sage Well #2	µS/cm	462	454	338	694	593	88	13	13	0
	MW08-1	µS/cm							0	0	0
	MW08-2	µS/cm	710	698	425	958	915	145	18	18	0
	MW08-3	µS/cm							0	0	0
	MW98-1	µS/cm	1442	1380	661	1980	1906	307	53	53	0
Nitrate (as N)	MW98-2	µS/cm	810	815	709	917	886	62	20	20	0
	4359 Rye Grass Road	mg/L	132	132	113	149	147	13	9	9	0
	Black Sage Well #2	mg/L	48.7	46.0	28.1	87.5	71.7	13.9	13	13	0
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	74.3	78.3	6.4	159	136.6	46.7	17	17	0
	MW08-3	mg/L							0	0	0
Nitrate (as N)	MW98-1	mg/L	79.7	71.4	31.9	146	117.1	25.8	50	50	0
	MW98-2	mg/L	52.8	52.4	46.1	67.2	59.9	4.9	19	19	0
	4359 Rye Grass Road	mg/L	10.93	11.30	8.01	12.9	12.34	1.35	9	9	7
	Black Sage Well #2	mg/L	1.124	0.989	<0.010	3.13	2.350	0.794	13	12	0
	MW08-1	mg/L							0	0	0
	MW08-2	mg/L	0.208	0.183	<0.010	0.948	0.522	0.236	18	13	0
Nitrate (as N)	MW08-3	mg/L							0	0	0
	MW98-1	mg/L	69.4	61.4	13.8	123	112.0	26.5	53	53	53
MW98-2	mg/L	0.045	0.028	<0.010	0.332	0.095	0.072	20	12	0	

APPENDIX E: 2025 Laboratory Certificates of Analysis



CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Okanagan Similkameen 101 Martin Street Penticton, BC V2A 5J9	WORK ORDER	25D1181
ATTENTION	Rob Palmer	RECEIVED / TEMP REPORTED	2025-04-08 10:36 / 4.6°C
PO NUMBER	TLGW	REPORTED	2025-04-15 09:23
PROJECT	Oliver - TLGW	COC NUMBER	eCOC#00022253
PROJECT INFO			

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/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



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

We've Got Chemistry



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

Ahead of the Curve



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

Work Order Comments:

Custody Seals Intact: YES

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

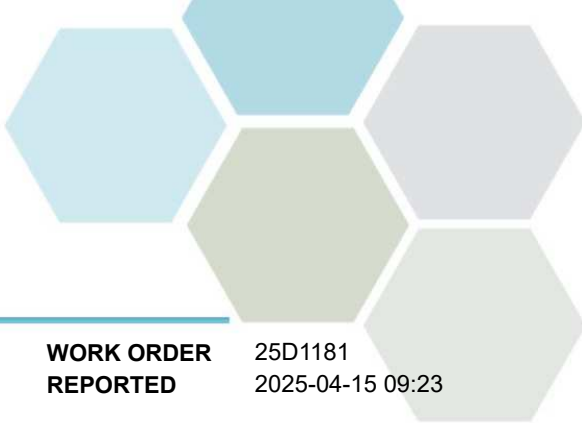
If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

Hanane El Hannaoui
Junior Account Manager

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#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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MW98-1 (25D1181-01) | Matrix: Ground Water | Sampled: 2025-04-07 13:05

Anions

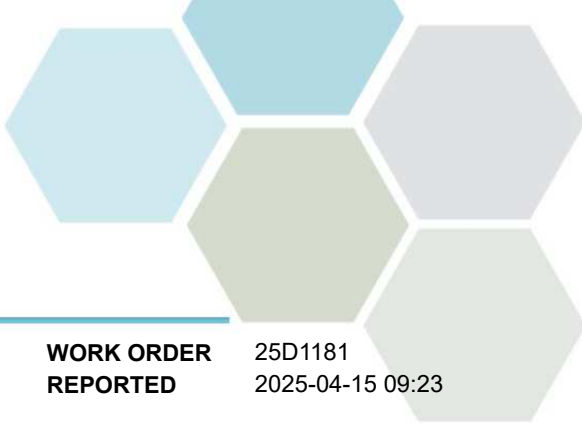
Bromide	< 0.10	N/A	0.10 mg/L	2025-04-10	
Chloride	46.3	AO ≤ 250	0.10 mg/L	2025-04-10	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2025-04-10	
Nitrate (as N)	55.9	MAC = 10	0.010 mg/L	2025-04-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-04-10	
Sulfate	59.5	AO ≤ 500	1.0 mg/L	2025-04-10	

Calculated Parameters

Bicarbonate (HCO3)	427	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	683	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	55.9	N/A	0.100 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-04-10	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-04-10	
Arsenic, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-10	
Barium, dissolved	0.0218	N/A	0.0050 mg/L	2025-04-10	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-10	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-10	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-04-10	
Cadmium, dissolved	0.000029	N/A	0.000010 mg/L	2025-04-10	
Calcium, dissolved	229	N/A	0.20 mg/L	2025-04-10	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-10	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-10	
Copper, dissolved	0.00169	N/A	0.00040 mg/L	2025-04-10	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-04-10	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-04-10	
Lithium, dissolved	0.0261	N/A	0.00010 mg/L	2025-04-10	
Magnesium, dissolved	27.2	N/A	0.010 mg/L	2025-04-10	
Manganese, dissolved	0.0253	N/A	0.00020 mg/L	2025-04-10	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-04-10	
Molybdenum, dissolved	0.00024	N/A	0.00010 mg/L	2025-04-10	
Nickel, dissolved	0.00045	N/A	0.00040 mg/L	2025-04-10	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-04-10	
Potassium, dissolved	4.87	N/A	0.10 mg/L	2025-04-10	
Selenium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-10	
Silicon, dissolved	15.9	N/A	1.0 mg/L	2025-04-10	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-04-10	
Sodium, dissolved	23.9	N/A	0.10 mg/L	2025-04-10	
Strontium, dissolved	0.892	N/A	0.0010 mg/L	2025-04-10	
Sulfur, dissolved	21.2	N/A	3.0 mg/L	2025-04-10	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-10	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW98-1 (25D1181-01) | Matrix: Ground Water | Sampled: 2025-04-07 13:05, Continued

Dissolved Metals, Continued

Thallium, dissolved	0.000021	N/A	0.000020	mg/L	2025-04-10	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-10	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-10	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-10	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-04-10	
Uranium, dissolved	0.0172	N/A	0.000020	mg/L	2025-04-10	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-10	
Zinc, dissolved	0.0340	N/A	0.0040	mg/L	2025-04-10	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-10	

General Parameters

Alkalinity, Total (as CaCO3)	350	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Bicarbonate (as CaCO3)	350	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-04-09	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-04-11	
Conductivity (EC)	1330	N/A	2.0	µS/cm	2025-04-11	
pH	7.35	7.0-10.5	0.10	pH units	2025-04-11	HT2

MW08-2 (25D1181-02) | Matrix: Ground Water | Sampled: 2025-04-07 14:20

Anions

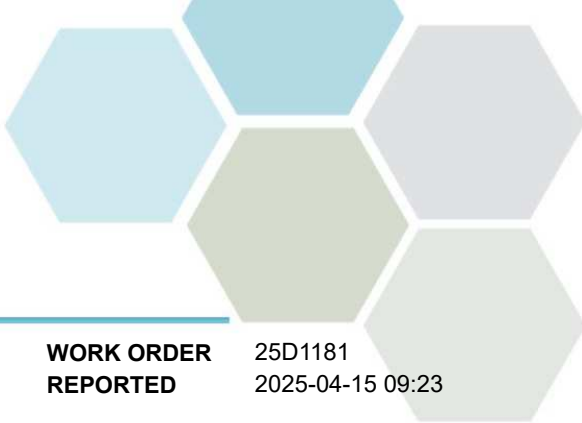
Bromide	0.20	N/A	0.10	mg/L	2025-04-10	
Chloride	44.8	AO ≤ 250	0.10	mg/L	2025-04-10	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2025-04-10	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2025-04-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2025-04-10	
Sulfate	78.3	AO ≤ 500	1.0	mg/L	2025-04-10	

Calculated Parameters

Bicarbonate (HCO3)	182	N/A	1.22	mg/L	N/A	
Carbonate (CO3)	14.0	N/A	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340	mg/L	N/A	
Hardness, Dissolved (as CaCO3)	274	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Barium, dissolved	0.0077	N/A	0.0050	mg/L	2025-04-11	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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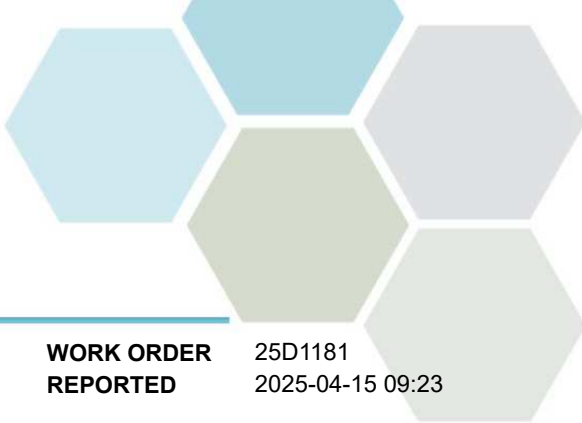
MW08-2 (25D1181-02) | Matrix: Ground Water | Sampled: 2025-04-07 14:20, Continued

Dissolved Metals, Continued

Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-04-11	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-04-11	
Calcium, dissolved	12.5	N/A	0.20	mg/L	2025-04-11	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Copper, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-04-11	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2025-04-11	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Lithium, dissolved	0.0436	N/A	0.00010	mg/L	2025-04-11	
Magnesium, dissolved	59.1	N/A	0.010	mg/L	2025-04-11	
Manganese, dissolved	0.0904	N/A	0.00020	mg/L	2025-04-11	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-04-10	
Molybdenum, dissolved	0.00034	N/A	0.00010	mg/L	2025-04-11	
Nickel, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-04-11	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-04-11	
Potassium, dissolved	5.92	N/A	0.10	mg/L	2025-04-11	
Selenium, dissolved	0.00057	N/A	0.00050	mg/L	2025-04-11	
Silicon, dissolved	1.1	N/A	1.0	mg/L	2025-04-11	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2025-04-11	
Sodium, dissolved	27.7	N/A	0.10	mg/L	2025-04-11	
Strontium, dissolved	0.130	N/A	0.0010	mg/L	2025-04-11	
Sulfur, dissolved	27.8	N/A	3.0	mg/L	2025-04-11	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-04-11	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-04-11	
Uranium, dissolved	0.00245	N/A	0.000020	mg/L	2025-04-11	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2025-04-11	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	

General Parameters

Alkalinity, Total (as CaCO3)	173	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Phenolphthalein (as CaCO3)	11.7	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Bicarbonate (as CaCO3)	149	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Carbonate (as CaCO3)	23.4	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Ammonia, Total (as N)	0.062	None Required	0.050	mg/L	2025-04-09	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-04-11	
Conductivity (EC)	610	N/A	2.0	µS/cm	2025-04-11	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW08-2 (25D1181-02) | Matrix: Ground Water | Sampled: 2025-04-07 14:20, Continued

General Parameters, Continued

pH	8.64	7.0-10.5	0.10	pH units	2025-04-11	HT2
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MW98-2 (25D1181-03) | Matrix: Ground Water | Sampled: 2025-04-07 15:20

Anions

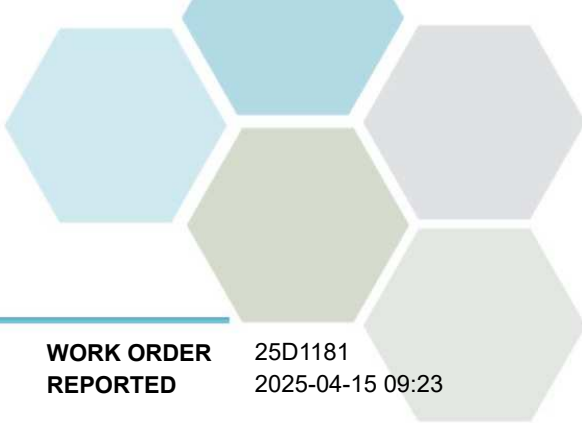
Bromide	< 0.10	N/A	0.10	mg/L	2025-04-10	
Chloride	8.58	AO ≤ 250	0.10	mg/L	2025-04-10	
Fluoride	0.35	MAC = 1.5	0.10	mg/L	2025-04-10	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2025-04-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2025-04-10	
Sulfate	53.3	AO ≤ 500	1.0	mg/L	2025-04-10	

Calculated Parameters

Bicarbonate (HCO ₃)	519	N/A	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	N/A	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340	mg/L	N/A	
Hardness, Dissolved (as CaCO ₃)	466	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Arsenic, dissolved	0.00056	N/A	0.00050	mg/L	2025-04-11	
Barium, dissolved	0.0836	N/A	0.0050	mg/L	2025-04-11	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-04-11	
Cadmium, dissolved	0.000085	N/A	0.000010	mg/L	2025-04-11	
Calcium, dissolved	102	N/A	0.20	mg/L	2025-04-11	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Cobalt, dissolved	0.00017	N/A	0.00010	mg/L	2025-04-11	
Copper, dissolved	0.00110	N/A	0.00040	mg/L	2025-04-11	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2025-04-11	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Lithium, dissolved	0.0304	N/A	0.00010	mg/L	2025-04-11	
Magnesium, dissolved	51.2	N/A	0.010	mg/L	2025-04-11	
Manganese, dissolved	0.0203	N/A	0.00020	mg/L	2025-04-11	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-04-10	
Molybdenum, dissolved	0.00857	N/A	0.00010	mg/L	2025-04-11	
Nickel, dissolved	0.00109	N/A	0.00040	mg/L	2025-04-11	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-04-11	
Potassium, dissolved	6.71	N/A	0.10	mg/L	2025-04-11	
Selenium, dissolved	0.00067	N/A	0.00050	mg/L	2025-04-11	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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MW98-2 (25D1181-03) | Matrix: Ground Water | Sampled: 2025-04-07 15:20, Continued

Dissolved Metals, Continued

Silicon, dissolved	12.8	N/A	1.0 mg/L	2025-04-11	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-04-11	
Sodium, dissolved	22.5	N/A	0.10 mg/L	2025-04-11	
Strontium, dissolved	1.16	N/A	0.0010 mg/L	2025-04-11	
Sulfur, dissolved	19.4	N/A	3.0 mg/L	2025-04-11	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-11	
Thallium, dissolved	< 0.000020	N/A	0.000020 mg/L	2025-04-11	
Thorium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-11	
Tin, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-04-11	
Titanium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-04-11	
Tungsten, dissolved	< 0.0010	N/A	0.0010 mg/L	2025-04-11	
Uranium, dissolved	0.0167	N/A	0.000020 mg/L	2025-04-11	
Vanadium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-04-11	
Zinc, dissolved	0.129	N/A	0.0040 mg/L	2025-04-11	
Zirconium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-11	

General Parameters

Alkalinity, Total (as CaCO3)	426	N/A	1.0 mg/L	2025-04-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-04-11	
Alkalinity, Bicarbonate (as CaCO3)	426	N/A	1.0 mg/L	2025-04-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-04-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-04-11	
Ammonia, Total (as N)	0.098	None Required	0.050 mg/L	2025-04-09	
Chemical Oxygen Demand	70	N/A	20 mg/L	2025-04-11	
Conductivity (EC)	864	N/A	2.0 µS/cm	2025-04-11	
pH	7.89	7.0-10.5	0.10 pH units	2025-04-11	HT2

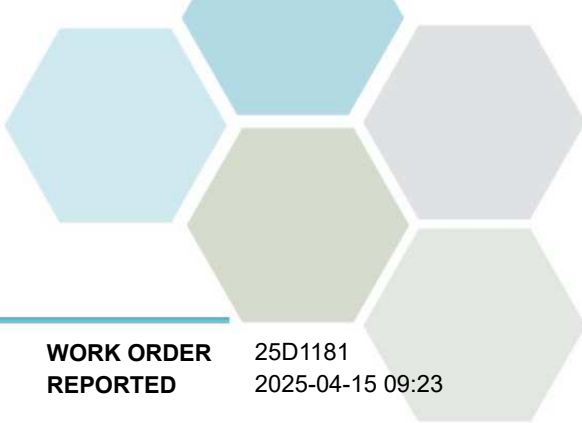
Rep-001 (25D1181-04) | Matrix: Ground Water | Sampled: 2025-04-07 13:05

Anions

Bromide	< 0.10	N/A	0.10 mg/L	2025-04-10	
Chloride	45.8	AO ≤ 250	0.10 mg/L	2025-04-10	
Fluoride	0.10	MAC = 1.5	0.10 mg/L	2025-04-10	
Nitrate (as N)	55.1	MAC = 10	0.010 mg/L	2025-04-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-04-10	
Sulfate	59.4	AO ≤ 500	1.0 mg/L	2025-04-10	

Calculated Parameters

Bicarbonate (HCO3)	427	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	684	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	55.1	N/A	0.100 mg/L	N/A	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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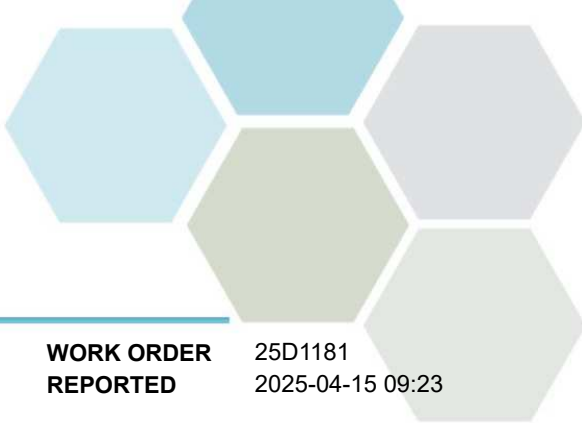
Rep-001 (25D1181-04) | Matrix: Ground Water | Sampled: 2025-04-07 13:05, Continued

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Barium, dissolved	0.0223	N/A	0.0050	mg/L	2025-04-11	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-04-11	
Cadmium, dissolved	0.000025	N/A	0.000010	mg/L	2025-04-11	
Calcium, dissolved	229	N/A	0.20	mg/L	2025-04-11	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Copper, dissolved	0.00167	N/A	0.00040	mg/L	2025-04-11	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2025-04-11	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Lithium, dissolved	0.0269	N/A	0.00010	mg/L	2025-04-11	
Magnesium, dissolved	27.0	N/A	0.010	mg/L	2025-04-11	
Manganese, dissolved	0.0257	N/A	0.00020	mg/L	2025-04-11	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-04-10	
Molybdenum, dissolved	0.00024	N/A	0.00010	mg/L	2025-04-11	
Nickel, dissolved	0.00048	N/A	0.00040	mg/L	2025-04-11	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-04-11	
Potassium, dissolved	4.88	N/A	0.10	mg/L	2025-04-11	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Silicon, dissolved	15.9	N/A	1.0	mg/L	2025-04-11	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2025-04-11	
Sodium, dissolved	23.8	N/A	0.10	mg/L	2025-04-11	
Strontium, dissolved	0.886	N/A	0.0010	mg/L	2025-04-11	
Sulfur, dissolved	21.3	N/A	3.0	mg/L	2025-04-11	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-04-11	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-04-11	
Uranium, dissolved	0.0171	N/A	0.000020	mg/L	2025-04-11	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Zinc, dissolved	0.0348	N/A	0.0040	mg/L	2025-04-11	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	

General Parameters

Alkalinity, Total (as CaCO3)	350	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Bicarbonate (as CaCO3)	350	N/A	1.0	mg/L	2025-04-11	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Rep-001 (25D1181-04) Matrix: Ground Water Sampled: 2025-04-07 13:05, Continued					
<i>General Parameters, Continued</i>					
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-04-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-04-11	
Ammonia, Total (as N)	0.058	None Required	0.050 mg/L	2025-04-09	
Chemical Oxygen Demand	26	N/A	20 mg/L	2025-04-11	
Conductivity (EC)	1350	N/A	2.0 µS/cm	2025-04-11	
pH	7.48	7.0-10.5	0.10 pH units	2025-04-11	HT2

Rep-002 (25D1181-05) | Matrix: Ground Water | Sampled: 2025-04-07 13:05

Anions

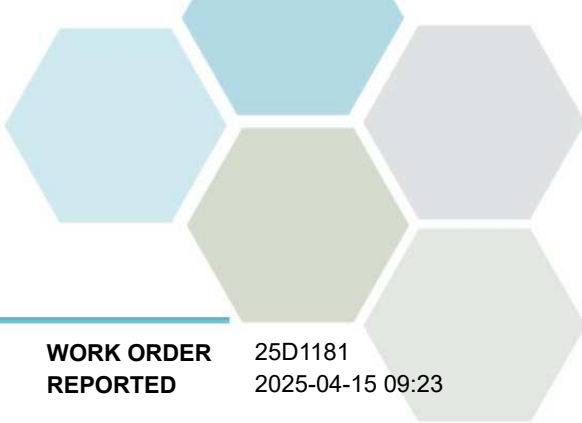
Bromide	< 0.10	N/A	0.10 mg/L	2025-04-10	
Chloride	45.4	AO ≤ 250	0.10 mg/L	2025-04-10	
Fluoride	< 0.10	MAC = 1.5	0.10 mg/L	2025-04-10	
Nitrate (as N)	54.8	MAC = 10	0.010 mg/L	2025-04-10	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-04-10	
Sulfate	59.7	AO ≤ 500	1.0 mg/L	2025-04-10	

Calculated Parameters

Bicarbonate (HCO3)	429	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	677	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	54.8	N/A	0.100 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-04-11	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-04-11	
Arsenic, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-11	
Barium, dissolved	0.0219	N/A	0.0050 mg/L	2025-04-11	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-11	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-11	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-04-11	
Cadmium, dissolved	0.000023	N/A	0.000010 mg/L	2025-04-11	
Calcium, dissolved	227	N/A	0.20 mg/L	2025-04-11	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-04-11	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-04-11	
Copper, dissolved	0.00171	N/A	0.00040 mg/L	2025-04-11	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-04-11	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-04-11	
Lithium, dissolved	0.0268	N/A	0.00010 mg/L	2025-04-11	
Magnesium, dissolved	26.6	N/A	0.010 mg/L	2025-04-11	
Manganese, dissolved	0.0243	N/A	0.00020 mg/L	2025-04-11	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-04-10	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Rep-002 (25D1181-05) | Matrix: Ground Water | Sampled: 2025-04-07 13:05, Continued

Dissolved Metals, Continued

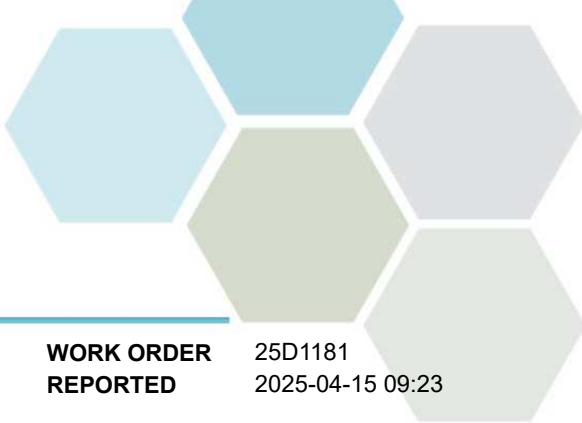
Molybdenum, dissolved	0.00023	N/A	0.00010	mg/L	2025-04-11	
Nickel, dissolved	0.00045	N/A	0.00040	mg/L	2025-04-11	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-04-11	
Potassium, dissolved	4.78	N/A	0.10	mg/L	2025-04-11	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Silicon, dissolved	16.0	N/A	1.0	mg/L	2025-04-11	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2025-04-11	
Sodium, dissolved	23.5	N/A	0.10	mg/L	2025-04-11	
Strontium, dissolved	0.878	N/A	0.0010	mg/L	2025-04-11	
Sulfur, dissolved	21.9	N/A	3.0	mg/L	2025-04-11	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-04-11	
Thallium, dissolved	0.000023	N/A	0.000020	mg/L	2025-04-11	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-04-11	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-04-11	
Uranium, dissolved	0.0171	N/A	0.000020	mg/L	2025-04-11	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-04-11	
Zinc, dissolved	0.0336	N/A	0.0040	mg/L	2025-04-11	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-04-11	

General Parameters

Alkalinity, Total (as CaCO3)	351	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Bicarbonate (as CaCO3)	351	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-04-11	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-04-09	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-04-11	
Conductivity (EC)	1360	N/A	2.0	µS/cm	2025-04-11	
pH	7.45	7.0-10.5	0.10	pH units	2025-04-11	HT2

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 PROJECT Regional District of Okanagan Similkameen
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WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	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 (2021)	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 (2021)	Electrometry	✓	Kelowna

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

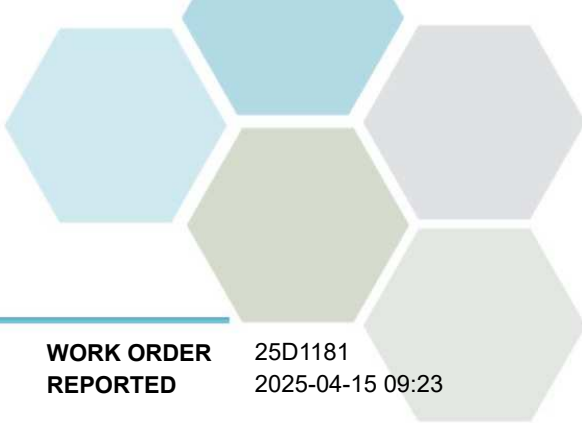
Glossary of Terms:

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
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
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

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, September 2022\)](#)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Regional District of Okanagan Similkameen
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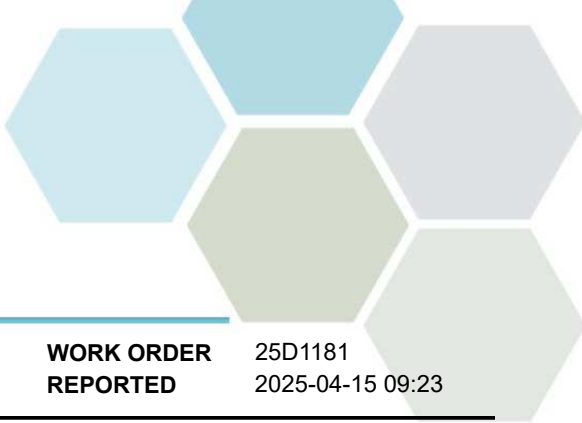
WORK ORDER REPORTED 25D1181
2025-04-15 09:23

General Comments:

The results in this report apply to the received 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. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: hhannaoui@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

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 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.

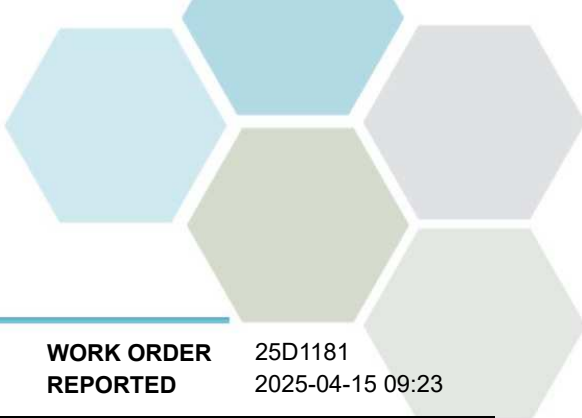
Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Anions, Batch B5D2466

Blank (B5D2466-BLK1)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B5D2466-BS1)			Prepared: 2025-04-09, Analyzed: 2025-04-09						
Bromide	3.92	0.10 mg/L	4.00		98	85-115			
Chloride	15.9	0.10 mg/L	16.0		99	90-110			
Fluoride	4.13	0.10 mg/L	4.00		103	88-108			
Nitrate (as N)	4.01	0.010 mg/L	4.00		100	90-110			
Nitrite (as N)	1.99	0.010 mg/L	2.00		100	85-115			
Sulfate	16.1	1.0 mg/L	16.0		101	90-110			

Dissolved Metals, Batch B5D2641

Blank (B5D2641-BLK1)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5D2641-BLK2)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5D2641-BLK3)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B5D2641-BS1)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	0.00249	0.000010 mg/L	0.00250		100	80-120			
LCS (B5D2641-BS2)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	0.00242	0.000010 mg/L	0.00250		97	80-120			
LCS (B5D2641-BS3)			Prepared: 2025-04-10, Analyzed: 2025-04-10						
Mercury, dissolved	0.00269	0.000010 mg/L	0.00250		108	80-120			
Duplicate (B5D2641-DUP2)			Source: 25D1181-05		Prepared: 2025-04-10, Analyzed: 2025-04-10				
Mercury, dissolved	< 0.000010	0.000010 mg/L		< 0.000010					



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5D2641, Continued

Dissolved Metals, Batch B5D2651

Blank (B5D2651-BLK1)

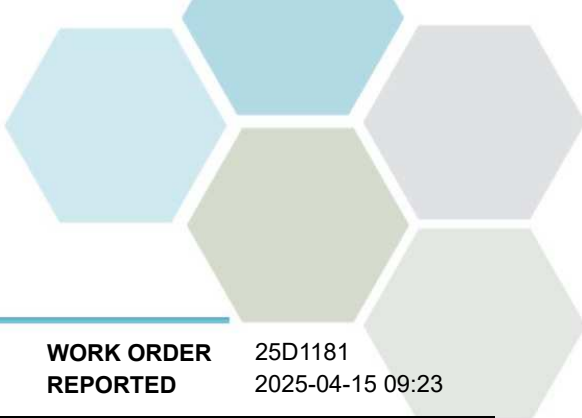
Prepared: 2025-04-10, Analyzed: 2025-04-10

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	< 0.0500	0.0500 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	< 0.5	0.5 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	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B5D2651-BS1)

Prepared: 2025-04-10, Analyzed: 2025-04-10

Aluminum, dissolved	4.12	0.0050 mg/L	4.00	103	80-120
Antimony, dissolved	0.0407	0.00020 mg/L	0.0400	102	80-120
Arsenic, dissolved	0.408	0.00050 mg/L	0.400	102	80-120
Barium, dissolved	0.0399	0.0050 mg/L	0.0400	100	80-120
Beryllium, dissolved	0.0403	0.00010 mg/L	0.0400	101	80-120
Bismuth, dissolved	0.0399	0.00010 mg/L	0.0400	100	80-120
Boron, dissolved	0.409	0.0500 mg/L	0.400	102	80-120
Cadmium, dissolved	0.0406	0.000010 mg/L	0.0400	102	80-120
Calcium, dissolved	4.12	0.20 mg/L	4.00	103	80-120
Chromium, dissolved	0.0416	0.00050 mg/L	0.0400	104	80-120
Cobalt, dissolved	0.0413	0.00010 mg/L	0.0400	103	80-120
Copper, dissolved	0.0411	0.00040 mg/L	0.0400	103	80-120
Iron, dissolved	4.10	0.010 mg/L	4.00	103	80-120
Lead, dissolved	0.0402	0.00020 mg/L	0.0400	100	80-120
Lithium, dissolved	0.0410	0.00010 mg/L	0.0400	103	80-120



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

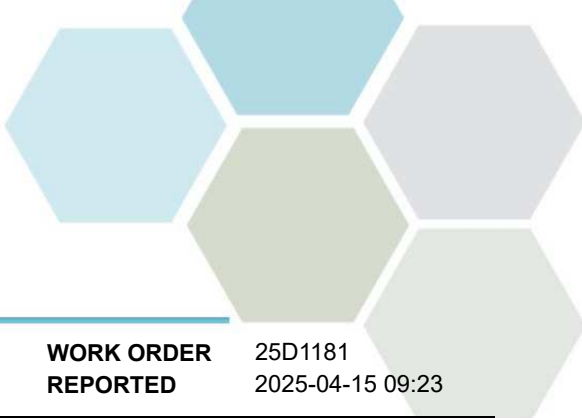
Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B5D2651, Continued									
LCS (B5D2651-BS1), Continued					Prepared: 2025-04-10, Analyzed: 2025-04-10				
Magnesium, dissolved	4.08	0.010 mg/L	4.00		102	80-120			
Manganese, dissolved	0.0414	0.00020 mg/L	0.0400		103	80-120			
Molybdenum, dissolved	0.0409	0.00010 mg/L	0.0400		102	80-120			
Nickel, dissolved	0.0410	0.00040 mg/L	0.0400		102	80-120			
Phosphorus, dissolved	4.05	0.050 mg/L	4.00		101	80-120			
Potassium, dissolved	4.09	0.10 mg/L	4.00		102	80-120			
Selenium, dissolved	0.402	0.00050 mg/L	0.400		101	80-120			
Silicon, dissolved	4.1	1.0 mg/L	4.00		103	80-120			
Silver, dissolved	0.0406	0.000050 mg/L	0.0400		102	80-120			
Sodium, dissolved	4.13	0.10 mg/L	4.00		103	80-120			
Strontium, dissolved	0.0400	0.0010 mg/L	0.0400		100	80-120			
Sulfur, dissolved	40.9	0.5 mg/L	40.0		102	80-120			
Tellurium, dissolved	0.0403	0.00050 mg/L	0.0400		101	80-120			
Thallium, dissolved	0.0398	0.000020 mg/L	0.0400		99	80-120			
Thorium, dissolved	0.0399	0.00010 mg/L	0.0400		100	80-120			
Tin, dissolved	0.0406	0.00020 mg/L	0.0400		101	80-120			
Titanium, dissolved	0.0417	0.0050 mg/L	0.0400		104	80-120			
Tungsten, dissolved	0.0407	0.0010 mg/L	0.0400		102	80-120			
Uranium, dissolved	0.0403	0.000020 mg/L	0.0400		101	80-120			
Vanadium, dissolved	0.0406	0.0050 mg/L	0.0400		102	80-120			
Zinc, dissolved	0.410	0.0040 mg/L	0.400		103	80-120			
Zirconium, dissolved	0.0405	0.00010 mg/L	0.0400		101	80-120			

General Parameters, Batch B5D2426

Blank (B5D2426-BLK1)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
Blank (B5D2426-BLK2)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
Blank (B5D2426-BLK3)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
Blank (B5D2426-BLK4)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
LCS (B5D2426-BS1)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	0.931	0.050 mg/L	1.00		93	85-115			
LCS (B5D2426-BS2)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	0.867	0.050 mg/L	1.00		87	85-115			
LCS (B5D2426-BS3)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	0.870	0.050 mg/L	1.00		87	85-115			
LCS (B5D2426-BS4)					Prepared: 2025-04-09, Analyzed: 2025-04-09				
Ammonia, Total (as N)	0.877	0.050 mg/L	1.00		88	85-115			

General Parameters, Batch B5D2585

Blank (B5D2585-BLK1)					Prepared: 2025-04-11, Analyzed: 2025-04-11				
Chemical Oxygen Demand	< 20	20 mg/L							
LCS (B5D2585-BS1)					Prepared: 2025-04-11, Analyzed: 2025-04-11				
Chemical Oxygen Demand	531	20 mg/L	500		106	89-115			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25D1181
2025-04-15 09:23

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B5D2585, Continued									
Duplicate (B5D2585-DUP1)		Source: 25D1181-01		Prepared: 2025-04-11, Analyzed: 2025-04-11					
Chemical Oxygen Demand	< 20	20 mg/L		< 20				14	
Matrix Spike (B5D2585-MS1)		Source: 25D1181-01		Prepared: 2025-04-11, Analyzed: 2025-04-11					
Chemical Oxygen Demand	164	20 mg/L	125	< 20	115	75-125			
General Parameters, Batch B5D2709									
Blank (B5D2709-BLK1)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
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							
Blank (B5D2709-BLK2)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
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							
Blank (B5D2709-BLK3)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
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)	1.6	1.0 µS/cm							
LCS (B5D2709-BS1)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Alkalinity, Total (as CaCO3)	89.4	1.0 mg/L	100		89	80-120			
LCS (B5D2709-BS2)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Conductivity (EC)	1410	1.0 µS/cm	1410		100	95-105			
LCS (B5D2709-BS3)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Alkalinity, Total (as CaCO3)	89.8	1.0 mg/L	100		90	80-120			
LCS (B5D2709-BS4)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Conductivity (EC)	1410	1.0 µS/cm	1410		100	95-105			
LCS (B5D2709-BS5)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Alkalinity, Total (as CaCO3)	90.0	1.0 mg/L	100		90	80-120			
LCS (B5D2709-BS6)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
Conductivity (EC)	1440	1.0 µS/cm	1410		102	95-105			
Reference (B5D2709-SRM1)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
pH	7.01	0.10 pH units	7.01		100	98-102			
Reference (B5D2709-SRM2)				Prepared: 2025-04-11, Analyzed: 2025-04-11					
pH	7.02	0.10 pH units	7.01		100	98-102			

CERTIFICATE OF ANALYSIS

REPORTED TO Regional District of Okanagan Similkameen
101 Martin Street
Penticton, BC V2A 5J9

ATTENTION Rob Palmer

PO NUMBER TLGW
PROJECT Oliver - TLGW

PROJECT INFO

WORK ORDER 25E3155

RECEIVED / TEMP 2025-05-23 09:46 / 17.0°C
REPORTED 2025-05-30 10:42

COC NUMBER eCOC#00023772

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/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



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

We've Got Chemistry



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

Ahead of the Curve



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

Work Order Comments:

Custody Seals Intact: N/A

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

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

Authorized By:

Hanane El Hannaoui
Junior Account Manager

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#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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Black Sage Well #2 (25E3155-01) | Matrix: Ground Water | Sampled: 2025-05-22 10:15

Anions

Bromide	< 0.10	N/A	0.10 mg/L	2025-05-23	
Chloride	11.1	AO ≤ 250	0.10 mg/L	2025-05-23	
Fluoride	0.16	MAC = 1.5	0.10 mg/L	2025-05-23	
Nitrate (as N)	0.628	MAC = 10	0.010 mg/L	2025-05-23	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-05-23	
Sulfate	46.0	AO ≤ 500	1.0 mg/L	2025-05-23	

Calculated Parameters

Bicarbonate (HCO3)	219	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	185	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	0.628	N/A	0.0100 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-05-28	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-05-28	
Arsenic, dissolved	0.00069	N/A	0.00050 mg/L	2025-05-28	
Barium, dissolved	0.0435	N/A	0.0050 mg/L	2025-05-28	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-05-28	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-05-28	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-05-28	
Cadmium, dissolved	0.000015	N/A	0.000010 mg/L	2025-05-28	
Calcium, dissolved	46.0	N/A	0.20 mg/L	2025-05-28	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-05-28	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-05-28	
Copper, dissolved	0.00940	N/A	0.00040 mg/L	2025-05-28	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-05-28	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-05-28	
Lithium, dissolved	0.00510	N/A	0.00010 mg/L	2025-05-28	
Magnesium, dissolved	17.0	N/A	0.010 mg/L	2025-05-28	
Manganese, dissolved	0.00317	N/A	0.00020 mg/L	2025-05-28	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-05-26	
Molybdenum, dissolved	0.00323	N/A	0.00010 mg/L	2025-05-28	
Nickel, dissolved	0.00046	N/A	0.00040 mg/L	2025-05-28	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-05-28	
Potassium, dissolved	3.57	N/A	0.10 mg/L	2025-05-28	
Selenium, dissolved	0.00083	N/A	0.00050 mg/L	2025-05-28	
Silicon, dissolved	6.9	N/A	1.0 mg/L	2025-05-28	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-05-28	
Sodium, dissolved	14.8	N/A	0.10 mg/L	2025-05-28	
Strontium, dissolved	0.596	N/A	0.0010 mg/L	2025-05-28	
Sulfur, dissolved	16.3	N/A	3.0 mg/L	2025-05-28	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-05-28	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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Black Sage Well #2 (25E3155-01) | Matrix: Ground Water | Sampled: 2025-05-22 10:15, Continued

Dissolved Metals, Continued

Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-05-28	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-05-28	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-05-28	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-05-28	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-05-28	
Uranium, dissolved	0.00494	N/A	0.000020	mg/L	2025-05-28	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-05-28	
Zinc, dissolved	0.0064	N/A	0.0040	mg/L	2025-05-28	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-05-28	

General Parameters

Alkalinity, Total (as CaCO3)	179	N/A	1.0	mg/L	2025-05-26	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-05-26	
Alkalinity, Bicarbonate (as CaCO3)	179	N/A	1.0	mg/L	2025-05-26	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-05-26	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-05-26	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-05-29	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-05-29	
Conductivity (EC)	495	N/A	2.0	µS/cm	2025-05-26	
pH	7.95	7.0-10.5	0.10	pH units	2025-05-26	HT2

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 PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	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 (2021)	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 (2021)	Electrometry	✓	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
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
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

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, September 2022\)](#)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

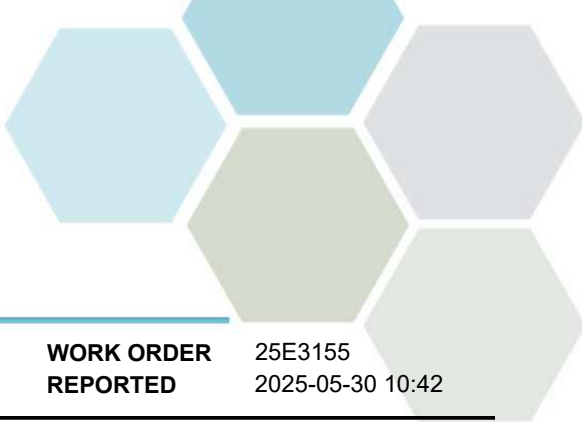
WORK ORDER REPORTED 25E3155
2025-05-30 10:42

General Comments:

The results in this report apply to the received 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. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: hhannaoui@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

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 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 B5E4149									
Blank (B5E4149-BLK1)			Prepared: 2025-05-23, Analyzed: 2025-05-23						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
Blank (B5E4149-BLK2)			Prepared: 2025-05-23, Analyzed: 2025-05-23						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
Blank (B5E4149-BLK3)			Prepared: 2025-05-23, Analyzed: 2025-05-23						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B5E4149-BS1)			Prepared: 2025-05-23, Analyzed: 2025-05-23						
Bromide	3.98	0.10 mg/L	4.00		100	85-115			
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.11	0.10 mg/L	4.00		103	88-108			
Nitrate (as N)	4.06	0.010 mg/L	4.00		102	90-110			
Nitrite (as N)	1.93	0.010 mg/L	2.00		96	85-115			
Sulfate	15.7	1.0 mg/L	16.0		98	90-110			
LCS (B5E4149-BS2)			Prepared: 2025-05-23, Analyzed: 2025-05-23						
Bromide	4.02	0.10 mg/L	4.00		101	85-115			
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.01	0.10 mg/L	4.00		100	88-108			
Nitrate (as N)	4.08	0.010 mg/L	4.00		102	90-110			
Nitrite (as N)	1.96	0.010 mg/L	2.00		98	85-115			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Anions, Batch B5E4149, Continued

LCS (B5E4149-BS2), Continued

Prepared: 2025-05-23, Analyzed: 2025-05-23

Sulfate	16.2	1.0 mg/L	16.0		101	90-110			
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LCS (B5E4149-BS3)

Prepared: 2025-05-23, Analyzed: 2025-05-23

Bromide	4.01	0.10 mg/L	4.00		100	85-115			
Chloride	16.0	0.10 mg/L	16.0		100	90-110			
Fluoride	4.02	0.10 mg/L	4.00		100	88-108			
Nitrate (as N)	4.05	0.010 mg/L	4.00		101	90-110			
Nitrite (as N)	1.93	0.010 mg/L	2.00		97	85-115			
Sulfate	16.1	1.0 mg/L	16.0		101	90-110			

Dissolved Metals, Batch B5E4324

Blank (B5E4324-BLK1)

Prepared: 2025-05-27, Analyzed: 2025-05-27

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	< 0.0500	0.0500 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	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B5E4324-BS1)

Prepared: 2025-05-27, Analyzed: 2025-05-27

Aluminum, dissolved	3.91	0.0050 mg/L	4.00		98	80-120			
Antimony, dissolved	0.0392	0.00020 mg/L	0.0400		98	80-120			
Arsenic, dissolved	0.391	0.00050 mg/L	0.400		98	80-120			
Barium, dissolved	0.0395	0.0050 mg/L	0.0400		99	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5E4324, Continued

LCS (B5E4324-BS1), Continued

Prepared: 2025-05-27, Analyzed: 2025-05-27

Beryllium, dissolved	0.0386	0.00010 mg/L	0.0400		96	80-120			
Bismuth, dissolved	0.0399	0.00010 mg/L	0.0400		100	80-120			
Boron, dissolved	0.375	0.0500 mg/L	0.400		94	80-120			
Cadmium, dissolved	0.0401	0.000010 mg/L	0.0400		100	80-120			
Calcium, dissolved	3.71	0.20 mg/L	4.00		93	80-120			
Chromium, dissolved	0.0397	0.00050 mg/L	0.0400		99	80-120			
Cobalt, dissolved	0.0385	0.00010 mg/L	0.0400		96	80-120			
Copper, dissolved	0.0388	0.00040 mg/L	0.0400		97	80-120			
Iron, dissolved	3.82	0.010 mg/L	4.00		95	80-120			
Lead, dissolved	0.0402	0.00020 mg/L	0.0400		101	80-120			
Lithium, dissolved	0.0379	0.00010 mg/L	0.0400		95	80-120			
Magnesium, dissolved	4.12	0.010 mg/L	4.00		103	80-120			
Manganese, dissolved	0.0389	0.00020 mg/L	0.0400		97	80-120			
Molybdenum, dissolved	0.0398	0.00010 mg/L	0.0400		100	80-120			
Nickel, dissolved	0.0390	0.00040 mg/L	0.0400		98	80-120			
Phosphorus, dissolved	4.00	0.050 mg/L	4.00		100	80-120			
Potassium, dissolved	4.04	0.10 mg/L	4.00		101	80-120			
Selenium, dissolved	0.387	0.00050 mg/L	0.400		97	80-120			
Silicon, dissolved	4.0	1.0 mg/L	4.00		101	80-120			
Silver, dissolved	0.0394	0.000050 mg/L	0.0400		99	80-120			
Sodium, dissolved	3.93	0.10 mg/L	4.00		98	80-120			
Strontium, dissolved	0.0389	0.0010 mg/L	0.0400		97	80-120			
Sulfur, dissolved	39.9	3.0 mg/L	40.0		100	80-120			
Tellurium, dissolved	0.0387	0.00050 mg/L	0.0400		97	80-120			
Thallium, dissolved	0.0397	0.000020 mg/L	0.0400		99	80-120			
Thorium, dissolved	0.0405	0.00010 mg/L	0.0400		101	80-120			
Tin, dissolved	0.0391	0.00020 mg/L	0.0400		98	80-120			
Titanium, dissolved	0.0378	0.0050 mg/L	0.0400		94	80-120			
Tungsten, dissolved	0.0395	0.0010 mg/L	0.0400		99	80-120			
Uranium, dissolved	0.0401	0.000020 mg/L	0.0400		100	80-120			
Vanadium, dissolved	0.0400	0.0050 mg/L	0.0400		100	80-120			
Zinc, dissolved	0.392	0.0040 mg/L	0.400		98	80-120			
Zirconium, dissolved	0.0394	0.00010 mg/L	0.0400		98	80-120			

Matrix Spike (B5E4324-MS1)

Source: 25E3155-01

Prepared: 2025-05-28, Analyzed: 2025-05-28

Aluminum, dissolved	3.77	0.0050 mg/L	4.00	< 0.0050	94	70-130			
Antimony, dissolved	0.0413	0.00020 mg/L	0.0400	< 0.00020	103	70-130			
Arsenic, dissolved	0.393	0.00050 mg/L	0.400	0.00069	98	70-130			
Barium, dissolved	0.0825	0.0050 mg/L	0.0400	0.0435	98	70-130			
Beryllium, dissolved	0.0375	0.00010 mg/L	0.0400	< 0.00010	94	70-130			
Bismuth, dissolved	0.0321	0.00010 mg/L	0.0400	< 0.00010	80	70-130			
Boron, dissolved	0.406	0.0500 mg/L	0.400	< 0.0500	91	70-130			
Cadmium, dissolved	0.0391	0.000010 mg/L	0.0400	0.000015	98	70-130			
Calcium, dissolved	49.5	0.20 mg/L	4.00	46.0	87	70-130			
Chromium, dissolved	0.0375	0.00050 mg/L	0.0400	< 0.00050	93	70-130			
Cobalt, dissolved	0.0364	0.00010 mg/L	0.0400	< 0.00010	91	70-130			
Copper, dissolved	0.0449	0.00040 mg/L	0.0400	0.00940	89	70-130			
Iron, dissolved	3.64	0.010 mg/L	4.00	< 0.010	91	70-130			
Lead, dissolved	0.0384	0.00020 mg/L	0.0400	< 0.00020	96	70-130			
Lithium, dissolved	0.0425	0.00010 mg/L	0.0400	0.00510	93	70-130			
Magnesium, dissolved	20.3	0.010 mg/L	4.00	17.0	83	70-130			
Manganese, dissolved	0.0404	0.00020 mg/L	0.0400	0.00317	93	70-130			
Molybdenum, dissolved	0.0418	0.00010 mg/L	0.0400	0.00323	96	70-130			
Nickel, dissolved	0.0369	0.00040 mg/L	0.0400	0.00046	91	70-130			
Phosphorus, dissolved	3.97	0.050 mg/L	4.00	< 0.050	99	70-130			
Potassium, dissolved	7.06	0.10 mg/L	4.00	3.57	87	70-130			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B5E4324, Continued									
Matrix Spike (B5E4324-MS1), Continued		Source: 25E3155-01		Prepared: 2025-05-28, Analyzed: 2025-05-28					
Selenium, dissolved	0.386	0.00050 mg/L	0.400	0.00083	96	70-130			
Silicon, dissolved	10.5	1.0 mg/L	4.00	6.9	90	70-130			
Silver, dissolved	0.0349	0.000050 mg/L	0.0400	< 0.000050	87	70-130			
Sodium, dissolved	18.3	0.10 mg/L	4.00	14.8	89	70-130			
Strontium, dissolved	0.637	0.0010 mg/L	0.0400	0.596	102	70-130			
Sulfur, dissolved	57.1	3.0 mg/L	40.0	16.3	102	70-130			
Tellurium, dissolved	0.0375	0.00050 mg/L	0.0400	< 0.00050	94	70-130			
Thallium, dissolved	0.0389	0.000020 mg/L	0.0400	< 0.000020	97	70-130			
Thorium, dissolved	0.0376	0.00010 mg/L	0.0400	< 0.00010	94	70-130			
Tin, dissolved	0.0401	0.00020 mg/L	0.0400	< 0.00020	100	70-130			
Titanium, dissolved	0.0371	0.0050 mg/L	0.0400	< 0.0050	93	70-130			
Tungsten, dissolved	0.0393	0.0010 mg/L	0.0400	< 0.0010	98	70-130			
Uranium, dissolved	0.0434	0.000020 mg/L	0.0400	0.00494	96	70-130			
Vanadium, dissolved	0.0386	0.0050 mg/L	0.0400	< 0.0050	96	70-130			
Zinc, dissolved	0.384	0.0040 mg/L	0.400	0.0064	94	70-130			
Zirconium, dissolved	0.0392	0.00010 mg/L	0.0400	< 0.00010	98	70-130			

Dissolved Metals, Batch B5E4356

Blank (B5E4356-BLK1)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5E4356-BLK2)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5E4356-BLK3)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5E4356-BLK4)		Prepared: 2025-05-26, Analyzed: 2025-05-27							
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B5E4356-BS1)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	0.00265	0.000010 mg/L	0.00250	106	80-120				
LCS (B5E4356-BS2)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	0.00265	0.000010 mg/L	0.00250	106	80-120				
LCS (B5E4356-BS3)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Mercury, dissolved	0.00269	0.000010 mg/L	0.00250	108	80-120				
LCS (B5E4356-BS4)		Prepared: 2025-05-26, Analyzed: 2025-05-27							
Mercury, dissolved	0.00265	0.000010 mg/L	0.00250	106	80-120				

General Parameters, Batch B5E4358

Blank (B5E4358-BLK1)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
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 (B5E4358-BLK2)		Prepared: 2025-05-26, Analyzed: 2025-05-26							
Alkalinity, Total (as CaCO3)	< 1.0	1.0 mg/L							
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	1.0 mg/L							



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT	Regional District of Okanagan Similkameen Oliver - TLGW	WORK ORDER REPORTED	25E3155 2025-05-30 10:42
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B5E4358, Continued									
Blank (B5E4358-BLK2), Continued			Prepared: 2025-05-26, Analyzed: 2025-05-26						
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 (B5E4358-BLK3)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
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 (B5E4358-BS1)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Alkalinity, Total (as CaCO3)	96.4	1.0 mg/L	100		96	80-120			
LCS (B5E4358-BS2)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Conductivity (EC)	1420	2.0 µS/cm	1410		101	95-105			
LCS (B5E4358-BS3)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Alkalinity, Total (as CaCO3)	97.1	1.0 mg/L	100		97	80-120			
LCS (B5E4358-BS4)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Conductivity (EC)	1430	2.0 µS/cm	1410		101	95-105			
LCS (B5E4358-BS5)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Alkalinity, Total (as CaCO3)	96.2	1.0 mg/L	100		96	80-120			
LCS (B5E4358-BS6)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
Conductivity (EC)	1420	2.0 µS/cm	1410		101	95-105			
Reference (B5E4358-SRM1)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
pH	7.02	0.10 pH units	7.01		100	98-102			
Reference (B5E4358-SRM2)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
pH	7.02	0.10 pH units	7.01		100	98-102			
Reference (B5E4358-SRM3)			Prepared: 2025-05-26, Analyzed: 2025-05-26						
pH	7.02	0.10 pH units	7.01		100	98-102			

General Parameters, Batch B5E4556

Blank (B5E4556-BLK1)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Chemical Oxygen Demand	< 20	20 mg/L							
Blank (B5E4556-BLK2)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Chemical Oxygen Demand	< 20	20 mg/L							
LCS (B5E4556-BS1)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Chemical Oxygen Demand	507	20 mg/L	500		101	89-115			
LCS (B5E4556-BS2)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Chemical Oxygen Demand	508	20 mg/L	500		102	89-115			

General Parameters, Batch B5E4757



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25E3155
2025-05-30 10:42

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B5E4757, Continued									
Blank (B5E4757-BLK1)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							BLK
Blank (B5E4757-BLK2)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							BLK
Blank (B5E4757-BLK3)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							BLK
Blank (B5E4757-BLK5)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							BLK
LCS (B5E4757-BS1)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	0.982	0.050 mg/L	1.00		98	85-115			
LCS (B5E4757-BS2)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	1.01	0.050 mg/L	1.00		101	85-115			
LCS (B5E4757-BS3)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	0.966	0.050 mg/L	1.00		97	85-115			
LCS (B5E4757-BS5)			Prepared: 2025-05-29, Analyzed: 2025-05-29						
Ammonia, Total (as N)	0.975	0.050 mg/L	1.00		98	85-115			

QC Qualifiers:

BLK Analyte concentration in the Method Blank is above the Reporting Limit (RL).



CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Okanagan Similkameen 101 Martin Street Penticton, BC V2A 5J9	WORK ORDER	25G3510
ATTENTION	Rob Palmer	RECEIVED / TEMP REPORTED	2025-07-24 10:17 / 6.6°C
PO NUMBER	20259001-OLF	COC NUMBER	2025-07-31 11:13 eCOC#00025982
PROJECT	OLF		
PROJECT INFO			

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/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



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

We've Got Chemistry



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

Ahead of the Curve



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

Work Order Comments:

Custody Seals Intact: n/a

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

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

Authorized By:

Hanane El Hannaoui
Junior Account Manager

1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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MW 98-1 (25G3510-01) | Matrix: Ground Water | Sampled: 2025-07-23 10:25

Anions

Bromide	< 0.10	N/A	0.10 mg/L	2025-07-25	
Chloride	42.5	AO ≤ 250	0.10 mg/L	2025-07-25	
Fluoride	0.16	MAC = 1.5	0.10 mg/L	2025-07-25	
Nitrate (as N)	56.7	MAC = 10	0.010 mg/L	2025-07-25	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-07-25	
Sulfate	60.3	AO ≤ 500	1.0 mg/L	2025-07-25	

Calculated Parameters

Bicarbonate (HCO3)	329	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	596	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	56.7	N/A	0.250 mg/L	N/A	
Nitrogen, Total	56.7	N/A	0.250 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-07-25	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-07-25	
Arsenic, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-07-25	
Barium, dissolved	0.0204	N/A	0.0050 mg/L	2025-07-25	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-07-25	
Cadmium, dissolved	0.000014	N/A	0.000010 mg/L	2025-07-25	
Calcium, dissolved	195	N/A	0.20 mg/L	2025-07-25	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-07-25	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Copper, dissolved	0.00101	N/A	0.00040 mg/L	2025-07-25	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-07-25	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-07-25	
Lithium, dissolved	0.0269	N/A	0.00010 mg/L	2025-07-25	
Magnesium, dissolved	26.1	N/A	0.010 mg/L	2025-07-25	
Manganese, dissolved	0.00328	N/A	0.00020 mg/L	2025-07-25	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-07-28	
Molybdenum, dissolved	0.00017	N/A	0.00010 mg/L	2025-07-25	
Nickel, dissolved	< 0.00040	N/A	0.00040 mg/L	2025-07-25	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-07-25	
Potassium, dissolved	3.96	N/A	0.10 mg/L	2025-07-25	
Selenium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-07-25	
Silicon, dissolved	17.9	N/A	1.0 mg/L	2025-07-25	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-07-25	
Sodium, dissolved	24.8	N/A	0.10 mg/L	2025-07-25	
Strontium, dissolved	0.807	N/A	0.0010 mg/L	2025-07-25	
Sulfur, dissolved	21.0	N/A	3.0 mg/L	2025-07-25	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW 98-1 (25G3510-01) | Matrix: Ground Water | Sampled: 2025-07-23 10:25, Continued

Dissolved Metals, Continued

Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-07-25	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-07-25	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-07-25	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-07-25	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-07-25	
Uranium, dissolved	0.0110	N/A	0.000020	mg/L	2025-07-25	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-07-25	
Zinc, dissolved	0.0149	N/A	0.0040	mg/L	2025-07-25	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	

General Parameters

Alkalinity, Total (as CaCO3)	270	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Bicarbonate (as CaCO3)	270	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-07-30	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-07-29	
Conductivity (EC)	1210	N/A	2.0	µS/cm	2025-07-25	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050	mg/L	2025-07-29	
pH	7.26	7.0-10.5	0.10	pH units	2025-07-25	HT2

MW 08-2 (25G3510-02) | Matrix: Ground Water | Sampled: 2025-07-23 12:50

Anions

Bromide	0.14	N/A	0.10	mg/L	2025-07-25	
Chloride	37.1	AO ≤ 250	0.10	mg/L	2025-07-25	
Fluoride	0.17	MAC = 1.5	0.10	mg/L	2025-07-25	
Nitrate (as N)	0.338	MAC = 10	0.010	mg/L	2025-07-25	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2025-07-25	
Sulfate	159	AO ≤ 500	1.0	mg/L	2025-07-25	

Calculated Parameters

Bicarbonate (HCO3)	357	N/A	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340	mg/L	N/A	
Hardness, Dissolved (as CaCO3)	452	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	0.338	N/A	0.0100	mg/L	N/A	
Nitrogen, Total	0.546	N/A	0.0500	mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-07-25	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-07-25	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW 08-2 (25G3510-02) | Matrix: Ground Water | Sampled: 2025-07-23 12:50, Continued

Dissolved Metals, Continued

Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-07-25	
Barium, dissolved	0.0235	N/A	0.0050	mg/L	2025-07-25	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-07-25	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-07-25	
Calcium, dissolved	57.2	N/A	0.20	mg/L	2025-07-25	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-07-25	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	
Copper, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-07-25	
Iron, dissolved	0.013	N/A	0.010	mg/L	2025-07-25	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-07-25	
Lithium, dissolved	0.0555	N/A	0.00010	mg/L	2025-07-25	
Magnesium, dissolved	75.1	N/A	0.010	mg/L	2025-07-25	
Manganese, dissolved	0.230	N/A	0.00020	mg/L	2025-07-25	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-07-28	
Molybdenum, dissolved	0.00067	N/A	0.00010	mg/L	2025-07-25	
Nickel, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-07-25	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-07-25	
Potassium, dissolved	7.59	N/A	0.10	mg/L	2025-07-25	
Selenium, dissolved	0.0108	N/A	0.00050	mg/L	2025-07-25	
Silicon, dissolved	5.2	N/A	1.0	mg/L	2025-07-25	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2025-07-25	
Sodium, dissolved	33.1	N/A	0.10	mg/L	2025-07-25	
Strontium, dissolved	0.761	N/A	0.0010	mg/L	2025-07-25	
Sulfur, dissolved	54.7	N/A	3.0	mg/L	2025-07-25	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-07-25	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-07-25	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-07-25	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-07-25	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-07-25	
Uranium, dissolved	0.0695	N/A	0.000020	mg/L	2025-07-25	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-07-25	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2025-07-25	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-07-25	

General Parameters

Alkalinity, Total (as CaCO3)	293	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Bicarbonate (as CaCO3)	293	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-07-25	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
MW 08-2 (25G3510-02) Matrix: Ground Water Sampled: 2025-07-23 12:50, Continued					
<i>General Parameters, Continued</i>					
BOD, 5-day	< 8.0	N/A	8.0 mg/L	2025-07-31	
Chemical Oxygen Demand	< 20	N/A	20 mg/L	2025-07-29	
Conductivity (EC)	958	N/A	2.0 µS/cm	2025-07-25	
Nitrogen, Total Kjeldahl	0.208	N/A	0.050 mg/L	2025-07-29	
pH	8.01	7.0-10.5	0.10 pH units	2025-07-25	HT2

MW 98-2 (25G3510-03) | Matrix: Ground Water | Sampled: 2025-07-23 13:45

Anions

Bromide	< 0.10	N/A	0.10 mg/L	2025-07-25	
Chloride	8.33	AO ≤ 250	0.10 mg/L	2025-07-25	
Fluoride	0.48	MAC = 1.5	0.10 mg/L	2025-07-25	
Nitrate (as N)	0.332	MAC = 10	0.010 mg/L	2025-07-25	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-07-25	
Sulfate	58.2	AO ≤ 500	1.0 mg/L	2025-07-25	

Calculated Parameters

Bicarbonate (HCO3)	491	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	485	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	0.332	N/A	0.0100 mg/L	N/A	
Nitrogen, Total	0.876	N/A	0.0500 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-07-25	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-07-25	
Arsenic, dissolved	0.00060	N/A	0.00050 mg/L	2025-07-25	
Barium, dissolved	0.0954	N/A	0.0050 mg/L	2025-07-25	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-07-25	
Cadmium, dissolved	0.000063	N/A	0.000010 mg/L	2025-07-25	
Calcium, dissolved	103	N/A	0.20 mg/L	2025-07-25	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-07-25	
Cobalt, dissolved	0.00016	N/A	0.00010 mg/L	2025-07-25	
Copper, dissolved	0.00077	N/A	0.00040 mg/L	2025-07-25	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-07-25	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-07-25	
Lithium, dissolved	0.0360	N/A	0.00010 mg/L	2025-07-25	
Magnesium, dissolved	55.2	N/A	0.010 mg/L	2025-07-25	
Manganese, dissolved	0.0162	N/A	0.00020 mg/L	2025-07-25	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-07-28	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
MW 98-2 (25G3510-03) Matrix: Ground Water Sampled: 2025-07-23 13:45, Continued					
<i>Dissolved Metals, Continued</i>					
Molybdenum, dissolved	0.00844	N/A	0.00010 mg/L	2025-07-25	
Nickel, dissolved	0.00117	N/A	0.00040 mg/L	2025-07-25	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-07-25	
Potassium, dissolved	7.09	N/A	0.10 mg/L	2025-07-25	
Selenium, dissolved	0.00053	N/A	0.00050 mg/L	2025-07-25	
Silicon, dissolved	13.7	N/A	1.0 mg/L	2025-07-25	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-07-25	
Sodium, dissolved	23.5	N/A	0.10 mg/L	2025-07-25	
Strontium, dissolved	1.22	N/A	0.0010 mg/L	2025-07-25	
Sulfur, dissolved	19.9	N/A	3.0 mg/L	2025-07-25	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-07-25	
Thallium, dissolved	< 0.000020	N/A	0.000020 mg/L	2025-07-25	
Thorium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
Tin, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-07-25	
Titanium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-07-25	
Tungsten, dissolved	< 0.0010	N/A	0.0010 mg/L	2025-07-25	
Uranium, dissolved	0.0116	N/A	0.000020 mg/L	2025-07-25	
Vanadium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-07-25	
Zinc, dissolved	0.103	N/A	0.0040 mg/L	2025-07-25	
Zirconium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-07-25	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO3)	402	N/A	1.0 mg/L	2025-07-25	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-07-25	
Alkalinity, Bicarbonate (as CaCO3)	402	N/A	1.0 mg/L	2025-07-25	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-07-25	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-07-25	
Ammonia, Total (as N)	0.370	None Required	0.050 mg/L	2025-07-30	
Chemical Oxygen Demand	54	N/A	20 mg/L	2025-07-29	
Conductivity (EC)	884	N/A	2.0 µS/cm	2025-07-25	
Nitrogen, Total Kjeldahl	0.545	N/A	0.050 mg/L	2025-07-29	
pH	7.87	7.0-10.5	0.10 pH units	2025-07-25	HT2

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 PROJECT Regional District of Okanagan Similkameen
OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Biochemical Oxygen Demand in Water	SM 5210 B (2019)	Dissolved Oxygen Meter	✓	Kelowna
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	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 (2021)	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
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	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
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
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

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, September 2022\)](#)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO Regional District of Okanagan Similkameen
PROJECT OLF

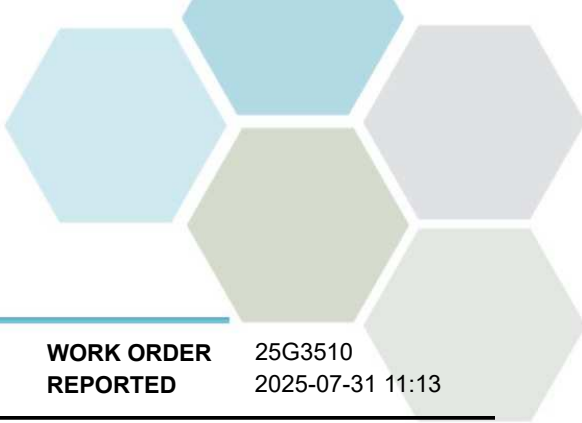
WORK ORDER 25G3510
REPORTED 2025-07-31 11:13

General Comments:

The results in this report apply to samples received by CARO and analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety and must not be modified. CARO is not responsible for losses or damages resulting directly or indirectly from errors or omissions in the conduct of the testing. Any liability is limited to the cost of analysis. CARO will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Results in **red** indicate values above the regulatory limits where these have been included. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: hhannaoui@caro.ca

Regulatory limits are added to test reports on request and are as a convenience only. While CARO makes every effort to ensure accuracy of regulatory limits, CARO assumes no liability for the use of this information. It remains the client's responsibility to ensure that regulatory limits are correct for their circumstances.



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

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 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
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Anions, Batch B5G4564

Blank (B5G4564-BLK1)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B5G4564-BS1)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
Bromide	4.02	0.10 mg/L	4.00		101	85-115			
Chloride	16.1	0.10 mg/L	16.0		101	90-110			
Fluoride	4.03	0.10 mg/L	4.00		101	88-108			
Nitrate (as N)	4.05	0.010 mg/L	4.00		101	90-110			
Nitrite (as N)	2.06	0.010 mg/L	2.00		103	85-115			
Sulfate	16.1	1.0 mg/L	16.0		101	90-110			

Dissolved Metals, Batch B5G4629

Blank (B5G4629-BLK1)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
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	< 0.0500	0.0500 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							



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25G3510
2025-07-31 11:13

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5G4629, Continued

Blank (B5G4629-BLK1), Continued

Prepared: 2025-07-25, Analyzed: 2025-07-25

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	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B5G4629-BS1)

Prepared: 2025-07-25, Analyzed: 2025-07-25

Aluminum, dissolved	4.03	0.0050 mg/L	4.00		101	80-120			
Antimony, dissolved	0.0403	0.00020 mg/L	0.0400		101	80-120			
Arsenic, dissolved	0.401	0.00050 mg/L	0.400		100	80-120			
Barium, dissolved	0.0413	0.0050 mg/L	0.0400		103	80-120			
Beryllium, dissolved	0.0403	0.00010 mg/L	0.0400		101	80-120			
Bismuth, dissolved	0.0414	0.00010 mg/L	0.0400		104	80-120			
Boron, dissolved	0.410	0.0500 mg/L	0.400		102	80-120			
Cadmium, dissolved	0.0403	0.000010 mg/L	0.0400		101	80-120			
Calcium, dissolved	4.00	0.20 mg/L	4.00		100	80-120			
Chromium, dissolved	0.0403	0.00050 mg/L	0.0400		101	80-120			
Cobalt, dissolved	0.0399	0.00010 mg/L	0.0400		100	80-120			
Copper, dissolved	0.0403	0.00040 mg/L	0.0400		101	80-120			
Iron, dissolved	4.00	0.010 mg/L	4.00		100	80-120			
Lead, dissolved	0.0412	0.00020 mg/L	0.0400		103	80-120			
Lithium, dissolved	0.0406	0.00010 mg/L	0.0400		102	80-120			
Magnesium, dissolved	3.97	0.010 mg/L	4.00		99	80-120			
Manganese, dissolved	0.0401	0.00020 mg/L	0.0400		100	80-120			
Molybdenum, dissolved	0.0404	0.00010 mg/L	0.0400		101	80-120			
Nickel, dissolved	0.0404	0.00040 mg/L	0.0400		101	80-120			
Phosphorus, dissolved	4.02	0.050 mg/L	4.00		100	80-120			
Potassium, dissolved	4.02	0.10 mg/L	4.00		101	80-120			
Selenium, dissolved	0.397	0.00050 mg/L	0.400		99	80-120			
Silicon, dissolved	4.0	1.0 mg/L	4.00		101	80-120			
Silver, dissolved	0.0402	0.000050 mg/L	0.0400		101	80-120			
Sodium, dissolved	4.00	0.10 mg/L	4.00		100	80-120			
Strontium, dissolved	0.0398	0.0010 mg/L	0.0400		100	80-120			
Sulfur, dissolved	40.3	3.0 mg/L	40.0		101	80-120			
Tellurium, dissolved	0.0407	0.00050 mg/L	0.0400		102	80-120			
Thallium, dissolved	0.0410	0.000020 mg/L	0.0400		103	80-120			
Thorium, dissolved	0.0412	0.00010 mg/L	0.0400		103	80-120			
Tin, dissolved	0.0406	0.00020 mg/L	0.0400		102	80-120			
Titanium, dissolved	0.0397	0.0050 mg/L	0.0400		99	80-120			
Tungsten, dissolved	0.0413	0.0010 mg/L	0.0400		103	80-120			
Uranium, dissolved	0.0413	0.000020 mg/L	0.0400		103	80-120			
Vanadium, dissolved	0.0398	0.0050 mg/L	0.0400		99	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT	Regional District of Okanagan Similkameen OLF	WORK ORDER REPORTED	25G3510 2025-07-31 11:13
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5G4629, Continued

LCS (B5G4629-BS1), Continued			Prepared: 2025-07-25, Analyzed: 2025-07-25						
Zinc, dissolved	0.401	0.0040 mg/L	0.400		100	80-120			
Zirconium, dissolved	0.0405	0.00010 mg/L	0.0400		101	80-120			

Dissolved Metals, Batch B5G4793

Blank (B5G4793-BLK1)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5G4793-BLK2)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5G4793-BLK3)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5G4793-BLK4)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B5G4793-BS1)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	0.00264	0.000010 mg/L	0.00250		105	80-120			
LCS (B5G4793-BS2)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	0.00289	0.000010 mg/L	0.00250		116	80-120			
LCS (B5G4793-BS3)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	0.00295	0.000010 mg/L	0.00250		118	80-120			
LCS (B5G4793-BS4)			Prepared: 2025-07-27, Analyzed: 2025-07-28						
Mercury, dissolved	0.00270	0.000010 mg/L	0.00250		108	80-120			

General Parameters, Batch B5G4597

Blank (B5G4597-BLK1)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
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)	< 1.0	1.0 µS/cm							BLK
Blank (B5G4597-BLK2)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
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)	< 1.0	1.0 µS/cm							BLK
Blank (B5G4597-BLK3)			Prepared: 2025-07-25, Analyzed: 2025-07-25						
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)	1.8	1.0 µS/cm							BLK

General Parameters, Batch B5G4724



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT	Regional District of Okanagan Similkameen OLF	WORK ORDER REPORTED	25G3510 2025-07-31 11:13
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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General Parameters, Batch B5G4724, Continued

Blank (B5G4724-BLK1)			Prepared: 2025-07-26, Analyzed: 2025-07-31						
BOD, 5-day	< 2.0	2.0 mg/L							
LCS (B5G4724-BS1)			Prepared: 2025-07-26, Analyzed: 2025-07-31						
BOD, 5-day	202	66.6 mg/L	198		102	85-115			

General Parameters, Batch B5G4802

Blank (B5G4802-BLK1)			Prepared: 2025-07-29, Analyzed: 2025-07-29						
Chemical Oxygen Demand	< 20	20 mg/L							
Blank (B5G4802-BLK2)			Prepared: 2025-07-29, Analyzed: 2025-07-29						
Chemical Oxygen Demand	< 20	20 mg/L							
LCS (B5G4802-BS1)			Prepared: 2025-07-29, Analyzed: 2025-07-29						
Chemical Oxygen Demand	490	20 mg/L	500		98	89-115			
LCS (B5G4802-BS2)			Prepared: 2025-07-29, Analyzed: 2025-07-29						
Chemical Oxygen Demand	497	20 mg/L	500		99	89-115			

General Parameters, Batch B5G4848

Blank (B5G4848-BLK1)			Prepared: 2025-07-28, Analyzed: 2025-07-29						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
Blank (B5G4848-BLK2)			Prepared: 2025-07-28, Analyzed: 2025-07-29						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
LCS (B5G4848-BS1)			Prepared: 2025-07-28, Analyzed: 2025-07-29						
Nitrogen, Total Kjeldahl	0.970	0.050 mg/L	1.00		97	85-115			
LCS (B5G4848-BS2)			Prepared: 2025-07-28, Analyzed: 2025-07-29						
Nitrogen, Total Kjeldahl	0.965	0.050 mg/L	1.00		96	85-115			

General Parameters, Batch B5G5058

Blank (B5G5058-BLK1)			Prepared: 2025-07-30, Analyzed: 2025-07-30						
Ammonia, Total (as N)	< 0.050	0.050 mg/L							
LCS (B5G5058-BS1)			Prepared: 2025-07-30, Analyzed: 2025-07-30						
Ammonia, Total (as N)	1.06	0.050 mg/L	1.00		106	85-115			

QC Qualifiers:
 BLK Analyte concentration in the Method Blank is above the Reporting Limit (RL).

CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Okanagan Similkameen 101 Martin Street Penticton, BC V2A 5J9	WORK ORDER	25H0838
ATTENTION	Rob Palmer	RECEIVED / TEMP REPORTED	2025-08-07 10:40 / 7.3°C 2025-08-13 14:57
PO NUMBER	20259001-OLF	COC NUMBER	eCOC#00026483
PROJECT	OLF		
PROJECT INFO			

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/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



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

We've Got Chemistry



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

Ahead of the Curve



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

Work Order Comments:

Custody Seals Intact: n/a

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

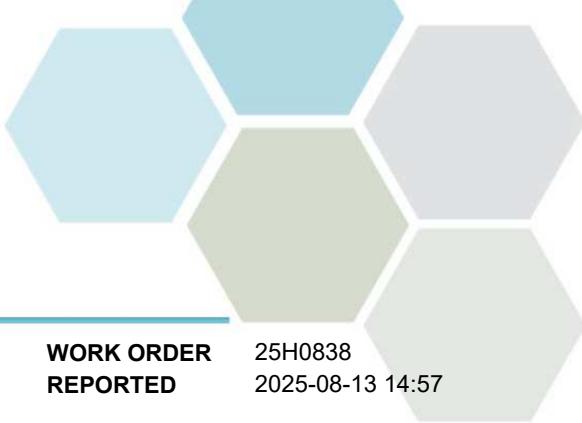
If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

Hanane El Hannaoui
Junior Account Manager

1-888-311-8846 | www.caro.ca

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
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Black Sage Well #2 (25H0838-01) | Matrix: Ground Water | Sampled: 2025-08-06 13:10

Anions

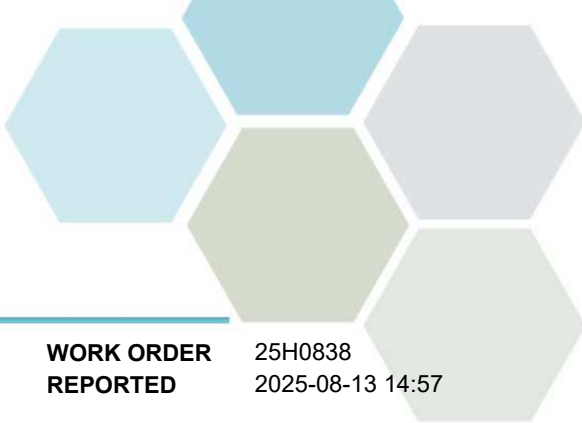
Bromide	< 0.10	N/A	0.10 mg/L	2025-08-08	
Chloride	7.03	AO ≤ 250	0.10 mg/L	2025-08-08	
Fluoride	0.19	MAC = 1.5	0.10 mg/L	2025-08-08	
Nitrate (as N)	< 0.010	MAC = 10	0.010 mg/L	2025-08-08	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-08-08	
Sulfate	28.1	AO ≤ 500	1.0 mg/L	2025-08-08	

Calculated Parameters

Bicarbonate (HCO3)	158	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	141	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100 mg/L	N/A	
Nitrogen, Total	< 0.0500	N/A	0.0500 mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-08-11	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-08-11	
Arsenic, dissolved	0.00059	N/A	0.00050 mg/L	2025-08-11	
Barium, dissolved	0.0314	N/A	0.0050 mg/L	2025-08-11	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-08-11	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-08-11	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-08-11	
Cadmium, dissolved	0.000026	N/A	0.000010 mg/L	2025-08-11	
Calcium, dissolved	37.7	N/A	0.20 mg/L	2025-08-11	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-08-11	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-08-11	
Copper, dissolved	0.0389	N/A	0.00040 mg/L	2025-08-11	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-08-11	
Lead, dissolved	0.00078	N/A	0.00020 mg/L	2025-08-11	
Lithium, dissolved	0.00381	N/A	0.00010 mg/L	2025-08-11	
Magnesium, dissolved	11.4	N/A	0.010 mg/L	2025-08-11	
Manganese, dissolved	0.0240	N/A	0.00020 mg/L	2025-08-11	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-08-10	
Molybdenum, dissolved	0.00381	N/A	0.00010 mg/L	2025-08-11	
Nickel, dissolved	0.00041	N/A	0.00040 mg/L	2025-08-11	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-08-11	
Potassium, dissolved	3.24	N/A	0.10 mg/L	2025-08-11	
Selenium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-08-11	
Silicon, dissolved	6.4	N/A	1.0 mg/L	2025-08-11	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-08-11	
Sodium, dissolved	13.0	N/A	0.10 mg/L	2025-08-11	
Strontium, dissolved	0.410	N/A	0.0010 mg/L	2025-08-11	
Sulfur, dissolved	9.2	N/A	3.0 mg/L	2025-08-11	



TEST RESULTS

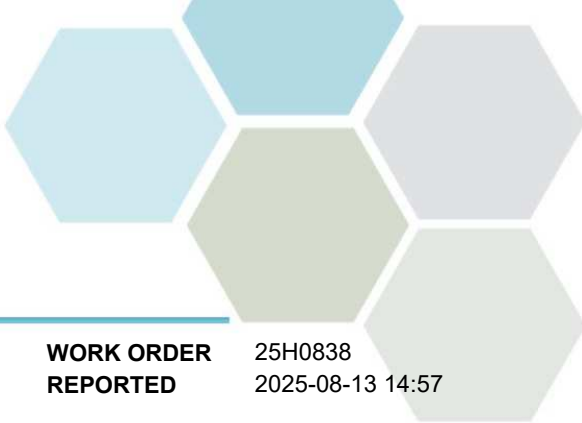
REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
Black Sage Well #2 (25H0838-01) Matrix: Ground Water Sampled: 2025-08-06 13:10, Continued					
<i>Dissolved Metals, Continued</i>					
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-08-11	
Thallium, dissolved	< 0.000020	N/A	0.000020 mg/L	2025-08-11	
Thorium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-08-11	
Tin, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-08-11	
Titanium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-08-11	
Tungsten, dissolved	< 0.0010	N/A	0.0010 mg/L	2025-08-11	
Uranium, dissolved	0.00183	N/A	0.000020 mg/L	2025-08-11	
Vanadium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-08-11	
Zinc, dissolved	0.0214	N/A	0.0040 mg/L	2025-08-11	
Zirconium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-08-11	
<i>General Parameters</i>					
Alkalinity, Total (as CaCO3)	130	N/A	1.0 mg/L	2025-08-08	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-08-08	
Alkalinity, Bicarbonate (as CaCO3)	130	N/A	1.0 mg/L	2025-08-08	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-08-08	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-08-08	
Ammonia, Total (as N)	< 0.050	None Required	0.050 mg/L	2025-08-09	
Chemical Oxygen Demand	< 20	N/A	20 mg/L	2025-08-12	
Conductivity (EC)	338	N/A	2.0 µS/cm	2025-08-08	
Nitrogen, Total Kjeldahl	< 0.050	N/A	0.050 mg/L	2025-08-13	
pH	7.69	7.0-10.5	0.10 pH units	2025-08-08	HT2

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 PROJECT Regional District of Okanagan Similkameen
OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Kelowna
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)	✓	Richmond
Hardness in Water	SM 2340 B (2021)	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
Nitrogen, Total Kjeldahl in Water	SM 4500-Norg D* (2021)	Block Digestion and Flow Injection Analysis	✓	Kelowna
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Kelowna

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

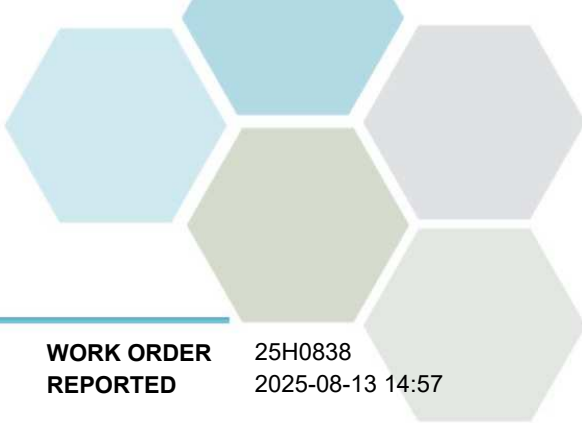
Glossary of Terms:

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
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
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

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada, September 2022\)](#)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO PROJECT Regional District of Okanagan Similkameen
OLF

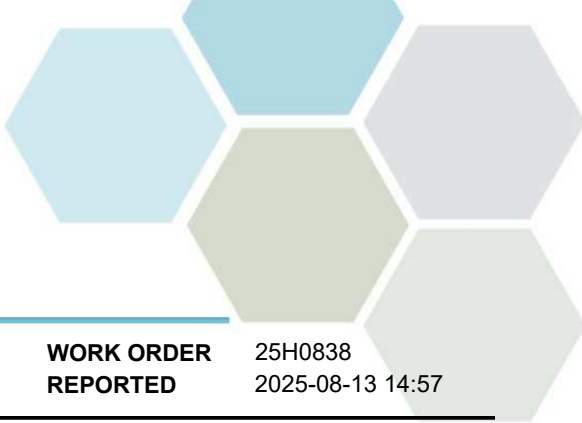
WORK ORDER REPORTED 25H0838
2025-08-13 14:57

General Comments:

The results in this report apply to samples received by CARO and analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety and must not be modified. CARO is not responsible for losses or damages resulting directly or indirectly from errors or omissions in the conduct of the testing. Any liability is limited to the cost of analysis. CARO will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Results in **red** indicate values above the regulatory limits where these have been included. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: hhannaoui@caro.ca

Regulatory limits are added to test reports on request and are as a convenience only. While CARO makes every effort to ensure accuracy of regulatory limits, CARO assumes no liability for the use of this information. It remains the client's responsibility to ensure that regulatory limits are correct for their circumstances.



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

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 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
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Anions, Batch B5H2477

Blank (B5H2477-BLK1)			Prepared: 2025-08-08, Analyzed: 2025-08-08						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B5H2477-BS1)			Prepared: 2025-08-08, Analyzed: 2025-08-08						
Bromide	4.03	0.10 mg/L	4.00		101	85-115			
Chloride	16.1	0.10 mg/L	16.0		100	90-110			
Fluoride	4.09	0.10 mg/L	4.00		102	88-108			
Nitrate (as N)	4.06	0.010 mg/L	4.00		102	90-110			
Nitrite (as N)	1.94	0.010 mg/L	2.00		97	85-115			
Sulfate	16.1	1.0 mg/L	16.0		100	90-110			

Dissolved Metals, Batch B5H2687

Blank (B5H2687-BLK1)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5H2687-BLK2)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5H2687-BLK3)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5H2687-BLK4)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B5H2687-BS1)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	0.00276	0.000010 mg/L	0.00250		110	80-120			
LCS (B5H2687-BS2)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	0.00277	0.000010 mg/L	0.00250		111	80-120			
LCS (B5H2687-BS3)			Prepared: 2025-08-10, Analyzed: 2025-08-10						
Mercury, dissolved	0.00274	0.000010 mg/L	0.00250		110	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5H2687, Continued

LCS (B5H2687-BS4)

Prepared: 2025-08-10, Analyzed: 2025-08-10

Mercury, dissolved	0.00269	0.000010 mg/L	0.00250		108	80-120			
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Dissolved Metals, Batch B5H2710

Blank (B5H2710-BLK1)

Prepared: 2025-08-11, Analyzed: 2025-08-11

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	< 0.0500	0.0500 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	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B5H2710-BS1)

Prepared: 2025-08-11, Analyzed: 2025-08-11

Aluminum, dissolved	3.95	0.0050 mg/L	4.00		99	80-120			
Antimony, dissolved	0.0399	0.00020 mg/L	0.0400		100	80-120			
Arsenic, dissolved	0.390	0.00050 mg/L	0.400		97	80-120			
Barium, dissolved	0.0395	0.0050 mg/L	0.0400		99	80-120			
Beryllium, dissolved	0.0391	0.00010 mg/L	0.0400		98	80-120			
Bismuth, dissolved	0.0395	0.00010 mg/L	0.0400		99	80-120			
Boron, dissolved	0.385	0.0500 mg/L	0.400		96	80-120			
Cadmium, dissolved	0.0398	0.000010 mg/L	0.0400		100	80-120			
Calcium, dissolved	3.92	0.20 mg/L	4.00		98	80-120			
Chromium, dissolved	0.0389	0.00050 mg/L	0.0400		97	80-120			
Cobalt, dissolved	0.0387	0.00010 mg/L	0.0400		97	80-120			
Copper, dissolved	0.0386	0.00040 mg/L	0.0400		96	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B5H2710, Continued									
LCS (B5H2710-BS1), Continued					Prepared: 2025-08-11, Analyzed: 2025-08-11				
Iron, dissolved	3.87	0.010 mg/L	4.00		97	80-120			
Lead, dissolved	0.0392	0.00020 mg/L	0.0400		98	80-120			
Lithium, dissolved	0.0399	0.00010 mg/L	0.0400		100	80-120			
Magnesium, dissolved	3.90	0.010 mg/L	4.00		97	80-120			
Manganese, dissolved	0.0391	0.00020 mg/L	0.0400		98	80-120			
Molybdenum, dissolved	0.0396	0.00010 mg/L	0.0400		99	80-120			
Nickel, dissolved	0.0387	0.00040 mg/L	0.0400		97	80-120			
Phosphorus, dissolved	3.84	0.050 mg/L	4.00		96	80-120			
Potassium, dissolved	3.88	0.10 mg/L	4.00		97	80-120			
Selenium, dissolved	0.386	0.00050 mg/L	0.400		96	80-120			
Silicon, dissolved	3.8	1.0 mg/L	4.00		96	80-120			
Silver, dissolved	0.0390	0.000050 mg/L	0.0400		97	80-120			
Sodium, dissolved	3.90	0.10 mg/L	4.00		97	80-120			
Strontium, dissolved	0.0393	0.0010 mg/L	0.0400		98	80-120			
Sulfur, dissolved	39.5	3.0 mg/L	40.0		99	80-120			
Tellurium, dissolved	0.0381	0.00050 mg/L	0.0400		95	80-120			
Thallium, dissolved	0.0389	0.000020 mg/L	0.0400		97	80-120			
Thorium, dissolved	0.0396	0.00010 mg/L	0.0400		99	80-120			
Tin, dissolved	0.0398	0.00020 mg/L	0.0400		99	80-120			
Titanium, dissolved	0.0386	0.0050 mg/L	0.0400		97	80-120			
Tungsten, dissolved	0.0387	0.0010 mg/L	0.0400		97	80-120			
Uranium, dissolved	0.0412	0.000020 mg/L	0.0400		103	80-120			
Vanadium, dissolved	0.0393	0.0050 mg/L	0.0400		98	80-120			
Zinc, dissolved	0.387	0.0040 mg/L	0.400		97	80-120			
Zirconium, dissolved	0.0389	0.00010 mg/L	0.0400		97	80-120			

Matrix Spike (B5H2710-MS1)		Source: 25H0838-01		Prepared: 2025-08-11, Analyzed: 2025-08-11					
Aluminum, dissolved	3.98	0.0050 mg/L	4.00	< 0.0050	99	70-130			
Antimony, dissolved	0.0414	0.00020 mg/L	0.0400	< 0.00020	103	70-130			
Arsenic, dissolved	0.399	0.00050 mg/L	0.400	0.00059	100	70-130			
Barium, dissolved	0.0735	0.0050 mg/L	0.0400	0.0314	105	70-130			
Beryllium, dissolved	0.0386	0.00010 mg/L	0.0400	< 0.00010	97	70-130			
Bismuth, dissolved	0.0373	0.00010 mg/L	0.0400	< 0.00010	93	70-130			
Boron, dissolved	0.382	0.0500 mg/L	0.400	< 0.0500	91	70-130			
Cadmium, dissolved	0.0411	0.000010 mg/L	0.0400	0.000026	103	70-130			
Calcium, dissolved	40.5	0.20 mg/L	4.00	37.7	69	70-130			MS2
Chromium, dissolved	0.0395	0.00050 mg/L	0.0400	< 0.00050	99	70-130			
Cobalt, dissolved	0.0383	0.00010 mg/L	0.0400	< 0.00010	96	70-130			
Copper, dissolved	0.0747	0.00040 mg/L	0.0400	0.0389	90	70-130			
Iron, dissolved	3.90	0.010 mg/L	4.00	< 0.010	97	70-130			
Lead, dissolved	0.0420	0.00020 mg/L	0.0400	0.00078	103	70-130			
Lithium, dissolved	0.0432	0.00010 mg/L	0.0400	0.00381	98	70-130			
Magnesium, dissolved	15.3	0.010 mg/L	4.00	11.4	97	70-130			
Manganese, dissolved	0.0630	0.00020 mg/L	0.0400	0.0240	98	70-130			
Molybdenum, dissolved	0.0449	0.00010 mg/L	0.0400	0.00381	103	70-130			
Nickel, dissolved	0.0382	0.00040 mg/L	0.0400	0.00041	95	70-130			
Phosphorus, dissolved	4.12	0.050 mg/L	4.00	< 0.050	103	70-130			
Potassium, dissolved	7.04	0.10 mg/L	4.00	3.24	95	70-130			
Selenium, dissolved	0.397	0.00050 mg/L	0.400	< 0.00050	99	70-130			
Silicon, dissolved	10.5	1.0 mg/L	4.00	6.4	103	70-130			
Silver, dissolved	0.0340	0.000050 mg/L	0.0400	< 0.000050	85	70-130			
Sodium, dissolved	16.8	0.10 mg/L	4.00	13.0	95	70-130			
Strontium, dissolved	0.456	0.0010 mg/L	0.0400	0.410	114	70-130			
Sulfur, dissolved	49.8	3.0 mg/L	40.0	9.2	101	70-130			
Tellurium, dissolved	0.0398	0.00050 mg/L	0.0400	< 0.00050	99	70-130			
Thallium, dissolved	0.0405	0.000020 mg/L	0.0400	< 0.000020	101	70-130			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
OLF

WORK ORDER REPORTED 25H0838
2025-08-13 14:57

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5H2710, Continued

Matrix Spike (B5H2710-MS1), Continued	Source: 25H0838-01		Prepared: 2025-08-11, Analyzed: 2025-08-11						
Thorium, dissolved	0.0422	0.00010 mg/L	0.0400	< 0.00010	106	70-130			
Tin, dissolved	0.0412	0.00020 mg/L	0.0400	< 0.00020	103	70-130			
Titanium, dissolved	0.0399	0.0050 mg/L	0.0400	< 0.0050	100	70-130			
Tungsten, dissolved	0.0406	0.0010 mg/L	0.0400	< 0.0010	102	70-130			
Uranium, dissolved	0.0450	0.000020 mg/L	0.0400	0.00183	108	70-130			
Vanadium, dissolved	0.0405	0.0050 mg/L	0.0400	< 0.0050	100	70-130			
Zinc, dissolved	0.414	0.0040 mg/L	0.400	0.0214	98	70-130			
Zirconium, dissolved	0.0413	0.00010 mg/L	0.0400	< 0.00010	103	70-130			

General Parameters, Batch B5H2587

Blank (B5H2587-BLK1)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
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 (B5H2587-BLK2)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
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 (B5H2587-BLK3)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
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 (B5H2587-BS1)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Alkalinity, Total (as CaCO3)	89.4	1.0 mg/L	100		89	80-120			

LCS (B5H2587-BS2)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Conductivity (EC)	1410	2.0 µS/cm	1410		100	95-105			

LCS (B5H2587-BS3)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Alkalinity, Total (as CaCO3)	90.3	1.0 mg/L	100		90	80-120			

LCS (B5H2587-BS4)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Conductivity (EC)	1410	2.0 µS/cm	1410		100	95-105			

LCS (B5H2587-BS5)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Alkalinity, Total (as CaCO3)	90.6	1.0 mg/L	100		91	80-120			

LCS (B5H2587-BS6)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
Conductivity (EC)	1410	2.0 µS/cm	1410		100	95-105			

Reference (B5H2587-SRM1)	Prepared: 2025-08-08, Analyzed: 2025-08-08								
pH	7.00	0.10 pH units	7.01		100	98-102			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT	Regional District of Okanagan Similkameen OLF	WORK ORDER REPORTED	25H0838 2025-08-13 14:57
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B5H2587, Continued									
Reference (B5H2587-SRM2)			Prepared: 2025-08-08, Analyzed: 2025-08-08						
pH	7.00	0.10 pH units	7.01		100	98-102			
Reference (B5H2587-SRM3)			Prepared: 2025-08-08, Analyzed: 2025-08-08						
pH	7.00	0.10 pH units	7.01		100	98-102			
General Parameters, Batch B5H2613									
Blank (B5H2613-BLK1)			Prepared: 2025-08-09, Analyzed: 2025-08-09						
Ammonia, Total (as N)	< 0.010	0.010 mg/L							
Blank (B5H2613-BLK2)			Prepared: 2025-08-09, Analyzed: 2025-08-09						
Ammonia, Total (as N)	< 0.010	0.010 mg/L							
LCS (B5H2613-BS1)			Prepared: 2025-08-09, Analyzed: 2025-08-09						
Ammonia, Total (as N)	1.01	0.010 mg/L	1.00		101	85-115			
LCS (B5H2613-BS2)			Prepared: 2025-08-09, Analyzed: 2025-08-09						
Ammonia, Total (as N)	0.996	0.010 mg/L	1.00		100	85-115			
General Parameters, Batch B5H2717									
Blank (B5H2717-BLK1)			Prepared: 2025-08-12, Analyzed: 2025-08-12						
Chemical Oxygen Demand	< 20	20 mg/L							
LCS (B5H2717-BS1)			Prepared: 2025-08-12, Analyzed: 2025-08-12						
Chemical Oxygen Demand	491	20 mg/L	500		98	89-115			
General Parameters, Batch B5H2946									
Blank (B5H2946-BLK1)			Prepared: 2025-08-12, Analyzed: 2025-08-13						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
Blank (B5H2946-BLK2)			Prepared: 2025-08-12, Analyzed: 2025-08-13						
Nitrogen, Total Kjeldahl	< 0.050	0.050 mg/L							
LCS (B5H2946-BS1)			Prepared: 2025-08-12, Analyzed: 2025-08-13						
Nitrogen, Total Kjeldahl	0.924	0.050 mg/L	1.00		92	85-115			
LCS (B5H2946-BS2)			Prepared: 2025-08-12, Analyzed: 2025-08-13						
Nitrogen, Total Kjeldahl	0.914	0.050 mg/L	1.00		91	85-115			

QC Qualifiers:

MS2 The native sample concentration is greater than the spike concentration hence the matrix spike limits do not apply.



CERTIFICATE OF ANALYSIS

REPORTED TO	Regional District of Okanagan Similkameen 101 Martin Street Penticton, BC V2A 5J9	WORK ORDER	25K0678
ATTENTION	Rob Palmer	RECEIVED / TEMP REPORTED	2025-11-05 10:45 / 8.4°C 2025-11-13 15:45
PO NUMBER	20259001-TLGW	COC NUMBER	eCOC#00029678
PROJECT	Oliver - TLGW		
PROJECT INFO			

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/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks



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

We've Got Chemistry



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

Ahead of the Curve



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

Work Order Comments:

Custody Seals Intact: N/A

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

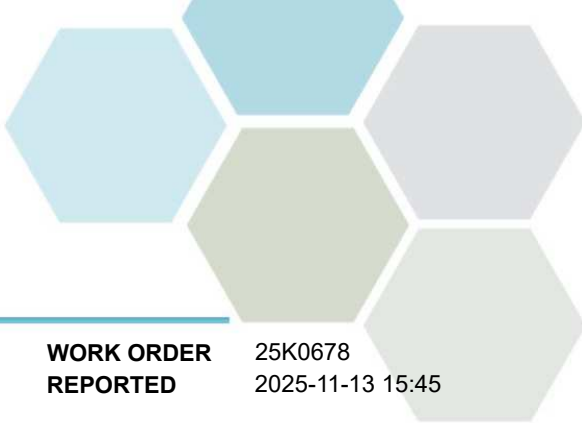
If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

Hanane El Hannaoui
Junior Account Manager

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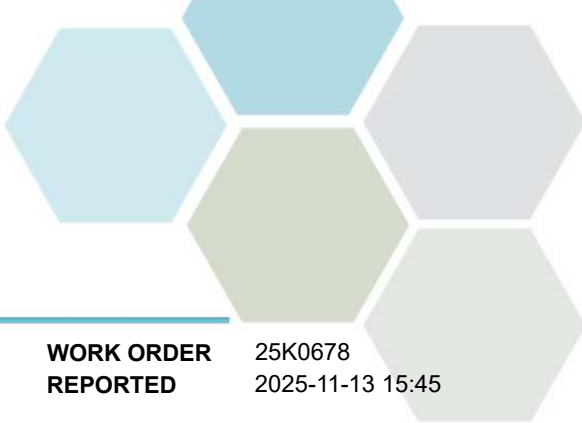


TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
MW 98-1 (25K0678-01) Matrix: Ground Water Sampled: 2025-11-04 11:40					
Anions					
Bromide	< 0.10	N/A	0.10 mg/L	2025-11-07	
Chloride	48.2	AO ≤ 250	0.10 mg/L	2025-11-07	
Fluoride	0.11	MAC = 1.5	0.10 mg/L	2025-11-07	
Nitrate (as N)	57.5	MAC = 10	0.010 mg/L	2025-11-07	
Nitrite (as N)	< 0.010	MAC = 1	0.010 mg/L	2025-11-07	
Sulfate	56.1	AO ≤ 500	1.0 mg/L	2025-11-07	
Calculated Parameters					
Bicarbonate (HCO3)	432	N/A	1.22 mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600 mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340 mg/L	N/A	
Hardness, Dissolved (as CaCO3)	618	N/A	0.500 mg/L	N/A	
Nitrate+Nitrite (as N)	57.5	N/A	0.100 mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-11-12	
Antimony, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-11-12	
Arsenic, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-11-12	
Barium, dissolved	0.0241	N/A	0.0050 mg/L	2025-11-12	
Beryllium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-11-12	
Bismuth, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-11-12	
Boron, dissolved	< 0.0500	N/A	0.0500 mg/L	2025-11-12	
Cadmium, dissolved	0.000019	N/A	0.000010 mg/L	2025-11-12	
Calcium, dissolved	207	N/A	0.20 mg/L	2025-11-12	
Chromium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-11-12	
Cobalt, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-11-12	
Copper, dissolved	0.00123	N/A	0.00040 mg/L	2025-11-12	
Iron, dissolved	< 0.010	N/A	0.010 mg/L	2025-11-12	
Lead, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-11-12	
Lithium, dissolved	0.0275	N/A	0.00010 mg/L	2025-11-12	
Magnesium, dissolved	24.6	N/A	0.010 mg/L	2025-11-12	
Manganese, dissolved	0.00482	N/A	0.00020 mg/L	2025-11-12	
Mercury, dissolved	< 0.000010	N/A	0.000010 mg/L	2025-11-13	
Molybdenum, dissolved	0.00018	N/A	0.00010 mg/L	2025-11-12	
Nickel, dissolved	0.00040	N/A	0.00040 mg/L	2025-11-12	
Phosphorus, dissolved	< 0.050	N/A	0.050 mg/L	2025-11-12	
Potassium, dissolved	4.55	N/A	0.10 mg/L	2025-11-12	
Selenium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-11-12	
Silicon, dissolved	16.2	N/A	1.0 mg/L	2025-11-12	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-11-12	
Sodium, dissolved	22.4	N/A	0.10 mg/L	2025-11-12	
Strontium, dissolved	0.909	N/A	0.0010 mg/L	2025-11-12	
Sulfur, dissolved	20.9	N/A	3.0 mg/L	2025-11-12	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-11-12	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW 98-1 (25K0678-01) | Matrix: Ground Water | Sampled: 2025-11-04 11:40, Continued

Dissolved Metals, Continued

Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-11-12	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-11-12	
Uranium, dissolved	0.0153	N/A	0.000020	mg/L	2025-11-12	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Zinc, dissolved	0.0243	N/A	0.0040	mg/L	2025-11-12	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	

General Parameters

Alkalinity, Total (as CaCO3)	354	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Bicarbonate (as CaCO3)	354	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-11-12	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-11-12	
Conductivity (EC)	1390	N/A	2.0	µS/cm	2025-11-07	
pH	7.19	7.0-10.5	0.10	pH units	2025-11-07	HT2

MW 08-2 (25K0678-02) | Matrix: Ground Water | Sampled: 2025-11-04 13:10

Anions

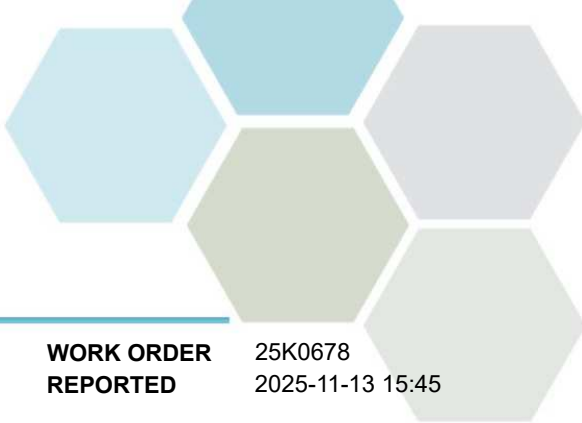
Bromide	0.22	N/A	0.10	mg/L	2025-11-07	
Chloride	42.9	AO ≤ 250	0.10	mg/L	2025-11-07	
Fluoride	< 0.10	MAC = 1.5	0.10	mg/L	2025-11-07	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2025-11-07	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2025-11-07	
Sulfate	118	AO ≤ 500	1.0	mg/L	2025-11-07	

Calculated Parameters

Bicarbonate (HCO3)	303	N/A	1.22	mg/L	N/A	
Carbonate (CO3)	< 0.600	N/A	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340	mg/L	N/A	
Hardness, Dissolved (as CaCO3)	267	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Arsenic, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-11-12	
Barium, dissolved	0.0071	N/A	0.0050	mg/L	2025-11-12	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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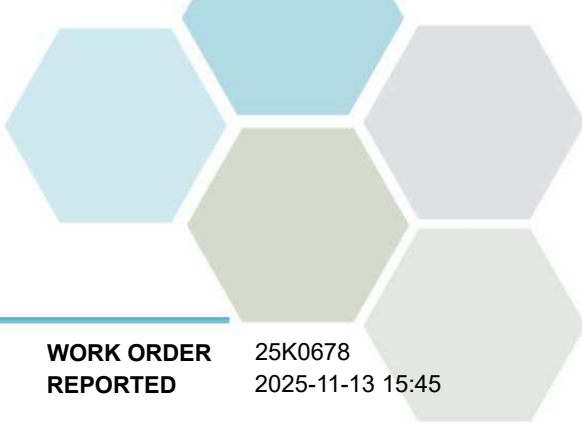
MW 08-2 (25K0678-02) | Matrix: Ground Water | Sampled: 2025-11-04 13:10, Continued

Dissolved Metals, Continued

Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-11-12	
Cadmium, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-11-12	
Calcium, dissolved	11.1	N/A	0.20	mg/L	2025-11-12	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-11-12	
Cobalt, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Copper, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-11-12	
Iron, dissolved	0.016	N/A	0.010	mg/L	2025-11-12	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Lithium, dissolved	0.0474	N/A	0.00010	mg/L	2025-11-12	
Magnesium, dissolved	58.0	N/A	0.010	mg/L	2025-11-12	
Manganese, dissolved	0.119	N/A	0.00020	mg/L	2025-11-12	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-11-13	
Molybdenum, dissolved	0.00040	N/A	0.00010	mg/L	2025-11-12	
Nickel, dissolved	< 0.00040	N/A	0.00040	mg/L	2025-11-12	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-11-12	
Potassium, dissolved	6.96	N/A	0.10	mg/L	2025-11-12	
Selenium, dissolved	0.00069	N/A	0.00050	mg/L	2025-11-12	
Silicon, dissolved	1.1	N/A	1.0	mg/L	2025-11-12	
Silver, dissolved	< 0.000050	N/A	0.000050	mg/L	2025-11-12	
Sodium, dissolved	30.5	N/A	0.10	mg/L	2025-11-12	
Strontium, dissolved	0.117	N/A	0.0010	mg/L	2025-11-12	
Sulfur, dissolved	32.5	N/A	3.0	mg/L	2025-11-12	
Tellurium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-11-12	
Thallium, dissolved	< 0.000020	N/A	0.000020	mg/L	2025-11-12	
Thorium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Tin, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Titanium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Tungsten, dissolved	< 0.0010	N/A	0.0010	mg/L	2025-11-12	
Uranium, dissolved	0.00279	N/A	0.000020	mg/L	2025-11-12	
Vanadium, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Zinc, dissolved	< 0.0040	N/A	0.0040	mg/L	2025-11-12	
Zirconium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	

General Parameters

Alkalinity, Total (as CaCO3)	249	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Bicarbonate (as CaCO3)	249	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0	mg/L	2025-11-07	
Ammonia, Total (as N)	< 0.050	None Required	0.050	mg/L	2025-11-12	
Chemical Oxygen Demand	< 20	N/A	20	mg/L	2025-11-12	
Conductivity (EC)	776	N/A	2.0	µS/cm	2025-11-07	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	Guideline	RL	Units	Analyzed	Qualifier
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MW 08-2 (25K0678-02) | Matrix: Ground Water | Sampled: 2025-11-04 13:10, Continued

General Parameters, Continued

pH	8.23	7.0-10.5	0.10	pH units	2025-11-07	HT2
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MW 98-2 (25K0678-03) | Matrix: Ground Water | Sampled: 2025-11-04 14:25

Anions

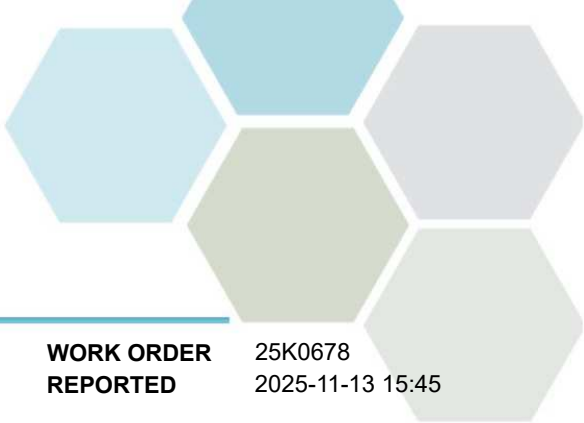
Bromide	< 0.10	N/A	0.10	mg/L	2025-11-07	
Chloride	8.43	AO ≤ 250	0.10	mg/L	2025-11-07	
Fluoride	0.37	MAC = 1.5	0.10	mg/L	2025-11-07	
Nitrate (as N)	< 0.010	MAC = 10	0.010	mg/L	2025-11-07	
Nitrite (as N)	< 0.010	MAC = 1	0.010	mg/L	2025-11-07	
Sulfate	50.2	AO ≤ 500	1.0	mg/L	2025-11-07	

Calculated Parameters

Bicarbonate (HCO ₃)	558	N/A	1.22	mg/L	N/A	
Carbonate (CO ₃)	< 0.600	N/A	0.600	mg/L	N/A	
Hydroxide (OH)	< 0.340	N/A	0.340	mg/L	N/A	
Hardness, Dissolved (as CaCO ₃)	438	N/A	0.500	mg/L	N/A	
Nitrate+Nitrite (as N)	< 0.0100	N/A	0.0100	mg/L	N/A	

Dissolved Metals

Aluminum, dissolved	< 0.0050	N/A	0.0050	mg/L	2025-11-12	
Antimony, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Arsenic, dissolved	0.00054	N/A	0.00050	mg/L	2025-11-12	
Barium, dissolved	0.0967	N/A	0.0050	mg/L	2025-11-12	
Beryllium, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Bismuth, dissolved	< 0.00010	N/A	0.00010	mg/L	2025-11-12	
Boron, dissolved	< 0.0500	N/A	0.0500	mg/L	2025-11-12	
Cadmium, dissolved	0.000079	N/A	0.000010	mg/L	2025-11-12	
Calcium, dissolved	96.5	N/A	0.20	mg/L	2025-11-12	
Chromium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-11-12	
Cobalt, dissolved	0.00016	N/A	0.00010	mg/L	2025-11-12	
Copper, dissolved	0.00101	N/A	0.00040	mg/L	2025-11-12	
Iron, dissolved	< 0.010	N/A	0.010	mg/L	2025-11-12	
Lead, dissolved	< 0.00020	N/A	0.00020	mg/L	2025-11-12	
Lithium, dissolved	0.0315	N/A	0.00010	mg/L	2025-11-12	
Magnesium, dissolved	47.8	N/A	0.010	mg/L	2025-11-12	
Manganese, dissolved	0.0163	N/A	0.00020	mg/L	2025-11-12	
Mercury, dissolved	< 0.000010	N/A	0.000010	mg/L	2025-11-13	
Molybdenum, dissolved	0.00821	N/A	0.00010	mg/L	2025-11-12	
Nickel, dissolved	0.00126	N/A	0.00040	mg/L	2025-11-12	
Phosphorus, dissolved	< 0.050	N/A	0.050	mg/L	2025-11-12	
Potassium, dissolved	6.21	N/A	0.10	mg/L	2025-11-12	
Selenium, dissolved	< 0.00050	N/A	0.00050	mg/L	2025-11-12	



TEST RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

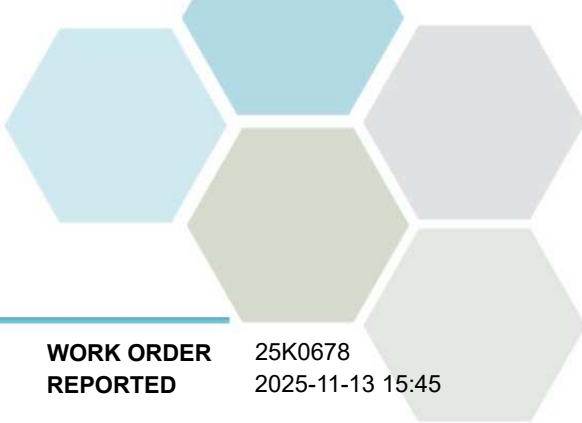
Analyte	Result	Guideline	RL Units	Analyzed	Qualifier
MW 98-2 (25K0678-03) Matrix: Ground Water Sampled: 2025-11-04 14:25, Continued					
<i>Dissolved Metals, Continued</i>					
Silicon, dissolved	12.8	N/A	1.0 mg/L	2025-11-12	
Silver, dissolved	< 0.000050	N/A	0.000050 mg/L	2025-11-12	
Sodium, dissolved	21.3	N/A	0.10 mg/L	2025-11-12	
Strontium, dissolved	1.20	N/A	0.0010 mg/L	2025-11-12	
Sulfur, dissolved	17.8	N/A	3.0 mg/L	2025-11-12	
Tellurium, dissolved	< 0.00050	N/A	0.00050 mg/L	2025-11-12	
Thallium, dissolved	< 0.000020	N/A	0.000020 mg/L	2025-11-12	
Thorium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-11-12	
Tin, dissolved	< 0.00020	N/A	0.00020 mg/L	2025-11-12	
Titanium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-11-12	
Tungsten, dissolved	< 0.0010	N/A	0.0010 mg/L	2025-11-12	
Uranium, dissolved	0.0200	N/A	0.000020 mg/L	2025-11-12	
Vanadium, dissolved	< 0.0050	N/A	0.0050 mg/L	2025-11-12	
Zinc, dissolved	0.0905	N/A	0.0040 mg/L	2025-11-12	
Zirconium, dissolved	< 0.00010	N/A	0.00010 mg/L	2025-11-12	

General Parameters

Alkalinity, Total (as CaCO3)	458	N/A	1.0 mg/L	2025-11-07	
Alkalinity, Phenolphthalein (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-11-07	
Alkalinity, Bicarbonate (as CaCO3)	458	N/A	1.0 mg/L	2025-11-07	
Alkalinity, Carbonate (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-11-07	
Alkalinity, Hydroxide (as CaCO3)	< 1.0	N/A	1.0 mg/L	2025-11-07	
Ammonia, Total (as N)	< 0.050	None Required	0.050 mg/L	2025-11-13	
Chemical Oxygen Demand	68	N/A	20 mg/L	2025-11-12	
Conductivity (EC)	880	N/A	2.0 µS/cm	2025-11-07	
pH	7.72	7.0-10.5	0.10 pH units	2025-11-07	HT2

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 PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Kelowna
Ammonia, Total in Water	SM 4500-NH3 G* (2021)	Automated Colorimetry (Phenate)	✓	Kelowna
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Kelowna
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Kelowna
Conductivity in Water	SM 2510 B (2021)	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 (2021)	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 (2021)	Electrometry	✓	Kelowna

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

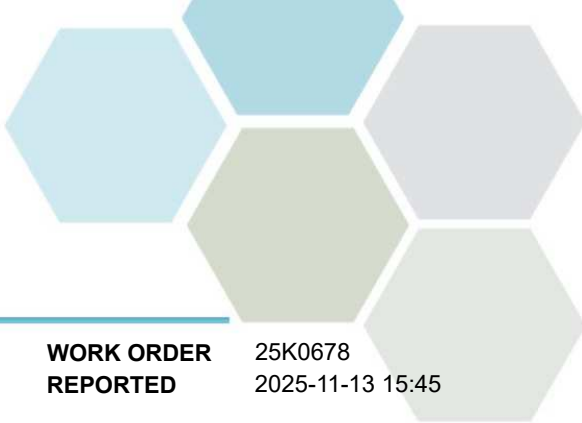
Glossary of Terms:

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
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration (health based)
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

Guidelines Referenced in this Report:

[Guidelines for Canadian Drinking Water Quality \(Health Canada\)](#)

Note: In some cases, the values displayed on the report represent the lowest guideline and are to be verified by the end user



APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO Regional District of Okanagan Similkameen
PROJECT Oliver - TLGW

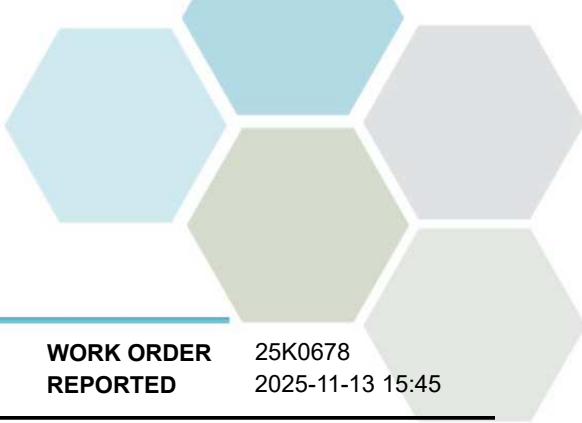
WORK ORDER 25K0678
REPORTED 2025-11-13 15:45

General Comments:

The results in this report apply to samples received by CARO and analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety and must not be modified. CARO is not responsible for losses or damages resulting directly or indirectly from errors or omissions in the conduct of the testing. Any liability is limited to the cost of analysis. CARO will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Results in **red** indicate values above the regulatory limits where these have been included. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: hhannaoui@caro.ca

Regulatory limits are added to test reports on request and are as a convenience only. While CARO makes every effort to ensure accuracy of regulatory limits, CARO assumes no liability for the use of this information. It remains the client's responsibility to ensure that regulatory limits are correct for their circumstances.



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

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 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 B5K2373									
Blank (B5K2373-BLK1)			Prepared: 2025-11-06, Analyzed: 2025-11-06						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
Blank (B5K2373-BLK2)			Prepared: 2025-11-07, Analyzed: 2025-11-07						
Bromide	< 0.10	0.10 mg/L							
Chloride	< 0.10	0.10 mg/L							
Fluoride	< 0.10	0.10 mg/L							
Nitrate (as N)	< 0.010	0.010 mg/L							
Nitrite (as N)	< 0.010	0.010 mg/L							
Sulfate	< 1.0	1.0 mg/L							
LCS (B5K2373-BS1)			Prepared: 2025-11-06, Analyzed: 2025-11-06						
Bromide	4.11	0.10 mg/L	4.00		103	85-115			
Chloride	16.5	0.10 mg/L	16.0		103	90-110			
Fluoride	3.93	0.10 mg/L	4.00		98	88-108			
Nitrate (as N)	3.95	0.010 mg/L	4.00		99	90-110			
Nitrite (as N)	1.94	0.010 mg/L	2.00		97	85-115			
Sulfate	16.5	1.0 mg/L	16.0		103	90-110			
LCS (B5K2373-BS2)			Prepared: 2025-11-07, Analyzed: 2025-11-07						
Bromide	4.11	0.10 mg/L	4.00		103	85-115			
Chloride	15.8	0.10 mg/L	16.0		99	90-110			
Fluoride	4.31	0.10 mg/L	4.00		108	88-108			
Nitrate (as N)	4.04	0.010 mg/L	4.00		101	90-110			
Nitrite (as N)	1.96	0.010 mg/L	2.00		98	85-115			
Sulfate	16.1	1.0 mg/L	16.0		100	90-110			

Dissolved Metals, Batch B5K2799

Blank (B5K2799-BLK1)			Prepared: 2025-11-12, Analyzed: 2025-11-12						
Aluminum, dissolved	< 0.0050	0.0050 mg/L							
Antimony, dissolved	< 0.00020	0.00020 mg/L							



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5K2799, Continued

Blank (B5K2799-BLK1), Continued

Prepared: 2025-11-12, Analyzed: 2025-11-12

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	< 0.0500	0.0500 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	< 0.0050	0.0050 mg/L							
Zinc, dissolved	< 0.0040	0.0040 mg/L							
Zirconium, dissolved	< 0.00010	0.00010 mg/L							

LCS (B5K2799-BS1)

Prepared: 2025-11-12, Analyzed: 2025-11-12

Aluminum, dissolved	4.07	0.0050 mg/L	4.00		102	80-120			
Antimony, dissolved	0.0406	0.00020 mg/L	0.0400		102	80-120			
Arsenic, dissolved	0.398	0.00050 mg/L	0.400		99	80-120			
Barium, dissolved	0.0408	0.0050 mg/L	0.0400		102	80-120			
Beryllium, dissolved	0.0408	0.00010 mg/L	0.0400		102	80-120			
Bismuth, dissolved	0.0409	0.00010 mg/L	0.0400		102	80-120			
Boron, dissolved	0.400	0.0500 mg/L	0.400		100	80-120			
Cadmium, dissolved	0.0402	0.000010 mg/L	0.0400		101	80-120			
Calcium, dissolved	3.99	0.20 mg/L	4.00		100	80-120			
Chromium, dissolved	0.0406	0.00050 mg/L	0.0400		101	80-120			
Cobalt, dissolved	0.0402	0.00010 mg/L	0.0400		100	80-120			
Copper, dissolved	0.0411	0.00040 mg/L	0.0400		103	80-120			
Iron, dissolved	4.03	0.010 mg/L	4.00		101	80-120			
Lead, dissolved	0.0409	0.00020 mg/L	0.0400		102	80-120			
Lithium, dissolved	0.0414	0.00010 mg/L	0.0400		104	80-120			
Magnesium, dissolved	4.17	0.010 mg/L	4.00		104	80-120			
Manganese, dissolved	0.0405	0.00020 mg/L	0.0400		101	80-120			
Molybdenum, dissolved	0.0401	0.00010 mg/L	0.0400		100	80-120			
Nickel, dissolved	0.0397	0.00040 mg/L	0.0400		99	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5K2799, Continued

LCS (B5K2799-BS1), Continued

Prepared: 2025-11-12, Analyzed: 2025-11-12

Phosphorus, dissolved	4.05	0.050 mg/L	4.00		101	80-120			
Potassium, dissolved	4.06	0.10 mg/L	4.00		101	80-120			
Selenium, dissolved	0.399	0.00050 mg/L	0.400		100	80-120			
Silicon, dissolved	4.0	1.0 mg/L	4.00		101	80-120			
Silver, dissolved	0.0394	0.000050 mg/L	0.0400		99	80-120			
Sodium, dissolved	4.19	0.10 mg/L	4.00		105	80-120			
Strontium, dissolved	0.0407	0.0010 mg/L	0.0400		102	80-120			
Sulfur, dissolved	38.8	3.0 mg/L	40.0		97	80-120			
Tellurium, dissolved	0.0397	0.00050 mg/L	0.0400		99	80-120			
Thallium, dissolved	0.0414	0.000020 mg/L	0.0400		104	80-120			
Thorium, dissolved	0.0405	0.00010 mg/L	0.0400		101	80-120			
Tin, dissolved	0.0404	0.00020 mg/L	0.0400		101	80-120			
Titanium, dissolved	0.0399	0.0050 mg/L	0.0400		100	80-120			
Tungsten, dissolved	0.0406	0.0010 mg/L	0.0400		102	80-120			
Uranium, dissolved	0.0411	0.000020 mg/L	0.0400		103	80-120			
Vanadium, dissolved	0.0393	0.0050 mg/L	0.0400		98	80-120			
Zinc, dissolved	0.398	0.0040 mg/L	0.400		100	80-120			
Zirconium, dissolved	0.0401	0.00010 mg/L	0.0400		100	80-120			

Duplicate (B5K2799-DUP1)

Source: 25K0678-01

Prepared: 2025-11-12, Analyzed: 2025-11-12

Aluminum, dissolved	< 0.0050	0.0050 mg/L	< 0.0050						20
Antimony, dissolved	< 0.00020	0.00020 mg/L	< 0.00020						20
Arsenic, dissolved	< 0.00050	0.00050 mg/L	< 0.00050						20
Barium, dissolved	0.0234	0.0050 mg/L	0.0241						20
Beryllium, dissolved	< 0.00010	0.00010 mg/L	< 0.00010						20
Bismuth, dissolved	< 0.00010	0.00010 mg/L	< 0.00010						20
Boron, dissolved	< 0.0500	0.0500 mg/L	< 0.0500						20
Cadmium, dissolved	0.000017	0.000010 mg/L	0.000019						20
Calcium, dissolved	210	0.20 mg/L	207				1		20
Chromium, dissolved	< 0.00050	0.00050 mg/L	< 0.00050						20
Cobalt, dissolved	< 0.00010	0.00010 mg/L	< 0.00010						20
Copper, dissolved	0.00123	0.00040 mg/L	0.00123						20
Iron, dissolved	< 0.010	0.010 mg/L	< 0.010						20
Lead, dissolved	< 0.00020	0.00020 mg/L	< 0.00020						20
Lithium, dissolved	0.0275	0.00010 mg/L	0.0275				< 1		20
Magnesium, dissolved	24.5	0.010 mg/L	24.6				< 1		20
Manganese, dissolved	0.00479	0.00020 mg/L	0.00482				< 1		20
Molybdenum, dissolved	0.00018	0.00010 mg/L	0.00018						20
Nickel, dissolved	< 0.00040	0.00040 mg/L	0.00040						20
Phosphorus, dissolved	< 0.050	0.050 mg/L	< 0.050						20
Potassium, dissolved	4.51	0.10 mg/L	4.55				1		20
Selenium, dissolved	< 0.00050	0.00050 mg/L	< 0.00050						20
Silicon, dissolved	16.3	1.0 mg/L	16.2				< 1		20
Silver, dissolved	< 0.000050	0.000050 mg/L	< 0.000050						20
Sodium, dissolved	22.7	0.10 mg/L	22.4				1		20
Strontium, dissolved	0.912	0.0010 mg/L	0.909				< 1		20
Sulfur, dissolved	20.5	3.0 mg/L	20.9				2		20
Tellurium, dissolved	< 0.00050	0.00050 mg/L	< 0.00050						20
Thallium, dissolved	< 0.000020	0.000020 mg/L	< 0.000020						20
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	0.0153	0.000020 mg/L	0.0153				< 1		20
Vanadium, dissolved	< 0.0050	0.0050 mg/L	< 0.0050						20
Zinc, dissolved	0.0235	0.0040 mg/L	0.0243				3		20



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B5K2799, Continued									
Duplicate (B5K2799-DUP1), Continued			Source: 25K0678-01		Prepared: 2025-11-12, Analyzed: 2025-11-12				
Zirconium, dissolved	< 0.00010	0.00010 mg/L		< 0.00010				20	
Matrix Spike (B5K2799-MS1)			Source: 25K0678-02		Prepared: 2025-11-12, Analyzed: 2025-11-12				
Aluminum, dissolved	3.18	0.0050 mg/L	4.00	< 0.0050	80	70-130			
Antimony, dissolved	0.0419	0.00020 mg/L	0.0400	< 0.00020	105	70-130			
Arsenic, dissolved	0.341	0.00050 mg/L	0.400	< 0.00050	85	70-130			
Barium, dissolved	0.0427	0.0050 mg/L	0.0400	0.0071	89	70-130			
Beryllium, dissolved	0.0340	0.00010 mg/L	0.0400	< 0.00010	85	70-130			
Bismuth, dissolved	0.0313	0.00010 mg/L	0.0400	< 0.00010	78	70-130			
Boron, dissolved	0.330	0.0500 mg/L	0.400	< 0.0500	78	70-130			
Cadmium, dissolved	0.0349	0.000010 mg/L	0.0400	< 0.000010	87	70-130			
Calcium, dissolved	14.0	0.20 mg/L	4.00	11.1	72	70-130			
Chromium, dissolved	0.0329	0.00050 mg/L	0.0400	< 0.00050	82	70-130			
Cobalt, dissolved	0.0319	0.00010 mg/L	0.0400	< 0.00010	80	70-130			
Copper, dissolved	0.0318	0.00040 mg/L	0.0400	< 0.00040	80	70-130			
Iron, dissolved	3.32	0.010 mg/L	4.00	0.016	83	70-130			
Lead, dissolved	0.0340	0.00020 mg/L	0.0400	< 0.00020	85	70-130			
Lithium, dissolved	0.0807	0.00010 mg/L	0.0400	0.0474	83	70-130			
Magnesium, dissolved	61.2	0.010 mg/L	4.00	58.0	81	70-130			
Manganese, dissolved	0.146	0.00020 mg/L	0.0400	0.119	69	70-130			MS2
Molybdenum, dissolved	0.0408	0.00010 mg/L	0.0400	0.00040	101	70-130			
Nickel, dissolved	0.0311	0.00040 mg/L	0.0400	< 0.00040	77	70-130			
Phosphorus, dissolved	3.40	0.050 mg/L	4.00	< 0.050	85	70-130			
Potassium, dissolved	10.2	0.10 mg/L	4.00	6.96	82	70-130			
Selenium, dissolved	0.352	0.00050 mg/L	0.400	0.00069	88	70-130			
Silicon, dissolved	5.0	1.0 mg/L	4.00	1.1	98	70-130			
Silver, dissolved	0.0298	0.000050 mg/L	0.0400	< 0.000050	75	70-130			
Sodium, dissolved	33.3	0.10 mg/L	4.00	30.5	69	70-130			MS2
Strontium, dissolved	0.147	0.0010 mg/L	0.0400	0.117	73	70-130			
Sulfur, dissolved	65.0	3.0 mg/L	40.0	32.5	81	70-130			
Tellurium, dissolved	0.0406	0.00050 mg/L	0.0400	< 0.00050	101	70-130			
Thallium, dissolved	0.0355	0.000020 mg/L	0.0400	< 0.000020	89	70-130			
Thorium, dissolved	0.0351	0.00010 mg/L	0.0400	< 0.00010	88	70-130			
Tin, dissolved	0.0411	0.00020 mg/L	0.0400	< 0.00020	103	70-130			
Titanium, dissolved	0.0383	0.0050 mg/L	0.0400	< 0.0050	96	70-130			
Tungsten, dissolved	0.0403	0.0010 mg/L	0.0400	< 0.0010	101	70-130			
Uranium, dissolved	0.0380	0.000020 mg/L	0.0400	0.00279	88	70-130			
Vanadium, dissolved	0.0337	0.0050 mg/L	0.0400	< 0.0050	84	70-130			
Zinc, dissolved	0.324	0.0040 mg/L	0.400	< 0.0040	81	70-130			
Zirconium, dissolved	0.0409	0.00010 mg/L	0.0400	< 0.00010	102	70-130			

Dissolved Metals, Batch B5K3044

Blank (B5K3044-BLK1)			Prepared: 2025-11-13, Analyzed: 2025-11-13						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
Blank (B5K3044-BLK2)			Prepared: 2025-11-13, Analyzed: 2025-11-13						
Mercury, dissolved	< 0.000010	0.000010 mg/L							
LCS (B5K3044-BS1)			Prepared: 2025-11-13, Analyzed: 2025-11-13						
Mercury, dissolved	0.00256	0.000010 mg/L	0.00250		102	80-120			
LCS (B5K3044-BS2)			Prepared: 2025-11-13, Analyzed: 2025-11-13						
Mercury, dissolved	0.00265	0.000010 mg/L	0.00250		106	80-120			



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO PROJECT Regional District of Okanagan Similkameen
Oliver - TLGW

WORK ORDER REPORTED 25K0678
2025-11-13 15:45

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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Dissolved Metals, Batch B5K3044, Continued

Duplicate (B5K3044-DUP1)		Source: 25K0678-01		Prepared: 2025-11-13, Analyzed: 2025-11-13					
Mercury, dissolved	< 0.000010	0.000010 mg/L		< 0.000010				20	

General Parameters, Batch B5K2568

Blank (B5K2568-BLK1)		Prepared: 2025-11-07, Analyzed: 2025-11-07							
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 (B5K2568-BLK2)		Prepared: 2025-11-07, Analyzed: 2025-11-07							
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 (B5K2568-BLK3)		Prepared: 2025-11-07, Analyzed: 2025-11-07							
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							

General Parameters, Batch B5K2837

Blank (B5K2837-BLK1)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Chemical Oxygen Demand	< 20	20 mg/L							

Blank (B5K2837-BLK2)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Chemical Oxygen Demand	< 20	20 mg/L							

LCS (B5K2837-BS1)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Chemical Oxygen Demand	520	20 mg/L	500	104	89-115				

LCS (B5K2837-BS2)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Chemical Oxygen Demand	528	20 mg/L	500	106	89-115				

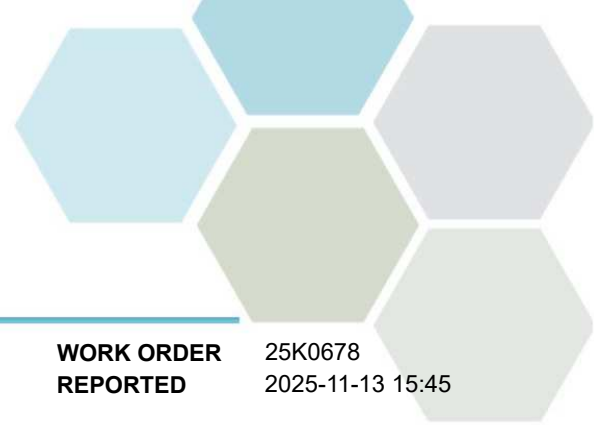
General Parameters, Batch B5K2964

Blank (B5K2964-BLK1)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Ammonia, Total (as N)	< 0.050	0.050 mg/L							

Blank (B5K2964-BLK2)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Ammonia, Total (as N)	< 0.050	0.050 mg/L							

LCS (B5K2964-BS1)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Ammonia, Total (as N)	0.926	0.050 mg/L	1.00	93	85-115				

LCS (B5K2964-BS2)		Prepared: 2025-11-12, Analyzed: 2025-11-12							
Ammonia, Total (as N)	0.926	0.050 mg/L	1.00	93	85-115				



APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO Regional District of Okanagan Similkameen
PROJECT Oliver - TLGW

WORK ORDER 25K0678
REPORTED 2025-11-13 15:45

QC Qualifiers:

MS2 The native sample concentration is greater than the spike concentration hence the matrix spike limits do not apply.

APPENDIX F: Landfill Gas Monitoring Data

Date	Time	Barometric Pressure (in Hg)	Pressure (in of H2O)	Purged Vol. (cm3)	CH4 (% v/v) Initial	CH4 (% v/v) Final	CO2 (% v/v) Initial	CO2 (% v/v) Final	O2 (% v/v) Initial	O2 (% v/v) Final	BAL (% v/v) Initial	BAL (% v/v) Final	CO (ppm) Final	H2S (ppm) Final	Water Level (m TOR)	Depth to Bottom (m TOR)	Comments
29-Apr-11	930	28.66	0.00	80,000	0.0	0.0	0.6	0.7	20.1	20.4	79.3	78.9					16 min purge
27-Jun-11	1300	n/a	n/a	60,000	0.0	0.0	0.8	0.7	19.7	19.3	79.5	80.0					
22-Sep-11	1100	28.60	n/a	50,000	0.0	0.0	0.7	0.7	20.4	20.5	79.0	78.0			none	5.58	Measured to top of PVC riser
29-Dec-11	1341	28.45	0.03	50,000	0.0	0.0	0.4	0.5	20.6	21.0	78.9	78.5			none	6.35	0.78 m PVC added in November when steel casing extended. Slip coupling with Vasoline used for connection.
29-Dec-11	1341	28.45	0.03	50,000	0.0	0.0	0.4	0.5	20.6	21.0	78.9	78.5			none	6.35	0.78 m PVC added in November when steel casing extended. Slip coupling with Vasoline used for connection.
17-Apr-12	1430	28.57	0.08	50,000	0.0	0.0	1.4	1.3	19.0	19.2	79.6	79.5			none	6.372	Very wind, pressure readings unstable - wind probable cause,
01-Aug-12	1245	28.66	0.01	50,000	0.0	0.0	2.1	2.0	18.7	18.6	79.1	79.4			none	6.372	Initial reading had 0.2% CH4, this remained even after fresh air purge therefore expect error/interference. Recalibrated and initial readings redone.
28-Nov-12	1352	28.41	0.02	50,000	0.0	0.0	1.0	1.2	20.5	20.8	78.5	78.0			none	6.38	3C / Calm / No snow
20-Feb-13	1150	28.65	0.01	50,000	0.0	0.0	0.7	0.7	20.2	20.3	79.1	79.0					
22-May-13	1418	28.51	0.00	50,000	0.0	0.0	0.7	0.7	20.4	20.4	78.9	78.9	0	0	none	6.355	
23-Aug-13	1248	28.44	0.00	90,000	0.0	0.0	0.7	0.7	20.2	20.4	79.1	79.8	0	0	none	6.36	Didn't close valve before removing SKC pump so purge additional 5 min
29-Nov-13	930	28.99	0.00	45,000	0.0	0.0	0.6	0.7	20.7	21.4	78.7	77.9	0	0	none	6.36	SKC batt dead @ 9min so did additional 5min with LandGEM before Final
20-Feb-14	1015	28.63	0.02	50,000	0.0	0.0	0.4	0.5	20.6	20.9	79.0	78.6	0	1			No water level measurements. Lost water level tape in MW08-2
28-May-14	930	28.58	0.00	75,000	0.0	0.0	0.5	0.5	20.1	20.2	79.0	79.3	0	0			No water level measurements. Lost water level tape in MW08-2
25-Aug-14	1525	28.55	0.00	60,000	0.0	0.0	0.8	0.7	19.8	19.6	79.4	79.6	0	0			No water level measurements. Lost water level tape in MW08-2
19-Nov-14	1400	28.87	0.00	75,000	0.0	0.0	0.7	0.0	20.5	19.9	78.8	79.3	0	0	none	6.37	
18-Feb-15	1030	28.92	-0.02	60,000	0.0	0.0	0.5	0.6	20.7	21.0	78.7	78.3	0	0	none	6.37	No snow. Days above freezing for past week. 12 minute purge
21-May-15	1415	28.41	0.00	65,000	0.0	0.0	0.4	0.4	19.9	18.9	79.7	80.7	0	3	none	6.37	1 min purge with GEM, 3 min purge with SKC and then battery died. 10 min purge with GEM
28-Aug-15	1300	28.52	0.00	75,000	0.0	0.0	1.1	1.2	19.9	19.7	79.0	79.1	3	0	none	6.37	CO? 15 minute purge
19-Nov-15	1100	28.86	0.00	50,000	0.0	0.0	0.6	0.7	20.6	20.6	78.8	78.7	0	0	none	6.37	10 min purge
15-Feb-16	1403	29.02	0.01	50,000	0.0	0.0	0.5	0.5	20.4	20.2	79.1	79.3	0	0	none	6.37	
19-May-16	1435	28.46	0.00	50,000	0.0	0.0	0.5	0.5	20.3	20.1	77.2	79.4	0	0	none	6.375	
19-Aug-16	1330	28.82	0.00	50,000	0.0	0.0	0.3	0.3	20.5	20.2	79.2	79.5	0	0	none	6.375	Moist on bottom.
28-Nov-16	1410	28.46	0.00	30,000	0.0	0.0	0.6	0.6	20.5	20.7	78.9	78.7	0	0	none	6.37	Moist on bottom. Had to use GEM 2000 (300 cm3/min) for 10 minute purge since SKC Pump giving flow fault even when not connected to anything. But SKC Pump was working when I checked at RDOS office before heading out to Oliver.
06-Mar-17	1455	28.47	-0.02	50,000	0.0	0.0	0.4	0.4	20.8	20.9	78.8	78.7	0	0	none	6.375	
26-May-17	1245	28.67	0.07	50,000	0.0	0.0	0.4	0.3	19.7	19.2	79.9	80.5	1	0	none	6.375	
28-Aug-17	1310	28.71	0.00	50,000	0.0	0.0	0.0	0.0	21.0	20.1	79.0	79.8	0	0	none	6.375	
18-Dec-17	1400	28.84	0.00	50,000	0.0	0.0	0.4	0.4	20.8	21.1	78.8	78.5	0	0	none	6.375	
12-Mar-18	1445	28.87	0.05	50,000	0.0	0.0	0.3	0.4	19.5	18.9	80.2	80.7	0	1	none	6.375	Muddy bottom. Question if hydrogen sulphide value is correct since value did not return to zero even after running in fresh air.
06-Jun-18	1425	28.51	0.02	50,000	0.0	0.0	0.3	0.3	19.8	19.7	79.9	80.0	0	0	N/A	N/A	Forgot water tape, so unable to measure static level
07-Sep-18	1020	28.68	0.02	50,000	N/A	0.0	N/A	0.5	N/A	19.4	N/A	80.1	10	0	none	6.37	Initial reading was missed
05-Dec-18	1445	28.89	0.01	50,000	0.0	0.0	0.1	0.1	21.7	21.6	78.2	78.3	0	0	none	6.37	Mud on probe
07-Dec-18	1140	28.89	0.011	50,000	0.0	0.0	0.4	0.5	20.1	21.9	79.5	77.6	0	0			Re-sample because unsure if when reading were taken on Dec 5, 2018 if correct inlet port was used on GEM
22-Feb-19	1036	28.51	0.010	50,000	0.1	0.1	0.2	0.3	22.5	21.5	77.2	77.8	0	0	none	6.375	Re-sample because unsure if when reading were taken on Dec 5, 2018 if correct inlet port was used on GEM
30-May-19	1036		0.010	50,000	0.0	0.0	0.2	0.2	20.0	20.1	79.7	79.7	0	0	none	6.375	Muddy on bottom.
14-Aug-19	1345		0.010	50,000	0.0	0.0	0.2	0.2	20.0	20.1	79.7	79.7	0	0	none	6.375	Muddy on bottom.
06-Dec-19	945	28.74	0.020	50,000	0.0	0.0	0.3	0.3	21.1	21.1	78.5	78.6	0	0	none	6.375	Muddy on bottom.
21-Feb-20	1325	28.94	0.09	50,000	0.0	0.0	0.4	0.4	20.1	20.2	79.6	79.4	0	0	none	6.375	Muddy on bottom.
26-Aug-20	1445	28.65	0.02	50,000	0.0	0.0	0.4	0.4	20.5	20.3	79.1	79.3	0	0	none	6.375	Muddy on bottom.
17-Dec-20	1140	28.76	0.04	50,000	0.0	0.0	0.5	0.5	19.9	20.3	19.6	19.2	0	0	none	6.375	Muddy on bottom.
24-Feb-21	1425	29.09	0.01	50,000	0.1	0.1	0.4	0.4	19.8	20.3	79.7	79.1	0	0	none	6.38	Muddy on bottom.
27-May-21	1415	28.35	-0.06	50,000	0.0	0.0	0.4	0.4	20.1	20.3	79.4	79.3	n/a	n/a	none	6.39	Muddy on bottom.
09-Sep-21	1424	28.53	0.01	50,000	0.0	0.0	0.5	0.5	20.5	20.3	78.9	79.2	1	1	none	6.39	Muddy on bottom.
15-Dec-21																	No sample event due to delays in transport services.
17-Feb-22	1415	28.78	0.05	50,000	0.0	0.0	0.5	0.5	20.6	20.2	78.9	79.3	0	0	none	6.39	
20-May-22	915	28.90	0.03	50,000	0.0	0.0	0.5	0.5	21.4	21.5	79.2	78.4	0	0	none		O2 jumping around 19.1 to 22 on initial read
17-Aug-22	1300	28.72	0.05	50,000	0.0	0.0	0.5	0.5	19.9	19.8	79.6	79.7	0	1	none	6.385	
07-Dec-22	940	28.98	0.00	50,000	0.1	0.1	0.5	0.6	22.0	22.5	77.3	77.0	0	0			Methane base reading was 0.1 on this meter. No water tape as too cold -5C.
16-Feb-23	1010	28.89	0.02	50,000	0.2	0.2	0.3	0.4	21.1	21.0	78.4	78.4	0	0	muddy	6.385	
26-May-23	915	28.64	0.01	50,000	0.3	0.3	0.4	0.4	19.0	18.7	80.2	80.6	0	1	muddy	6.385	0.3 methane on Fresh Air Check
06-Dec-23	1400	28.33	0.06	50,000	0.0	0.0	0.4	0.5	20.3	21.0	80.5	78.5	1	0	muddy	6.38	
29-Feb-24	910	28.02	-0.02	50,000	0.0	0.0	0.4	0.5	21.0	21.8	77.6	77.7	0	0	muddy	6.38	
06-Jun-24	1015	28.75	0.03	80,000	0.0	0.0	0.5	0.4	20.3	20.2	79.2	79.4	0	0	n/a	n/a	
04-Sep-24	1410	n/a	0.04	50,000	0.0	0.0	0.5	0.5	20.1	19.9	79.4	79.5	0	0	muddy	6.37	The 4th quarter monitoring event for 2024 was not completed as rental equipment was not available.
19-Feb-25	1445	28.58	0.00	50,000	0.0	0.0	0.5	0.5	20.7	21.7	78.8	77.7	0	0	muddy	6.37	
19-Jun-25	1150	28.61	0.01	50,000	0.0	0.0	0.4	0.4	20.2	19.6	79.4	80.0	0	1	muddy	6.375	
20-Aug-25	1020	28.82	0.01	50,000	0.0	0.0	0.6	0.5	20.2	19.8	79.3	79.7	1	0	muddy	6.38	
04-Dec-25	1015	28.99	0.00	50,000	0.0	0.0	0.4	0.4	21.5	21.6	78.0	77.9	0	0	muddy	6.38	