



# 2023 Operations and Monitoring Report



**Campbell River Waste Management Centre,  
Campbell River, British Columbia**

Comox Valley Regional District

25 April 2024

→ **The Power of Commitment**



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# Executive Summary

GHD Limited (GHD) was retained by Comox Strathcona Waste Management (CSWM), a function of the Comox Valley Regional District (CVRD), to complete the 2023 water quality monitoring and prepare this Annual Operations and Monitoring Report (Annual Report) for the Campbell River Waste Management Centre (Site or CRWMC). The objective of this Annual Report is to summarize the developmental progress and environmental monitoring for the Site during the 2023 calendar year (Reporting Period). The Annual Report contains the information required by Section 10.6 of the Landfill Criteria for Municipal Solid Waste (Landfill Criteria), Section 25.3 of the 2012 Comox Strathcona Solid Waste Management Plan (SWMP), and Section 3.2 of the Operational Certificate (OC) MR-02401.

The Site is located on Crown Lands within the city limits of Campbell River, British Columbia (BC) at 6700 Argonaut Road approximately 7.5 kilometres (km) west of the city centre. The Site is owned by the CVRD and operated by Berry & Vale Contracting Ltd. under contract with the CVRD. The authorized works include the municipal solid waste landfill and related appurtenances.

## ***Site Operations and Development***

The CRWMC Sanitary Landfill (Landfill) reached capacity as of May 4, 2022. Since then, the Site operated as a transfer station, with all MSW transferred to the Comox Valley Waste Management Centre (CVWMC) for disposal. The transfer station closed in 2023. No waste was discharged to the landfill in 2023.

Construction of the LFG collection system was completed in 2022, with 31 vertical LFG wells and 13 probes installed. The blower and flare will be installed in the Spring of 2024. A regional organics composting facility was constructed in 2022 on the lot adjacent to the Landfill (Block J) and operates since April 12, 2023.

## ***Environmental Monitoring***

Groundwater was observed to flow towards the east across the Site based on water levels measured during the Reporting Period, which is consistent with previous years. Groundwater elevations across the Site showed a decreasing trend between 2017 and 2019 but have since stabilized. Groundwater elevations at the Site in 2023 were consistent with the elevations observed in 2022 and 2021. The Site water table was found to fluctuate seasonally between 0.12 to 2.97 m below top of riser (BTOR) with a median fluctuation of 0.5 m over the four monitoring events conducted in 2023.

Analytical results for groundwater and surface water samples (SWM Pond only) are compared to the BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 including amendments up to BC Reg. 179/2021, July 7, 2021) Schedule 3.2 Column 3 (Aquatic Life Freshwater) (FAW) and Schedule 3.2 Column 6 (Drinking Water) (DW).

Surface water analytical results (excluding SWM Pond) are compared to the British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC ENV, 2021), BC Source Drinking Water Quality Guidelines (ENV, 2020), and BC Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC Ministry of Environment [MOE], 2021) (WQGs) for drinking water (DW) and the protection of freshwater aquatic life (FWAL).

No Landfill-derived impacts were observed in groundwater quality at background monitoring well MW01-16. Groundwater quality at monitoring well MW01-16 is considered to be representative of background groundwater quality at the Site.

Leachate impacts continue to be observed in groundwater at monitoring wells located in the Landfill Vicinity monitoring wells EBA04-6, EBA04-7, HBT94-1, and HBT94-2. Concentrations of nitrate and nitrite in monitoring well EBA04-7 exceeded the BC CSR Drinking Water standards during the May and August 2023 sampling events.

The decreasing trend in concentrations of leachate indicator parameters (such as alkalinity, chloride, TDS, conductivity, and manganese) at EBA11-1, observed during all four 2023 sampling events, is most likely due to the

final cover that has been applied to the Landfill. It is anticipated that groundwater quality at EBA11-1 will continue to improve now that the final cover has been applied to the Landfill.

Concentrations of nitrate and nitrite in monitoring well EBA11-1 exceeded the BC CSR Drinking Water standards in all four 2023 sampling events.

In the deep monitoring well MW04-19 located in the Block J Vicinity, concentrations of iron, manganese, and vanadium increased significantly during the November 2023 sampling event and the concentration of cobalt exceeded the BC CSR Drinking Water standards in November 2023 monitoring event. It is inferred that water impacted by leachate seeps from the SWM pond has traveled and infiltrated to the deep aquifer and moving downgradient from the pond.

In the shallow, downgradient and off-site monitoring well MW02-18, ammonia, dissolved manganese, and dissolved cobalt concentrations were greater than the applicable CSR standards in one or more monitoring events in 2023. It is noted that monitoring well MW02-18 is located adjacent to a historic dumping ground, therefore, impacts noted at MW02-18 may be from a combination of the Landfill and historical dumping.

Deep downgradient groundwater quality southeast of the Site at AG99-01, AG99-02, AG99-04, and AG99-05 remains generally stable over time with minimal leachate impacts observed.

Based on the results of surface water quality monitoring conducted in 2023 at SW-1 (tributary of Cold Creek), and SW03-17 (unnamed pond upstream of SW-1) the presence of leachate impacts is not suspected.

Water quality in the SWM Pond has improved in 2023. Concentrations of some leachate parameters, including alkalinity, chloride, conductivity, TDS, iron, and manganese decreased during the March and November 2023 sampling events at SWM Pond, while concentrations of sulphate and vanadium increased during the November 2023 sampling event.

It is anticipated that surface water quality in the SWM Pond will continue to improve now that the final cover has been applied to the Landfill. These measures have minimized precipitation infiltration to the Landfill, resulting in a significantly lower rate of leachate generation. The final cover has also significantly increased the clean surface water runoff from the landfill footprint that flows to the SWM Pond. The cover has also prevented, at least partially, leachate seeps from mixing with surface water and being directed to the SWM Pond.

### ***Recommendations***

Continue the groundwater and surface water monitoring programs (Appendix K) on a quarterly basis. Install the LFG blower and flare and commission the LFG collection and management system. Complete the landfill gas monitoring program as described in the Closure Plan.

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# 1. Introduction

GHD Limited (GHD) was retained by Comox Strathcona Waste Management (CSWM), a function of the Comox Valley Regional District (CVRD), to complete the 2023 water quality monitoring and prepare this Annual Operations and Monitoring Report (Annual Report) for the Campbell River Waste Management Centre (CRWMC or Site).

## 1.1 Objectives and Scope

The purpose of this Annual Report is to summarize the Site operations and development activities carried out during the 2023 calendar year (Reporting Period) and to provide and assess the Site environmental monitoring data. This Annual Report contains the following information in accordance with Section 10.6 of the Landfill Criteria for Municipal Solid Waste (Landfill Criteria) (BC MOE, 2016), Section 25.3 of the 2012 Comox Strathcona Solid Waste Management Plan (SWMP) (AECOM, 2013), and Section 3.2 of the Site's Operational Certificate 2401 (OC-2401) (Appendix A):

- A review of the preceding year of operation, plans for the next year and any new information or proposed changes relating to the facility.
- A summary of the landfill operation equipment.
- Closure works completed.
- Summary of complaints received, and the actions taken as a result of the complaint.
- Identification of non-compliance items and proposed action plan and schedule to reach compliance (if applicable).
- Progress report on efforts to resolve previously identified non-compliance items (if applicable).
- Landfill gas quantities collected, flared, and utilized.
- The tonnage of each type of waste discharged into the landfill or diverted.
- An updated estimate of the municipal solid waste (MSW) per capita disposal rate.
- A waste area population table including adjusted projected population for the estimated facility life.
- A survey including volume changes, on required frequency.
- The remaining Site life and capacity update.
- Update to the closure and post closure liability fund estimate.
- Comparison of the water quality monitoring data with the performance criteria in Section 4 of the Landfill Criteria for Municipal Solid Waste and the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills, interpretation of the monitoring data, identification and interpretation or irregularities and trends, recommendations, and any proposed changes to the monitoring program.

## 1.2 Scope and Limitations

*This report: has been prepared by GHD for Comox Valley Regional District and may only be used and relied on by Comox Valley Regional District for the purpose agreed between GHD and Comox Valley Regional District.*

*GHD otherwise disclaims responsibility to any person other than Comox Valley Regional District arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*



*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

## 1.3 Regulatory Settings

The CRWMC sanitary landfill (Landfill) currently operates under OC-2401, issued on December 2, 2003, by the British Columbia Ministry of Environment (MOE), and last amended on May 19, 2020. OC-2401 replaced the original permit, which was issued in November 1973 and last amended in July 1992 (CH2MHILL, 2009). A copy of the OC with the amendment letter are provided in Appendix A. Refuse authorized for disposal at the Site is characterized as “municipal solid waste as defined under the Waste Management Act”.

Groundwater quality for the Site has been historically compared to the BC Contaminated Sites Regulation (CSR) (BC Reg. 375/96 including amendments) Schedule 10 (Schedule 10) Column V (Drinking Water) (DW) and Schedule 6 (Schedule 6) Column II (Aquatic Life, Freshwater) (FAW) and Column V (Drinking Water) (DW). On November 1, 2017, the Stage 10 (Omnibus) and Stage 11 (Housekeeping) amendments came into effect, thus replacing the CSR Standards listed above. The CSR standards applied in this Annual Report are:

- Schedule 3.2 Generic Numerical Water Standards Column 3 for Freshwater Aquatic Life (FAW)
- Schedule 3.2 Generic Numerical Water Standards Column 6 for Drinking Water (DW)

The appropriate groundwater standards that apply to the Site depend on the current and future potential groundwater and surface water uses in the vicinity of the Site and the potential for groundwater or surface water at the Site to flow to surface water bodies that support aquatic life in the vicinity of the Site. The BC Ministry of Environment and Climate Change Strategy (ENV) (formerly the BC MOE) Protocol 21 Water Use Determination (Protocol 21) provides the criteria for selecting the appropriate CSR standards for water quality.

Protocol 21 specifies that Aquatic Life standards apply to groundwater quality at sites located within a 500 metre (m) radius of a surface water body. According to iMapBC, accessed November 7, 2023, the Site is located less than 500 m from two fresh surface water bodies: McIvor Lake and an ephemeral tributary of Cold Creek. McIvor Lake is upgradient of the Site and is not a receptor of any groundwater discharge from the Site. The tributary of Cold Creek is downgradient of the Site and may potentially be a receptor of groundwater discharge from the Site. Therefore, FAW standards apply to groundwater at the Site.

Based on the information obtained from iMapBC, accessed March 5, 2024, five water supply wells are located within a 500 m radius from the Site listed for Private Domestic use. In addition to five non-domestic/commercial use wells, one is listed as a water supply well for unknown use and one is listed as a decommissioned monitoring well (well tag 110853 assigned as monitoring well GLL93-1) in 2013. Additionally, based on GHD’s correspondence with the owner of the adjacent property, located at 5900 Argonaut Road, there is an unregistered shallow dug well located on the 5900 Argonaut Road property, which is located less than 500 m from the Site. GHD understands the well is used for domestic purposes at this time. The CSR DW standards have been applied to the Site in accordance with Protocol 21.

Surface water analytical results are also compared to the British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (ENV, 2021), BC Source Drinking Water Quality Guidelines (ENV, 2020), and BC Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC MOE, 2021) (collectively defined as WQGs) for drinking water (DW) the protection of freshwater aquatic life (FAW).

## 1.4 Annual Report Organization

The Annual Report is organized into the following sections:

- Executive Summary
- Section 1 Introduction
- Section 2 Site Background

- Section 3 Site Operations and Development
- Section 4 Environmental Monitoring Program
- Section 5 Environmental Monitoring Results
- Section 6 Compliance Assessment
- Section 7 Summary
- Section 8 Recommendations
- References

## 2. Site Background

### 2.1 Site Location

A Site location map is presented on Figure 1 and a Site Plan is presented on Figure 2. Figure 3 presents the land zoning uses in the area surrounding the Site.

The Site is located on Crown Lands within the city limits of Campbell River, BC at 6700 Argonaut Road, approximately 7.5 kilometres (km) west of the city centre. The legal description for the southern half of the Site is Block M, all part of District Lot 85, Sayward District. The legal description of the northern portion of the Site is Block J, all part of District Lot 85, Sayward District. The previous legal land description for Block M was “Block C, together with that part of Block A, and that part of Block K, all part of District Lot 85, Sayward District”. The aforementioned lands were all combined into Block M as per Land Lease V934579 dated January 8, 2019, from the Ministry of Forests, Lands and Natural Resource Operations.

A portion of Block M and the majority of Block J are located within the Agricultural Land Reserve (ALR) as set out by the Agricultural Land Commission (ALC). The CVRD has received a variance from the ALC with regards to the current location of the Landfill and surface water management pond where they overlap with ALR lands. The ALR boundary also includes land parcels located north and east of the Site as illustrated in Figure 4.

The total Site area is 29.7 hectares. The Site is currently zoned as Industrial Four (I-4) under the City of Campbell River Bylaw No. 3250, 2006, consolidated to bylaw 3743, 2019 (last amended November 4, 2019).

Island Ready Mix is located immediately to the west of the Site and houses operations and equipment for concrete manufacturing and a gravel pit. West Shore Aggregates Ltd. operates a gravel pit immediately to the south of the Site. The West Shore Aggregates property also has a landfill permitted to discharge refuse from “dryland log sorting, land clearing, construction and demolition operations” under permit PR 07730.

Mature forests situated on Crown Land are located to the north and east of the Site. There are three residential dwellings located approximately 500 m to the northeast of the Landfill footprint. The property immediately to the east of Block J is occupied by a single dwelling residential lot.

There are also several active and historical industrial operations in the vicinity of the Site. Active industrial operations include an auto scrap yard, three construction waste landfills (permits PR 07730, PR 10807, and PR 9081), aggregate extraction pits, an asphalt paving plant, and an Emcon facility, which includes a salt storage shed. Historical operations in the area include a crane operation, which housed facilities for cleaning copper coated fish farm nets, and a metal scrap yard.

### 2.2 Landfill Development

Prior to waste disposal operations at the Site, the Site operated as an aggregate extraction facility in the 1950s. According to CH2M HILL’s 2009 closure plan, the Site was then used as an unregulated dump site prior to the 1970s. Waste burning took place at the Site as well as disposal of liquid wastes (EBA, 2014). The City of Campbell River took

over Site operations in the mid 1970's until ownership was transferred to the CVRD in 1999 (EBA, 2014). A private contractor, Berry & Vale Contracting Ltd. (Berry & Vale), has operated the Site under contract with the CVRD since 1996.

According to the SWMP, the Site was projected to reach its capacity in early 2012. A transfer station was constructed in 2011 to divert certain incoming waste streams to the Comox Valley Waste Management Centre (CVWMC). In 2014, a mechanically stabilized earth wall (MSE wall) was constructed along the southeastern Site boundary with the aim of addressing slope stability concerns and adding additional capacity.

Prior to closure of the landfill in May 2022, landfilling occurred on Block M. Block J is primarily used for extraction of sand and gravel for use as cover material within the Landfill. An updated 2017 Design, Operations, and Closure Plan (2017 DOCP) (GHD, 2017) was prepared in 2017 and was submitted to ENV in March 2018. The 2017 DOCP provides final contours and a closure plan for the Site. The 2017 DOCP includes updated plans for the management of landfill gas and surface water. In 2018 construction began on a surface water management pond (SWM Pond) in Block J and was completed in 2019. An updated Closure Plan was prepared and submitted to ENV October 1, 2020.

The Landfill reached capacity and ceased landfilling of waste on May 4, 2022. The Landfill closure plan was prepared by GHD and was completed in 2022. Installation of an enclosed LFG flare is planned to be completed for the Spring of 2024. A regional organics composting facility designed by Sperling Hansen began construction in 2022 on the adjacent lot to the Landfill (Block J) and it operates since April 12, 2023.

Figure 2 presents a site plan for the Site.

## 2.3 Topography and Drainage

Topography in the vicinity of the Site generally slopes downward to the east from Mclvor Lake, (approximately 400 m to the west of the Landfill footprint), flattening out approximately 500 m to the east of the Site. The Site is located on the north side of a local valley. The narrow valley floor slopes to the east/northeast following the course of Argonaut Road. The valley appears to have been expanded laterally by historical soil extraction operations at the Site and to the southwest of the Site across Argonaut Road.

There are no natural watercourses on the Site. A constructed surface water infiltration swale is located along the southeast boundary of the Landfill footprint, which collects surface runoff from the southeast side of the Landfill footprint. During periods of heavy rainfall, surface water has been observed to flow northeast along the swale infiltrating into the ground within approximately 500 m of the Landfill footprint.

The closest natural surface water channel is located 400 m northeast of the Site and is one of several ephemeral tributaries of Cold Creek. Cold Creek discharges into the Quinsam River approximately 3 km northeast of the Site. Quinsam Hatchery, a salmon hatchery, is located at the confluence of Cold Creek and the Quinsam River. Quinsam River ultimately drains into the Campbell River approximately 2.3 km downstream of the confluence of Cold Creek and Quinsam River.

Mclvor Lake, which is contiguous with Campbell Lake, is located approximately 400 m to the west of the Site with a lake elevation of approximately 180 metres above mean sea level (m AMSL) well above the inferred original ground surface elevation of the Site (140 m AMSL). A drainage map illustrating surface water drainage in the area of the Site is presented in Figure 5.

## 2.4 Geologic Setting

### 2.4.1 Regional Geology

Vancouver Island is part of the Wrangellia Terrane, which includes most of Vancouver Island, Haida Gwaii, and parts of central Alaska. The Wrangellia Terrane is composed mostly of widespread, late Triassic aged flood basalts (Greene, Scoates and Weis, 2005). Regional bedrock geology in the vicinity of the Site is composed of the Vancouver

Group of mid to late Triassic age (Guthrie, 2003). The Vancouver Group is composed of undivided sedimentary rocks, marine sedimentary volcanic rocks, and small amounts of siltstones.

At several time periods during the Pleistocene Epoch, Vancouver Island was believed to be glaciated with ice thicknesses up to 2,000 m. During the recession of the last glaciation approximately 14,000-years ago, glacial and glaciofluvial sediments were deposited, and in some cases reworked and redeposited, to make up many of the present surficial deposits of Vancouver Island. These deposits consist of till, which is deposited directly by glacial activity and consist of larger clasts supported in a matrix of fine-grained sediment, and of glacial outwash, which consists primarily of poorly sorted, coarse grained (sand and gravel) sediments deposited by glacial melt water (Greene, Scoates and Weis, 2005). The overburden at the Site consists of glaciofluvial and outwash deposits of sand and gravel.

## 2.4.2 Site Geology

The understanding of the Site geology presented in the following sections is based on existing Site borehole logs for the monitoring wells, provided in Appendix B, regional mapping, previous reports, and well completion logs from nearby private wells.

### Overburden Geology

Overburden geology at the Site is relatively homogeneous and is primarily composed of deposits of fine to medium grained sand interbedded with deposits of fine to medium grained sand and medium subrounded gravel. Lenses of silt and fine-grained sand up to 4 m in thickness are present in an irregular distribution across the Site. Decommissioned monitoring well EBA04-5 was the deepest boring within the Site boundaries with a depth of 67 metres below ground surface (m BGS). Bedrock was not encountered at monitoring well EBA04-5. The boring locations (monitoring wells) are illustrated on Figure 2.

### Bedrock Geology

Based on Site borehole logs, bedrock has not been encountered in any boreholes advanced within the Site or immediately to the north and west of the Site, which are up to 67 m deep. Bedrock is also not encountered at private water supply wells, which are approximately 60 m deep and located approximately 3 km to the northeast to the Site. Bedrock is encountered at a depth of approximately 1.8 m BGS approximately 1.5 km to the southwest of the Site based on well stratigraphy log for private water supply well (well tag 98020) adjacent to McIvor Lake. The bedrock lithology was not indicated on the well log.

From review of bedrock geology maps of the area, it appears the Karmutsen formation is the bedrock unit in the vicinity of the Site. The Karmutsen formation is comprised of volcanic basalts and breccias.

## 2.5 Hydrogeologic Setting

The BC aquifer classification system lists Aquifer 975 to be evident over the extent of the Site. Aquifer 975 is classified as a sand and gravel aquifer of moderate productivity, high vulnerability, and low demand.

The Site is located on an unconfined aquifer primarily composed of sands and gravels. Groundwater within this aquifer flows to the east/northeast across the Site. From the mid-1990s to the early 2000s an overall decrease in groundwater elevations within the sand and gravel aquifer by 2 to 4 m is apparent based on historical Site groundwater elevation measurements. The cause of this decrease in groundwater elevations is unknown, however, this phenomenon is not suspected to be related to the Site.

The Site monitoring wells are generally screened at depths ranging from approximately 1 to 25 m below the top of the water table within the overburden aquifer. Wells screened less than 15 m below the top of the water table are intended to monitor the shallow portion of the overburden aquifer. Wells screened greater than 15 m below the top of the water table are intended to monitor the deep portion of the overburden aquifer.

Figures 6 and 7 present groundwater contours for the May and November 2023 monitoring events. Details of the results of the 2023 hydraulic monitoring program at the Site are presented in Section 5.1.

## 2.6 Potential Receptors

Mclvor Lake is the only surface water body located within a 500 m radius of the Site. Based on the local topography and interpreted groundwater flow direction, Mclvor Lake is located upgradient from the Site; therefore, it is an unlikely receptor of groundwater or surface water from the Site.

The ephemeral tributary of Cold Creek is located northeast of the Site boundary (750 m northeast of the waste footprint). Based on local topography, groundwater, and surface water elevations and hydrogeologic conditions of the area (i.e., unconfined sand and gravel aquifer), the nearest tributary of Cold Creek is downgradient of the Site. There are no surface water drainages from the Site to the tributary. Groundwater discharge to this tributary is not confirmed as groundwater elevations in the vicinity of the ephemeral tributary is not known. Surface water sampling is carried out on the Cold Creek tributaries east and northeast of the Site. (SW-1 located on a tributary of Cold Creek located approximately 1,100 m east of the Site and SW03-17 located approximately 1000 m east of the Site on a pond).

Based on a search of the iMapBC (accessed March 5, 2024), there are twelve water wells within a 500 m radius of the Site. Five of the water wells are listed as water supply wells for Private Domestic use, five are listed as water supply wells for non-domestic/commercial use, one is listed as a water supply well for unknown use and one is listed as a decommissioned monitoring well (Well tag 110853 assigned as monitoring well GLL93-1) in 2013. The well licenses and a map indicating the locations of the water wells are included in Appendix C.

Well tag 84136 was included in the 2020 environmental monitoring program (EMP) under the label EBA04-1. It should be noted the BC Water Resource Atlas indicates that well tag 84136 (labeled EBA04-1) is located at the southeast side of the Landfill footprint, however, it is actually located at the southwest corner of the Site.

Well tag 109728 was installed in January 2015 and appears to be located southeast of the Landfill footprint on the south side of Argonaut Road.

Well tags 122464, 122450, 39950, 73577, 74191, 74207, 93413, and 103257 appear to be located hydraulically upgradient from the Site, and well tag 125695 is located hydraulically cross-gradient from the Site; therefore, it is unlikely that MSW leachate from the Site will migrate to these well locations.

GHD understands an unregistered well is located on the 5900 Argonaut Road property approximately 70 m east of the Block J property line. GHD understands the well is a dug well currently used for domestic purposes. The well is approximately 7.9 m (26 feet) deep.

## 3. Site Operations and Development

### 3.1 Site Operations

The Site operates 7-days a week from 8:30 a.m. to 5:30 p.m. and is closed on all statutory holidays. The authorized works includes entrance facilities, sanitary landfill, recycling, and waste drop off/storage areas, and related appurtenances.

#### 3.1.1 Entrance Facilities

The Site entrance is equipped with a lockable and electrified gate system, posted signs, power, and phone connection. The Site receives waste primarily from the Campbell River waste shed, which includes the City of Campbell River and the surrounding communities. Waste collected from transfer stations in Gold River and Cortes

Island is also transferred to the Site. A weigh scale and scale house with a full-time attendant is located near the entrance.

### 3.1.2 Landfill

The Landfill is located to the northeast of the entrance facilities. As of May 4, 2022, the Landfill is closed, and the Site only accepted waste to be transferred to the CVWMC. The transfer station at the Site is now closed. The Landfill is a single-cell unlined natural attenuation landfill.

### 3.1.3 Transfer Station

The transfer station at the Site was permanently closed in 2023.

### 3.1.4 Management of Recyclable Materials

The selected recyclables that are accepted at the Site are:

- Glass containers
- Foam packaging
- Cartons and paper cups
- Flexible plastic packaging
- Metal containers
- Hard plastic containers
- Paper and cardboard
- Household batteries (excluding vehicle batteries)
- Residential small appliance and power tools
- Larger residential product packaging (e.g., hard plastic pots and trays)
- Scrap metal
- Drywall
- Refrigerant containing items
- Commercial recyclable hard plastics
- Tires off of rims (commercial and residential)
- Light bulbs (commercial and residential)
- Yard waste and grass clippings
- Clean wood waste
- Cooking oil
- Used motor oil
- Thermostats
- Polychlorinated biphenyls (PCBs) ballasts
- Smoke alarms and carbon monoxide detectors
- Commercial and residential motor oil and antifreeze
- Propane cylinders

### 3.1.5 Fencing

The entrance facilities and Landfill area are surrounded by an electric fence operated year-round.

## **3.2 Changes from Approved Reports, Plans, and Specifications**

### **3.2.1 CRWMC Closure**

The Landfill closure and updating plan and conceptual landfill gas design were submitted to the ENV October 1, 2020, and was accepted on February 2, 2021. The final issued for tender drawings for the landfill gas system and closure design, completed by GHD, were submitted to the ENV, as requested, on April 5, 2022.

An application for an OC amendment will also be submitted in 2024 to reflect the closed status of the Landfill.

There were no other changes to approved reports, plans, and specifications in 2023.

## **3.3 Site Development**

### **3.3.1 Closure Works**

Following closure of the Landfill in May 2022, a geomembrane and final cover were applied. The final cover is currently establishing vegetative cover. As part of the closure works, monitoring well EBA04-2 was decommissioned on July 6, 2022, and the landfill transfer station is now closed.

### **3.3.2 Composting Facility**

A regional organics composting facility designed by Sperling Hansen began construction in 2022 on the adjacent lot to the Landfill (Block J) and operates since April 12, 2023. A new monitoring well (CAM-WELL 66650) located within the compost facility, adjacent to the Landfill, is used to water down the compost. The new monitoring was sampled in 2023 and it will be incorporated in the 2024 EEMP.

### **3.3.3 Maintenance and Repairs**

Ongoing maintenance and repairs of Site equipment was completed as scheduled and required.

### **3.3.4 Inspections**

Inspections were conducted quarterly during groundwater testing events in 2023. There were no signs of erosion or sloughing on the recently closed landfill, in 2023. Landfill cover is native sands and gravels with limited grass growing and there were no signs of significant settlement, burrowing animals or erosion identified during regular operations.

## **3.4 Complaints**

No complaints were received in 2023 for the Site.

## **3.5 Emergencies, Incidents and Non-Compliance Items**

No emergencies, incidents, or non-compliance issues occurred at the Site in 2023.

## **3.6 Landfill Gas Collection**

As part of the 2017 DOCP (GHD, 2018), GHD updated the most recent Landfill Gas Generation Assessment (Conestoga-Rovers and Associates, 2010) to assist the development of the conceptual design of the landfill gas (LFG) collection system for the Site. The updated LFG generation assessment (GHD 2017) predicted that the Site will

produce approximately 1,536 tonnes of methane in 2020 (GHD, 2017). The detailed design of the LFG collection system occurred in 2021. Construction of the LFG collection system was completed in 2022, with 31 vertical LFG wells and 13 probes installed. The blower and flare will be installed in the Spring of 2024.

## **3.7 Waste Tonnage**

The Landfill reached capacity and ceased landfilling of waste on May 4, 2022. No waste was discharged to the landfill in 2023. Table 1 presents the total amount of MSW accepted at the CRWMC and transferred to the CVWMC for disposal in 2023.

### **3.7.1 Estimate of MSW Disposal Per Capita**

Table 2 presents the current and projected population of the Campbell River watershed until the estimated date of Site closure. Based on 24,111 tonnes of waste generated and a population of 48,172 in the Campbell River watershed in 2023, the updated 2023 municipal solid waste per capita estimate is 0.50 tonnes.

## **3.8 Volume Survey**

The Landfill reached capacity and ceased landfilling of waste on May 4, 2022. Therefore, the annual airspace consumption was not estimate for 2023.

## **3.9 Remaining Capacity and Estimated Site Life**

The Landfill reached capacity and stopped accepting waste as of May 4, 2022.

## **3.10 Closure and Post-Closure Fund Estimate**

The CRWMC closed in spring 2022 and had an anticipated closure cost of \$10,548,575. Forecasted post-closure costs for the Site were prepared for the CVRD. A copy of the memorandum including the information pertinent to the Site is included in Appendix D.

## **3.11 Operational Plan for the Next 12-Months**

Operational plans for 2023 includes the following activities:

- Installation of the flare and blower skid, and commissioning of the landfill gas collection system is planned for the Spring of 2024.
- The recycling facility will be upgraded in the summer of 2024.

# **4. Environmental Monitoring Program**

The water quality monitoring program for the Site was developed based on previous water quality monitoring reports and the requirements for monitoring municipal landfills as provided in Guidelines for Environmental Monitoring and Municipal Solid Waste Landfills (BC MOE, 1996). The objective of the program is to identify potential impacts (if any) the Landfill has on the receiving groundwater and surface water.

Four environmental monitoring events were conducted during the Reporting Period: February 27- March8, May 10-17, August 13-16, and November 13-16, 2023.

During the Reporting Period, water quality monitoring was conducted by CVRD staff. Prior to 2023, the EMP was conducted by GHD personnel with analytical services provided by Canadian Association for Laboratory Accreditation



(CALA) accredited laboratory ALS Canada Ltd (ALS), located in Burnaby, BC. Additionally, a CVRD technician was trained during the third and fourth quarters to take over the field component of the EMP. Water quality monitoring locations are presented on Figure 2. Monitoring specifications including analytical parameters and monitoring frequency for 2023 are included in Appendix E.

## 4.1 Groundwater Monitoring Program

The objective of the groundwater monitoring program is to monitor groundwater quality within the Site area and to identify, if any, the extent, magnitude, and temporal trends of Landfill-derived impacts to groundwater quality.

The field component of the groundwater monitoring program consists of both hydraulic monitoring and groundwater sampling at 22 locations in the Site area. Groundwater monitoring wells (MWs) location is shown in Figure 2. The 2023 groundwater monitoring program included sampling individual monitoring wells as follows:

- Background wells:
  - Shallow: AM02-01
  - Deep: MW01-16
- Landfill Vicinity wells, which are located within the Landfill footprint or on/near the Site boundary adjacent to the Landfill footprint. For the purpose of discussion in this Annual Report, the Landfill Vicinity wells are further divided between their screened locations in the shallow or deep portions of the overburden aquifer:
  - Shallow: EBA04-7, HBT94-1, HBT94-3
  - Deep: EBA04-1 (tap), EBA04-6, HBT94-2

It should be noted that EBA04-1 is sampled from a tap near the Site scale house located upgradient of the estimated limit of waste, however it has been grouped with the Landfill Vicinity wells for assessment purposes due to its proximity to the estimated limit of waste of the Landfill.

- Block J Vicinity wells, which are located northeast and cross-gradient of the Landfill. The Block J Vicinity wells are further divided between their screen locations in the shallow or deep portions of the overburden aquifer:
  - Shallow: AG99-06, EBA11-1, EBA11-3, EBA11-4
  - Deep: MW04-19, MW08-21
- Downgradient Off-Site wells, which are located east and southeast of the Landfill. The Downgradient Off-Site wells are further divided between their screen locations in the shallow or deep portions of the overburden aquifer:
  - Shallow: MW02-18, MW03-18, MW06-21, MW07-21
  - Deep: AG99-01, AG99-02, AG99-04, AG99-05

Groundwater samples were collected quarterly in 2023, with the following exceptions:

- HBT94-3 was dry during all monitoring events.
- HBT94-1 was dry during all monitoring events.
- AM02-01 was dry during all monitoring events.
  - AM02-01 has historically been dry during most monitoring events.

A new monitoring well, CAM\_WELL 66650 located within the compost facility, is used to water down the compost. Groundwater samples were collected and analysed in August and November 2023.

Well completion details including screened intervals for each groundwater monitoring well are included in Table 3.

## 4.2 Surface Water Monitoring Program

The objective of the surface water monitoring program is to identify the extent, magnitude (if any) and temporal trends of potential Landfill-derived impacts to surface water quality.

Surface water monitoring locations are located downstream from the Site, as shown on Figure 2. The 2023 surface water monitoring program included sampling of three surface water monitoring locations as follows:

- SW-1 is located on an ephemeral tributary of Cold Creek, which drains into the Quinsam River. SW-1 was sampled during the February-March, May, and November monitoring events.
  - SW-1 was not sampled in August 2023 as it was dry.
- SW03-17 is located on a pond approximately 1 km east of the Site. This pond sometimes drains into to the same ephemeral tributary of Cold Creek that SW-1 is located on. SW03-17 was sampled during the February-March, May, August, and November sampling events.
- SWM Pond is located on Site in Block J, northeast of the Landfill. The SWM Pond was only sampled during the August and November sampling events. Sampling was not possible during the February-March and May sampling events as the location was dry.

### **4.3 Leachate Monitoring Program**

As there is no leachate collection system at the Site, no leachate monitoring program is currently in place. The Site was originally developed as a natural attenuation landfill.

### **4.4 Sampling Methodology**

Groundwater sampling was conducted in general accordance with BC Field Sampling Manual (MOE, 2013) and consisted of the following methodology:

- Well identification and inspection.
- Water level monitoring followed by well volume calculation.
- Well purging and stabilization monitoring. Purging was completed using a dedicated bailer or dedicated Waterra™ tubing. A minimum three well volumes were purged at wells with good recovery. Wells with insufficient yield were purged dry and allowed to recover followed by sample collection. Field measurements included pH, conductivity, temperature, turbidity, and oxidation-reduction potential.
- Sample collection using dedicated sampling equipment (bailer or Waterra™).
- Equipment decontamination.

Surface water samples were collected by directly dipping a pre-cleaned unpreserved sample container below the water surface and then transferring to the appropriate preserved container when necessary. Field measurements included pH, conductivity, temperature, turbidity, oxidation-reduction potential, and dissolved oxygen.

Sampling of the domestic well on Site was completed by purging for a period of 20-minutes from an outside tap followed by direct sample collection. Field measurements collected included pH, conductivity, temperature, turbidity, and oxidation-reduction potential.

All samples were collected in the appropriate laboratory-supplied sample containers, preserved as required, packaged in an ice-chilled cooler, and delivered to the laboratory under chain-of-custody protocol. Groundwater samples designated for dissolved metals analysis were field filtered when possible.

### **4.5 Quality Assurance/Quality Control**

In order to ensure adequate quality control for water quality samples, the following quality assurance/quality control (QA/QC) practices were employed during the Reporting Period:

- Activities performed by qualified and trained personnel.
- Daily field equipment calibration.
- Field QA/QC practices included field duplicate, field blank and trip blank analysis.

## 4.6 Laboratory Program

Analytical services for the EMP were provided by ALS of Burnaby, BC. ALS is accredited by the Canadian Association for Laboratory Accreditation (CALA) to perform the analytical tests required as part of the EMP. Field sample keys (FSK) and laboratory reports for each monitoring event are provided in Appendix F.

## 4.7 Data Quality Assessment and Verification

A qualified chemist completed data verification to assess laboratory and field QA/QC measures. The QA/QC memorandum presented in Appendix G indicates that data exhibited acceptable levels of accuracy and precision with the qualifications and exception noted. All data reported for the 2023 EMP program has been determined to be acceptable for use in support of further analysis and interpretation in this Annual Report.

# 5. Environmental Monitoring Program Results and Trend Analysis

## 5.1 Water Level Monitoring

Results of the groundwater monitoring program are presented in Table 3. Groundwater contours for May and November 2023 are presented on Figures 6 and 7 and represent the dry and wet seasons, respectively.

Groundwater was observed to flow towards the east across the Site based on water levels measured during the Reporting Period, which is consistent with previous years.

Site water table was found to fluctuate seasonally between 0.12 to 2.97 m below top of riser (BTOR) with a median fluctuation of 0.5 m over the four monitoring events.

Groundwater elevations at the Site in 2023 were consistent with the elevations observed in 2022 and 2021. Groundwater elevations across the Site showed a decreasing trend between 2017 and 2019 but have since stabilized. Hydrographs showing groundwater elevation across the Site between 2014 and 2023 are presented in Appendix H.

## 5.2 Typical Leachate Indicator Parameters

The results of the water quality monitoring program are discussed in the following sections. Groundwater quality is assessed in terms of evidence of Landfill-related water quality impacts. This is accomplished through an assessment of the temporal and spatial trends in water quality and a comparison of water quality between each location, typical leachate concentrations, and background concentrations.

Assessment of groundwater and surface water quality at the Site employs indicator parameters that are indicative of leachate-impacted waters. As the Site does not have a leachate collections system or leachate monitoring wells to sample directly, the indicator parameters and their respective concentrations ranges are estimated using leachate quality monitoring data from MSW landfills of similar age ranges (approximately 10 to 15-years old).

Typical leachate indicator parameters concentration ranges for older MSW landfills are presented in Table 5.1 below.

Table 5.1 Typical Leachate Indicator Parameters Concentration Range

Parameter	Older MSW Landfills
Alkalinity	71 – 3,340 <sup>(1)</sup>
Ammonia	84.3 – 449 <sup>(1)</sup>

Parameter	Older MSW Landfills
Boron	3.2 – 4.68 <sup>(1)</sup>
Chloride	500 <sup>(2)</sup>
Conductivity (µS/cm)	161 – 8,126 <sup>(1)</sup>
Sulphate	50 <sup>(2)</sup>
Iron	100 – 500 <sup>(2)</sup>
Manganese	0.03 – 7.9 <sup>(2)</sup>
TDS	2,000 <sup>(2)</sup>
<p>All concentrations in mg/L unless otherwise specified.  TDS – total dissolved solids; mg/L – milligrams per litre; µS/cm – microSiemens per centimetre.  <sup>1</sup> (Conestoga Rovers &amp; Associates, 2015)  <sup>2</sup> Mulamoottil, et. al, 1999.</p>	

Based on GHD’s experience with similar MSW landfills, we consider the above values to be a realistic estimate of potential parameter concentrations in leachate at the Site. However, leachate characteristics can vary widely between landfills as well as landfill age, therefore, the example values are for comparison purposes only and cannot be used to definitively determine whether leachate impacts are present or not.

## 5.3 Groundwater Quality

The groundwater monitoring well network includes Background, Landfill Vicinity, Block J Vicinity, and Downgradient Off-Site monitoring wells.

Groundwater samples were collected from all monitoring wells quarterly in 2023, except dry or inaccessible wells. The monitoring events occurred February 27- March 8, May 10-17, August 13-16, and November 13-16, 2023.

Groundwater analytical results are presented in Tables 4 and 5. Analytical table notes are presented in Table 7. Summary tables of the leachate indicator parameter concentration ranges at each location are included in Appendix I.

Concentration versus time (C. vs. T) plots of select leachate indicator parameters and vanadium, used to support a temporal assessment of leachate impacts, are presented in Appendix J. Vanadium is included in the C vs. T plots to visualize its temporal trends, which includes seasonal exceedances of the applicable CSR standard.

The following sections provide an analysis of water quality following an upgradient to downgradient pattern, divided by geographic areas.

### 5.3.1 Background Groundwater Quality Results

Based on groundwater flow direction and historical groundwater chemistry, background monitoring wells include AM02-01 and MW01-16. Both monitoring wells are located upgradient, west of the Landfill footprint (Figure 2) and are screened in the shallow and deep portion of the overburden aquifer, respectively. Monitoring well AM02-01 (screened in the shallow overburden) is frequently dry and was dry during all four monitoring events in 2023 and could not be sampled.

The 2023 analytical results for samples collected from the background monitoring well MW01-16 (screened in the deep overburden) are summarized in Tables 4 and 5. Summary tables including current leachate indicator parameter concentration ranges are included in Appendix I (Table I-1). C vs. T plots of the leachate indicator parameters were used to support this assessment and are presented in Appendix J (Figures J-1 and J-2).

Background water quality in the deep portions of the overburden aquifer is characterized by low concentrations of the leachate indicator parameters. The following observations of background groundwater quality are made based on historic and current analytical data as well as the C vs. T plots:

- Monitoring well AM02-1 was dry during all 2023 monitoring events.
- Samples collected from MW01-16 are inferred to be representative of background groundwater quality.
- Leachate indicator parameter concentrations at MW01-16 are, overall, stable in the deep portion of the overburden aquifer except for iron and manganese that show a spiked concentration during the August 2023 sampling event.

### 5.3.2 Landfill Vicinity Groundwater Quality Results

The Landfill Vicinity wells are installed at the property boundary in the immediate vicinity of the Landfill and immediately downgradient of the Landfill footprint (Figure 2). These monitoring wells represent Site compliance with respect to Landfill-derived impacts migrating off-Site.

The Landfill Vicinity wells network includes:

- Shallow: EBA04-7, HBT94-1, HBT94-3
- Deep: EBA04-1 (tap), EBA04-6, HBT94-2

Monitoring wells HBT94-1 and HBT94-3 were dry during all four sampling events in 2023, and therefore, these were not sampled.

The 2023 analytical results for samples collected from three deep monitoring wells EBA04-1 (tap), EBA04-6, HBT94-2 and one shallow monitoring well (EBA04-7) are summarized in Tables 4 and 5. Based on the concentrations of leachate indicator parameters (Appendix I, Table I-2) and C vs. T plots (Appendix J, Figures J-3 and J-4), the following observations are drawn:

- Leachate indicator parameter concentrations in the Landfill Vicinity wells are, with the exception of EBA04-1, consistently greater than background which indicates the presence of Landfill-derived impacts.
- Concentration of leachate indicator parameters at EBA04-01 are generally comparable to background, with the only exceptions being dissolved iron, manganese, copper, zinc, lead, and vanadium concentrations.
- The C vs. T plots show recent increasing trends of dissolved manganese, and a decrease in sulphate at EBA04-07. All other parameters are, overall, consistent with no clear increasing or decreasing trends.

Overall, impacts are most pronounced at EBA04-07, located in shallow portion of the aquifer northeast of the waste mound. Impacts are generally more pronounced in the shallow monitoring well in each nested pair.

### 5.3.3 Block J Vicinity Groundwater Quality Results

The Block J Vicinity wells are installed at the Site's property boundary in the immediate vicinity of Block J (Figure 2). These monitoring wells are located cross-gradient to the Landfill. These monitoring wells represent Site compliance with respect to Landfill-derived impacts migrating off-Site.

The Block J Vicinity wells network includes:

- Shallow: AG99-06, EBA11-1, EBA11-2, EBA11-3, EBA11-4
- Deep: MW04-19, MW08-21

Monitoring well EBA11-2 was decommissioned in 2021.

The 2023 analytical results for samples collected from these monitoring wells are summarized in Tables 4 and 5. Based on the concentration of leachate indicator parameters (Appendix I, Tables I-3 and I-4) and C vs. T plots (Appendix J, Figures J-5 to J-8), the following observations are drawn:

- Concentrations of leachate indicator parameters at shallow monitoring well EBA11-1 show a decreasing trend in alkalinity, chloride, TDS, conductivity, sulfate and manganese during all four sampling events in 2023. The decreasing trend in these leachate indicator parameters is most likely attributable to the final cover being applied to the Landfill and improved water quality in the SWM Pond.

- Non-metal leachate indicator parameters at the remaining Block J Vicinity wells were slightly elevated above background in 2023, except for MW04-19 which shows an increase in dissolved iron, manganese and a spike in vanadium concentrations during the November 2023 monitoring event.
- Concentrations of leachate indicator parameter at shallow monitoring well EBA11-4 show an increasing trend in sulphate in 2023 and concentrations of dissolved vanadium at EBA11-4 have been historically elevated well above background.
- With the exception of EBA11-1 (screened in the shallow aquifer) and MW04-19 (screened in the deep aquifer), leachate indicator parameter concentrations at the Block J Vicinity wells have been consistent over time and are similar to background groundwater quality.

Concentrations of leachate indicator parameters increased significantly at EBA11-1 in late 2019 following the commissioning of the SWM Pond. Surface water that has been impacted by leachate seeps is directed to the SWM Pond where it infiltrates to the subsurface. Now that the final cover has been applied to the landfill, groundwater quality has improved in monitoring well EBA11-1 during 2023. It is anticipated that groundwater quality at this location will continue to improve over the following years. Based on the analytical results for monitoring well MW04-19 it can be inferred that water impacted by leachate seeps from the SWM Pond has traveled and infiltrated to the deep aquifer and moving downgradient from the pond. Prior to construction of the pond in 2019, leachate impacted surface water travelled down the surface water ditch adjacent to Argonaut Road. As shown in Figures 6 and 7, the Block J Vicinity wells are located cross-gradient to the inferred groundwater flow path from the landfill but are directly downgradient from the SWM Pond.

Continued monitoring is recommended to observe the evolution of water quality at the deep and shallow Block J monitoring wells. It is anticipated that groundwater quality at EBA11-1 will continue to improve now that the final cover has been applied to the Landfill. These measures will minimize precipitation infiltration to the Landfill, resulting in a significantly lower rate of leachate generation. The final cover will also significantly increase the clean surface water runoff from the landfill footprint that flows to the pond resulting in increased infiltration of clean surface water upgradient of EBA11-1.

### 5.3.4 Downgradient Off-Site Groundwater Quality Results

The Downgradient Off-Site wells are the monitoring wells installed outside of the Site's property boundary and downgradient, east, and southeast, of the Landfill (Figure 2). These monitoring wells represent Site compliance with respect to Landfill-derived impacts migrating off-Site.

The Downgradient Off-Site wells network includes:

- Shallow: MW02-18, MW03-18, MW06-21, MW07-21
- Deep: AG99-01, AG99-02, AG99-04, AG99-05

The 2023 analytical results for samples collected from these monitoring wells are summarized in Tables 4 and 5. Based on the concentration of leachate indicator parameters (Appendix I, Tables I-5 and I-6) and C vs. T plots (Appendix J, Figures J-9 to J-12) the following is inferred:

- Elevated leachate indicator parameter concentrations are most apparent at shallow monitoring well, MW02-18. Concentrations of alkalinity, chloride, conductivity, TDS, iron, and manganese at MW02-18 have been variable, and elevated well above background, over the past several years but do not show any obvious increasing or decreasing trends.
- Concentrations of alkalinity, conductivity, TDS, and vanadium are slightly elevated at the remaining downgradient Off-Site wells while concentrations of chloride, iron, manganese, and sulphate are generally comparable to background concentrations except for MW06-21 which show an elevated concentration of iron during the August 2023 sampling event.
- Concentrations are generally consistent at the remaining downgradient Off-Site wells.

Overall, the monitoring results from the downgradient Off-Site wells show Landfill-derived impacts are present at the shallow monitoring well MW02-18. Results from the remaining wells show that minor impacts may be present but are generally limited and are not worsening.

Figure 2 illustrates the approximate location of an historical dumping area. MW02-18 is located within the dumping area. Impacts noted at MW02-18 may be from a combination of the Landfill and historical dumping.

## 5.4 Groundwater Geochemical Characteristics

Figure 8 and 9 present chloride and manganese concentrations isopleths, respectively. The spatial pattern of the chloride and manganese contours in each figure match expected patterns of a leachate plume migrating from the east side of the Landfill. Figure 8 shows that a secondary plume is migrating eastward from the Surface Water Management Pond.

Figure 10 presents a trilinear piper plot for groundwater and surface water monitoring locations using analytical data from the November 2023 monitoring event.

The plot provides a means of comparing geochemical fingerprints between monitoring locations. Major cation and anion concentrations are plotted on trilinear (triangular) diagrams as percentages and geochemical patterns can be discerned by comparing the relative locations of samples on the plot. Locations that plot close to one another are characterized by similar major ion geochemistry and vice versa.

For the purposes of this assessment, the piper plot has been employed as an additional line of evidence to support identification of regions where potential MSW Landfill-derived impacts on groundwater may have occurred. Based on GHD's experience with similar MSW landfills, leachate typically plots in the central portion of a piper plot. Conversely, unimpacted groundwater typically plots in the left corner.

The following observations are drawn based on Figure 10:

- Background monitoring wells and the majority of the groundwater monitoring wells plot in the leftmost corner of the diamond. This is inferred to represent un-impacted groundwater and shows that the major ion chemistry of the majority of locations are similar to background.
- Block J Vicinity monitoring well EBA11-1 plots is upwards and to the right of cluster of un-impacted wells. This indicates that the geochemical fingerprint of this well has been altered. Based on the location of EBA11-1, cross-gradient of the landfill and downgradient of the SWM Pond, groundwater impacts are inferred to be due to infiltration of leachate impacted surface water in SWM Pond rather than impacts from the Landfill.
- Landfill Vicinity and Downgradient Off-Site wells HBT94-2, HBT94-1, and MW02-18 plot in locations shifted towards the central portion of the diamond. This shows that the geochemistry at these locations may have been influenced by Landfill leachate. It is noted that the shift between background and the Landfill Vicinity wells is not significant. This indicates that the difference in geochemical fingerprints (i.e., major ion proportions) and leachate impacts are minor.

## 5.5 Surface Water Quality

The surface water monitoring network includes two off-Site monitors located approximately 1.1 and 1 km east, downgradient, of the Site, Cold Creek tributary (SW-1) and Unnamed Pond (SW03-17) as well as the SWM Pond located on the Block J property. The surface water monitoring locations are presented on Figure 2.

Surface water samples at SW-1 and SW03-17 were collected quarterly in 2023. The monitoring events occurred February 28 – March 8, May 16, August 15, and November 15, 2022. Surface water samples were collected at the SWM Pond on March 3 and November 15, 2023. The SWM Pond was dry during the other monitoring events in 2023. SW-1 was dry during the August 2023 sampling event.

Water quality results were assessed for evidence of Landfill-derived impacts. Surface water analytical results are presented in Table 6a and 6b and analytical table notes are presented in Table 7. Two samples (WS-030823-CS-12 and WS-030823-CS-13) collected at SW-1 on March 8, 2023, were marked as 'failed' for holding time and rejected in the Data Verification Report (Appendix G). Nitrite (as N) has a holding time of 3-days. Holding time for samples WS-030823-CS-12 and WS-030823-CS-13, was past 6-days from sample collection and therefore rejection on detection limits for Nitrite (as N) were required. Summary tables including current leachate indicator parameter concentration ranges are included in Appendix I (Table I-7). C vs. T plots of the leachate indicator parameters were used to support this assessment and are presented in Appendix J (Figures J-13 and J-14).

Figure 10 presents a trilinear piper plot for select groundwater and surface water monitoring locations using analytical results from the November 2023 monitoring event.

At this time, monitoring of background surface water conditions is not conducted for the Site as an appropriate background surface water monitoring location does not appear to exist in the vicinity of the Site. Surface water quality at the Site is assessed based on concentrations of leachate indicator parameters in surface water and the assumption that background surface water quality at the Site is similar to background groundwater quality at monitoring well MW01-16.

Leachate indicator parameter concentrations in SW-1 and SW03-17 are generally comparable to or lower than background groundwater quality except for iron and manganese. In the absence of other elevated parameters, elevated concentrations of iron and manganese are interpreted to be due to natural variation between background groundwater and downgradient surface water.

Leachate indicator parameter concentrations at the SWM Pond have been notably elevated in comparison to background groundwater quality since 2021. However, water quality at the SMP has improved in 2023. Concentrations of some leachate parameters, including alkalinity, chloride, conductivity, TDS, iron and manganese decreased in 2023 at SWM Pond while concentrations of sulphate and vanadium increased during the November 2023 sampling event.

It was anticipated that surface water quality in the SWM Pond will improve now that the final cover has been applied to the Landfill. These measures have minimized precipitation infiltration to the Landfill, resulting in a significantly lower rate of leachate generation. The final cover has also significantly increased the clean surface water runoff from the landfill footprint that flows to the SWM Pond. The cover has also prevented, at least partially, leachate seeps from mixing with surface water and being directed to the SWM Pond.

The following observations are drawn based on the Piper Plot presented on Figure 10:

- Surface water quality in SWM Pond, plots in the upper portion of the diamond which indicates a moderate alteration of the geochemical fingerprint when compared to background groundwater. Considering the elevated concentrations and changes to major ion percentages, Landfill-derived impacts are interpreted to still be present, however in lower concentrations than observed in 2022.
- Surface water quality in SW-1 and SW03-17 plot in a location away from the background, un-impacted locations. This is not, however, interpreted to be related to Landfill-derived impacts. As shown in Table I-7 (Appendix I), concentrations of general chemistry and metals ions are very low in both SW-1 and SW03-17. Thus, the slightly elevated chloride results in a large shift on the Piper Plot. This is due to the very low concentration and not Landfill-impacts.

As previously discussed, there is no direct surface water discharge from the Site to the ephemeral tributaries east of the Site. The depth of groundwater in the vicinity of the tributaries is unknown and as such the discharge of groundwater to the tributaries cannot be confirmed without further investigation. However, there is no evidence of Landfill impacts, so additional investigation is not warranted at this time.



## 6. Compliance Assessment

A compliance assessment of groundwater analytical concentrations at the Site was completed using the following applicable BC Contaminated Sites Regulation (CSR) standards:

- Schedule 3.2 Generic Numerical Water Standards Column 3 for the protection of freshwater aquatic life (FAW)
- Schedule 3.2 Generic Numerical Water Standards Column 6 for the protection of drinking water (DW)

A compliance assessment of surface water analytical concentrations at the property boundary monitoring locations were completed using the following applicable WQGs:

- Approved, Working and Source WQG's for drinking water (DW) and freshwater aquatic life (FAW)

### 6.1 Groundwater

Background groundwater (MW01-16) analytical results were less than the applicable CSR standards during all four monitoring events in 2023.

The following parameter concentrations were greater than background concentrations and their applicable CSR standards for DW (Tables 4 and 5) during one or more 2023 monitoring events:

- EBA04-7 and EBA11-1: nitrate and nitrite
- MW02-18: dissolved cobalt and dissolved manganese
- MW04-19: dissolved cobalt

The following parameter concentrations were greater than background concentrations and their applicable CSR standards for FAW (Tables 4 and 5) during one 2023 monitoring event:

- MW02-18: ammonia

As discussed in the preceding sections, Landfill-derived impacts have been identified in the Landfill Vicinity wells. The observed CSR exceedances of ammonia and dissolved manganese at MW02-18 are inferred to be from a combination of the Landfill and historical dumping. It is unclear what portion of impacts at MW02-18 can be attributed to the Landfill versus the historic dumping area, however, the Landfill cannot be ruled out as at least a partial contributor to the CSR exceedances observed at this monitoring well. As discussed in previously, CSR exceedances at EBA11-1 are inferred to be due to the infiltration of impacted surface water from SWM Pond, rather than Landfill-derived impacts.

Concentrations of vanadium at AG99-02 exceeded CSR standards in 2022. No exceedances of vanadium were detected at AG99-02 in 2023, however vanadium concentrations were elevated during the four 2023 monitoring events and were close to exceeding the CSR DW standards. The source of elevated vanadium at this well is unknown, but as elevated vanadium concentrations have not been observed in other leachate impacted monitoring wells, the elevated vanadium concentrations at AG99-02 are not inferred to be caused by Landfill-derived impacts.

Volatile organic compounds (VOC's) and petroleum hydrocarbons (VHw6-10 and VPHw6-10) were not detected in the landfill vicinity wells, Block J vicinity wells or downgradient Off-Site monitoring wells.

### 6.2 Surface Water

The surface water monitoring network includes three surface water locations (SW-1, SW03-17 and SWM Pond) (Figure 2). Analytical results from SW-1 and SW03-17 were compared to BC WQGs. Analytical results from the SWM Pond were compared to CSR standards, per the OC.

The following parameters were reported in greater concentrations than their applicable BC WQGs DW (Table 6a) during one or more 2023 monitoring events at the following monitoring wells:

- SW-1 and SW03-17: total iron and total manganese
- SW-1 and SW03-17: field temperature

The following parameters were reported in greater concentrations than their applicable BC WQGs FAW (Table 6a) during one or more 2023 monitoring events at the following monitoring wells:

- SW-1: total alkalinity
- SW-1 and SW03-17: field pH, field temperature, and dissolved aluminum

The following parameters were reported in greater concentrations than their applicable BC CSR DW (Table 6b) during one or more 2023 monitoring events at the following monitoring wells:

- SWM Pond: nitrate and nitrite

Elevated concentrations of parameters indicative of Landfill-derived impacts were not identified at SW-1 or SW03-17. As such, BC WQG exceedances at both locations were inferred to be due to natural surface water quality. At SW-1, field pH was below the WQG for FAW through the February-May; at SW03-17 field pH was below the WQG for FAW in February monitoring event, indicating more acidic water in the Cold Creek tributary during this period. However, high alkalinity was observed in SW-1 during May monitoring event.

As previously discussed, Landfill-derived impacts are noted within the SWM Pond. Consequently, exceedances of CSR standards in the SWM Pond appear to be attributed to the Landfill. As previously mentioned, application of the final cover has improved runoff water quality that is entering the SWM Pond and it is anticipated that this will continue to improve surface water quality as well as groundwater quality in the vicinity of the SWM Pond.

## 7. Summary

The following summarizes the findings of the Annual Report:

### **Site Operations**

The CRWMC Landfill reached capacity and ceased disposal of waste in May 2022. Since then, the Site operated as a transfer station, with all MSW transferred to the Comox Valley Waste Management Centre (CVWMC) for disposal in 2023. No waste was discharged to the landfill in 2023.

### **Groundwater Flow Patterns**

- Groundwater was observed to flow towards the east across the Site.
- Site water table was found to fluctuate seasonally between 0.12 and 2.97 m below top of riser (BTOR) with a median fluctuation of 0.5 m.
- Groundwater elevations at the Site in 2023 were consistent with the elevations observed in 2022 and 2021. Groundwater elevations across the Site showed a decreasing trend between 2017 and 2019 but have since stabilized.

### **Groundwater Quality**

- No Landfill-derived impacts were observed in groundwater quality at background monitoring well MW01-16.
- Leachate impacts continue to be observed in groundwater at monitoring wells located in the Landfill Vicinity monitoring wells EBA04-6, EBA04-7, HBT94-1, and HBT94-2. Concentrations of nitrate and nitrite in monitoring well EBA04-7 exceeded the BC CSR Drinking Water standards during the May and August 2023 sampling events.

- The decreasing trend in concentrations of leachate indicator parameters (such as alkalinity, chloride, TDS, conductivity, and manganese) at EBA11-1, observed during all four 2023 sampling events, is most likely due to the final cover that has been applied to the Landfill.
- Concentrations of nitrate and nitrite in monitoring well EBA11-1 exceeded the BC CSR Drinking Water standards in all four 2023 sampling events.
- In monitoring well MW04-19, concentrations of iron, manganese, and vanadium increased significantly during the November 2023 sampling event and the concentration of cobalt exceeded the BC CSR Drinking Water standards in November 2023 monitoring event. It is inferred that water impacted by leachate seeps from the SWM pond has traveled and infiltrated to the deep aquifer and moving downgradient from the pond.
- Ammonia, dissolved manganese and dissolved cobalt concentrations at MW02-18 were greater than the applicable CSR standards in one or more monitoring events in 2023. It is noted that monitoring well MW02-18 is located adjacent to a historic dumping ground, therefore, impacts noted at MW02-18 may be from a combination of the Landfill and historical dumping.
- Deep downgradient groundwater quality southeast of the Site at AG99-01, AG99-02, AG99-04, and AG99-05 remains generally stable over time with minimal leachate impacts observed.
- The source of vanadium in groundwater quality at AG99-02 is not known at this time but is unlikely related to Landfilling activities.
- It is anticipated that groundwater quality at EBA11-1 will continue to improve now that the final cover has been applied to the Landfill. These measures will minimize precipitation infiltration to the Landfill, resulting in a significantly lower rate of leachate generation. The final cover will also significantly increase the clean surface water runoff from the landfill footprint that flows to the SWM Pond resulting in increased infiltration of clean surface water upgradient of EBA11-1. The cover will also prevent any leachate seeps from mixing with surface water and being directed to the SWM Pond.

### ***Surface Water Quality***

- Based on the results of surface water quality monitoring conducted in 2023 at SW-1 (tributary of Cold Creek), and SW03-17 (unnamed pond upstream of SW-1) the presence of leachate impacts is not suspected.
- Water quality in the SWM Pond has improved in 2023. Concentrations of some leachate parameters, including alkalinity, chloride, conductivity, TDS, iron and manganese decreased during the March and November 2023 sampling events at SWM Pond, while concentrations of sulphate and vanadium increased during the November 2023 sampling event.
- It is anticipated that surface water quality in the SWM Pond will continue to improve now that the final cover has been applied to the Landfill. These measures have minimized precipitation infiltration to the Landfill, resulting in a significantly lower rate of leachate generation. The final cover has also significantly increased the clean surface water runoff from the landfill footprint that flows to the SWM Pond. The cover has also prevented, at least partially, leachate seeps from mixing with surface water and being directed to the SWM Pond.

## 8. Recommendations

Based on the findings of the Annual Report, the following recommendations are made:

- Continue the groundwater and surface water monitoring programs (Appendix K) on a quarterly basis.
- Install the LFG blower and flare and commission the LFG collection and management system.
- Complete the landfill gas monitoring program as described in the Closure Plan.

All of Which is Respectfully Submitted,

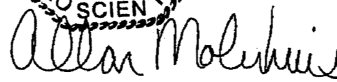
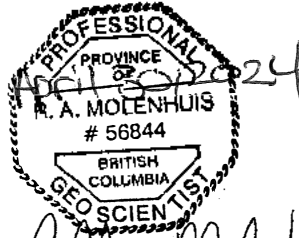
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# Tables

**Table 1**  
**Waste Tonnage and Diversion**  
**2023 Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Comox Strathcona Waste Management**

	Units	2023
<b>WASTE DISCHARGED TO LANDFILL <sup>(1)</sup></b>		
<i>Waste from CRWMC Wasteshed</i>		
Construction Waste	tonnes	1656
ICI & Household	tonnes	17301
Municipal Waste by Contract	tonnes	4301
Volunteer Clean Up	tonnes	20
Streetside cleanup/illegal dumping	tonnes	8
Mattresses	tonnes	421
Mixed Waste with Recyclables	tonnes	219
Invasive Species	tonnes	185
Clean Fill - Disposed	tonnes	0
<b>Subtotal</b>		<b>24111</b>
<i>Non-MSW materials diverted from mixed loads <sup>(2)</sup></i>		<i>839</i>
<i>Total MSW accepted at CRWMC in 2023</i>		<i>23272</i>
<i>Total MSW Transferred to CVWMC for disposal</i>		<i>23272</i>
<b>Total MSW Discharged to Landfill</b>		<b>0</b>
<b>LANDFILLED OFF-SITE</b>		
Asbestos	tonnes	26
Clean Fill	tonnes	1298
<b>Total Waste Landfilled Off-Site</b>		<b>1324</b>
<b>RECYCLED/DIVERTED MATERIAL <sup>(1)</sup></b>		
Yard Waste	tonnes	1507
Commercial Cardboard/Recycling	tonnes	21
Scrap Metal Sales	tonnes	881
Battery Sales	tonnes	31
Drywall/Gypsum waste	tonnes	625
Cut Grass & Raked Leaves	tonnes	178
Organics/food waste	tonnes	2198
Tires weigh only and EPR outbound only	tonnes	146
Outbound transfer of wood waste	tonnes	758
<b>Total Recycled/Diverted Material</b>		<b>6345</b>

## Notes:

- (1) Campbell River Waste Management Centre Yearly Tonnage Summary
  - (2) Non-MSW materials diverted by customers after passing over the scale
- CRWMC - Campbell River Waste Management Centre  
CVWMC - Comox Valley Waste Management Centre  
MSW - Municipal Solid Waste



**Waste Area Population and Projected Population  
2023 Annual Operations and Monitoring Report  
Campbell River Waste Management Centre  
Campbell River, British Columbia**

<b>Year</b>	<b>Estimated Population<sup>(1)(2)</sup></b>
2022	47,761
2023	48,172
2024	48,586
2025	49,004

Notes:

<sup>(1)</sup> 2021 population sourced from Stats Canada for City of Campbell River, Village of Sayward, Village of Gold River, Strathcona electoral areas A, B, C, and D, and adjacent IRs

<sup>(2)</sup> Average Annual population growth rate of 0.86% (Stats Canada, 2021)

Table 3

**Well Completion Details and Hydraulic Monitoring  
2023 Annual Operations and Monitoring Report  
Campbell River Waste Management Centre  
Campbell River, British Columbia**

Location	Coordinates		Top of Riser Reference Elevation	Total Depth of Well	Screened Interval				Screen Length	February 27-March 8, 2023		May 10-17, 2023		August 13-16, 2023		November 13-16, 2023		Screened Unit	Screened Lithology
					(m BTOR)		(m AMSL)			Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation		
	Northing (y)	Easting (x)	(m AMSL)	(m btor)	from	to	from	to	(m)	(m btor)	(m AMSL)	(m btor)	(m AMSL)	(m btor)	(m AMSL)	(m btor)	(m AMSL)		
MW01-16	5542073.127	331106.575	186.90	43.17	38.60	41.64	148.15	145.10	3.1	33.06	153.84	35.42	151.48	32.52	154.39	33.85	153.05	Shallow overburden	Sand and gravel
MW02-18	5542104.290	331913.490	138.79	32.66	31.14	32.66	107.65	106.13	1.5	25.49	113.30	25.55	113.24	25.32	113.47	25.27	113.52	Shallow overburden	Sand
MW03-18	5542306.040	332132.200	132.10	27.21	25.68	27.21	106.42	104.89	1.5	21.52	110.58	21.81	110.29	21.37	110.73	21.34	110.76	Shallow overburden	Sand and gravel
MW04-19	5542518.573	331969.010	136.32	36.12	32.31	35.36	104.01	100.96	3.1	24.60	111.72	24.76	111.56	24.63	111.69	24.65	111.67	Shallow overburden	Silty sand
MW06-21	5542011.922	331957.118	139.63	32.92	29.87	32.92	109.76	106.71	3.1	27.14	112.50	27.34	112.29	26.85	112.78	26.88	112.76	Shallow overburden	Silty Sand
MW07-21	5542197.335	332069.071	135.33	30.48	26.52	29.57	108.81	105.76	3.1	23.94	111.39	24.31	111.02	23.83	111.50	23.79	111.54	Shallow overburden	Gravel and sand
MW08-21	5542475.019	332003.177	134.81	42.67	37.49	40.54	97.32	94.27	3.1	23.99	110.82	24.29	110.52	23.84	110.98	23.84	110.97	Deep overburden	Sand
AG99-01	5542063.675	331815.529	144.19	48.50	46.50	48.50	97.69	95.69	2.0	29.40	114.80	30.62	113.57	30.07	114.12	30.12	114.07	Deep overburden	Gravel
AG99-02	5542017.821	331937.280	139.85	51.51	49.00	51.00	90.85	88.85	2.0	27.38	112.47	27.59	112.26	27.10	112.75	27.13	112.72	Deep overburden	Gravel, some sand and cobbles
AG99-04	5542190.662	332048.523	136.44	45.42	38.00	45.00	98.44	91.44	7.0	24.16	112.29	24.54	111.90	24.04	112.40	24.01	112.43	Deep overburden	Gravel, some sand and cobbles
AG99-05	5542314.710	332133.846	132.09	50.90	44.00	50.00	88.09	82.09	6.0	21.56	110.53	21.85	110.24	21.40	110.69	24.37	107.72	Deep overburden	Sand, trace silt
AG99-06	5542635.565	332073.874	132.69	45.11	22.00	25.00	110.69	107.69	3.0	22.96	109.73	23.13	109.56	23.48	109.21	23.65	109.04	Shallow overburden	Sand, trace silt
AM02-01	5542076.112	331105.831	186.86	33.20	19.00	34.00	167.86	152.86	15.0	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	Shallow overburden	Sand
EBA04-1	-	-	-	-	-	-	-	-	-	TAP	TAP	TAP	TAP	TAP	TAP	TAP	TAP	Deep overburden	Sand and gravel
EBA04-6	5542397.539	331952.509	136.34	39.60	38.10	39.60	98.24	96.74	1.5	25.81	110.53	26.21	110.13	25.71	110.63	25.69	110.65	Deep overburden	Sand and gravel
EBA04-7	5542370.669	331954.022	136.40	32.00	30.50	32.00	105.90	104.40	1.5	25.72	110.68	26.12	110.28	25.63	110.77	25.60	110.81	Shallow overburden	Sand and gravel
EBA11-1	5542468.941	331995.662	134.77	28.96	25.60	28.70	109.17	106.07	3.1	23.59	111.18	22.84	111.93	23.55	111.22	23.72	111.05	Shallow overburden	Sand, trace/some silt
EBA11-3	5542801.160	332038.159	134.19	30.18	27.10	30.18	107.09	104.01	3.1	23.91	110.29	23.98	110.21	23.99	110.20	24.03	110.16	Shallow overburden	Sand, trace gravel
EBA11-4	5542698.635	332061.625	133.13	29.57	25.90	29.00	107.23	104.13	3.1	23.83	109.30	24.02	109.11	24.10	109.03	24.21	108.93	Shallow overburden	Sand, trace gravel, trace/some silt
HBT94-1	5542161.126	331798.592	141.98	34.00	31.00	34.00	110.98	107.98	3.0	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	Shallow overburden	Sand, trace silt and gravel
HBT94-2	5542157.473	331796.264	142.05	44.00	41.00	43.00	101.05	99.05	2.0	27.99	114.06	28.27	113.78	27.81	114.24	27.71	114.34	Deep overburden	Sand, some silt
HBT94-3	5542148.604	331791.155	142.26	27.00	25.00	27.00	117.26	115.26	2.0	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	Shallow overburden	Gravel

**Notes:**

- m metre
- m BTOR metres below top of riser
- m AMSL metres above mean sea level
- not measured/data unavailable



**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	Units	AG99-05												AG99-06				EBA04-1			
		BC CSR Schedule 3.2		WG-022623-CS-47 02/26/2023	WG-051623-CS-07 05/16/2023	WG-081523-CS-17 08/15/2023	WG-111523-CS-19 11/15/2023	WG-030723-CS-52 03/07/2023	WG-051723-CS-16 05/17/2023	WG-081323-CS-06 08/13/2023	WG-111323-CS-06 11/13/2023	WG-022723-CS-41 02/27/2023	WG-051723-CS-18 05/17/2023	WG-081623-CS-20 08/16/2023	WG-081623-CS-21 08/16/2023 Duplicate	WG-111623-CS-24 11/16/2023					
		DW a	FAW b																		
<b>Parameters</b>																					
<b>Field Parameters</b>																					
Conductivity, field	uS/cm	--	--	164	180	116	100	129	219	157	100	89	87	85	85	89					
Oxidation reduction potential (ORP), field	mV/pts	--	--	285	247	207	240	301	239	240	240	270	174	194	184	143					
pH, field	s.u.	--	--	8.01	7.89	7.43	8.22	7.56	7.66	7.90	7.93	8.41	8.46	8.46	8.46	8.57					
Temperature, field	Deg C	--	--	10.28	13.13	12.01	10.70	9.26	12.00	13.11	9.74	7.35	16.88	21.44	21.44	8.16					
Total dissolved solids, field (TDS)	mg/L	--	--	107	117	76	84	142	102	102	65	58	56	55	55	58					
Turbidity, field	NTU	--	--	0.0	0.7	1.7	3.2	222	84.9	48.5	26.1	19.5	0.0	0.5	0.5	0.0					
<b>General Chemistry</b>																					
Alkalinity, bicarbonate	mg/L	--	--	77.7	93.6	62.4	50.3	60.2	65.2	77.9 J	44.3	43.2	42.8	43.8 J	43.8 J	44.6					
Alkalinity, carbonate	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0) J	ND (1.0)					
Alkalinity, hydroxide	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0) J	ND (1.0)					
Alkalinity, total (as CaCO3)	mg/L	--	--	77.7	93.6	62.4	50.3	60.2	65.2	77.9 J	44.3	43.2	42.8	43.8 J	43.8 J	44.6					
Chloride (dissolved)	mg/L	250	1500	3.12	2.73	1.16	1.05	0.80	0.0	4.47 J	2.34	0.86	0.84	0.84	0.84	0.78					
Conductivity	uS/cm	--	--	160	184	123	105	146	210	167 J	94.7	89.7	86.7	85.6 J	84.9 J	93.3					
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	0.021	ND (0.020)	ND (0.020) J	0.021	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020) J	ND (0.020)					
Hardness	mg/L	--	--	75.5	88.0	60.3	45.0	70.3	100	82.4 J	45.8	40.3	38.0	38.0	42.4	41.9					
Sulfate (dissolved)	mg/L	500	[b]	2.13	1.85	2.00	2.50	2.72	1.43	2.62 J	1.71	2.32	1.90	2.00 J	2.00 J	2.37					
Total dissolved solids (TDS)	mg/L	--	--	93	88	76	71	89.7	151	106 J	60	55	56	69 J	59 J	65					
<b>Nutrients</b>																					
Ammonia-N	mg/L	--	[a]	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	0.0050	ND (0.0050)	ND (0.0050) J	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050) J	ND (0.0050)					
Nitrate (as N)	mg/L	10	400	0.0924	0.104	0.0730	0.0921	0.172	0.0996	0.269 J	0.261	0.0393	0.0490	0.0673 J	0.0666 J	0.0666					
Nitrite (as N)	mg/L	1	[c]	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010) J	ND (0.0010)					
Nitrite:Nitrate	mg/L	10	400	0.0924	0.104	0.0730	0.0921	0.172	0.0996	0.269 J	0.261	0.0393	0.0490	0.0673 J	0.0666 J	-					
<b>Dissolved Metals</b>																					
Aluminum (dissolved)	ug/L	9500	--	3.3	3.4	5.4	3.5	64.1	2.4	3.6	3.8	3	4.7	5.3	4.8	3.1					
Antimony (dissolved)	ug/L	6	90	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)					
Arsenic (dissolved)	ug/L	10	50	0.27	0.25	0.25	0.32	0.13	0.14	0.16	0.22	0.46	0.8	0.28	0.27	0.3					
Barium (dissolved)	ug/L	1000	10000	1.15	1.39	0.95	0.71	6.18	3.13	0.5	0.28	0.41	0.44	0.46	0.49	0.45					
Beryllium (dissolved)	ug/L	8	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.1)					
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)					
Boron (dissolved)	ug/L	5000	12000	ND (10)	31	26	12	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)					
Cadmium (dissolved)	ug/L	5	[b]	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.0094	0.0078	0.0063	0.0072	0.0068					
Caesium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.01)					
Calcium (dissolved)	ug/L	--	--	24800	29600	20500	15300	22000	30600	24800	13200	14200	14700	14400	14000	14000					
Chromium (dissolved)	ug/L	50	10	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	0.78	0.7	0.93	0.64	ND (0.5)	0.67	ND (0.5)	ND (0.5)	ND (0.5)					
Cobalt (dissolved) <sup>(1)</sup>	ug/L	1	40	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)					
Copper (dissolved)	ug/L	1500	[b]	0.44	0.87	0.41	ND (0.2)	7.46	0.36	0.21	0.28	1.66	1.45	1.83	2.3	2.3					
Iron (dissolved) <sup>(2)</sup>	ug/L	6500	--	ND (10)	ND (10)	ND (10)	ND (10)	50	ND (10)	ND (10)	ND (10)	24	33	12	11	24					
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.163	0.225	0.121	0.115	0.21					
Lithium (dissolved)	ug/L	8	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)					
Magnesium (dissolved)	ug/L	--	--	2820	3420	2210	1660	3700	5870	4960	2500	1790	1720	1690	1680	1680					
Manganese (dissolved) <sup>(3)</sup>	ug/L	1500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	1.96	0.18	0.23	0.17	0.36	0.4	0.24	0.22	0.57					
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)					
Molybdenum (dissolved)	ug/L	250	10000	0.089	0.06	0.128	0.131	0.102	0.08	0.093	0.099	0.296	0.168	0.197	0.161	0.135					
Nickel (dissolved)	ug/L	80	[b]	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)					
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)					
Potassium (dissolved)	ug/L	--	--	459	504	425	307	272	365	331	246	288	269	231	217	224					
Rubidium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.2)					
Selenium (dissolved)	ug/L	10	20	0.09	0.088	0.098	0.096	0.064	0.185	0.127	0.097	0.098	0.119	0.092	0.104	0.098					
Silicon (dissolved)	ug/L	--	--	4210	4750	4260	4160	4810	5180	4720	4380	4380	5180	3640	3710	4050					
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)					
Sodium (dissolved)	ug/L	200000	--	2090	2090	1780	2000	2820	3320	3260	2220	1200	1300	1110	1100	1200					
Strontium (dissolved)	ug/L	2500	--	42.2	49.5	30.7	28.8	50.7	74.9	61.3	31.4	20.8	20.1	22.2	21.1	22.8					
Sulphur (dissolved)	ug/L	--	--	960	1130	740	790	780	520	1070	850	ND (500)	600	1010	1000	610					
Tellurium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.2)					
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)					
Thorium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.1)					
Tin (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.12	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)					
Titanium (dissolved)	ug/L	--	1000	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	2	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.1)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)					
Tungsten (dissolved)	ug/L	3	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.1)					
Uranium (dissolved)	ug/L	20	85	0.062	0.098	0.048	0.033	0.122	0.146	0.217	0.068	0.015	0.018	0.012	0.011	0.015					
Vanadium (dissolved)	ug/L	20	--	2.14	2.02	2.26	2.3	3.29	3.24	3.65	4.26	3.46	4.81	2.25	2.2	2.26					
Zinc (dissolved)	ug/L	3000	--	ND (1)	ND (1)	ND (1)	ND (1)	2.1	2.2	ND (1)	ND (1)	22.2	15.4	15	14.6	20.4					
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)					

**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	BC CSR Schedule 3.2		EBA04-6										EBA04-7				EBA11-1			
	Units	FAW b	WG-030823-CS-55	WG-030823-CS-56	WG-061723-CS-21	WG-081323-CS-08	WG-111323-CS-09	WG-030823-CS-57	WG-051723-CS-20	WG-081323-CS-07	WG-111423-CS-11	WG-022823-CS-45	WG-051623-CS-12	WG-081423-CS-10	WG-111323-CS-08					
			DW a	Duplicate	03/08/2023	03/08/2023	05/17/2023	08/13/2023	11/13/2023	03/08/2023	05/17/2023	08/13/2023	11/14/2023	02/28/2023	05/16/2023	08/14/2023	11/13/2023			
<b>Field Parameters</b>																				
Conductivity, field	uS/cm	--	--	485	485	671	593	586	899	803	790	927	1010	985	931	702				
Oxidation reduction potential (ORP), field	millivolts	--	--	295	295	238	236	237	303	244	242	262	264	236	248	248				
pH, field	s.u.	--	--	7.23	7.23	7.23	7.32	7.27	6.84	7.00	7.10	6.85	7.11	7.22	7.32	7.44				
Temperature, field	Deg C	--	--	10.86	10.86	14.89	14.34	10.86	10.70	13.80	13.81	10.57	8.81	11.42	10.46	9.06				
Total dissolved solids, field (TDS)	mg/L	--	--	315	315	429	378	375	576	513	502	593	630	596	489	489				
Turbidity, field	NTU	--	--	0.0	0.0	0.0	1.0	2.4	0.0	0.0	1.4	1.4	14.0	9.8	1.3	2.9				
<b>General Chemistry</b>																				
Alkalinity, bicarbonate	mg/L	--	--	252	253	323	317 J	315	323	283	313 J	442	208	162	162 J	107				
Alkalinity, carbonate	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)				
Alkalinity, hydroxide	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)				
Alkalinity, total (as CaCO3)	mg/L	--	--	252	254	323	317 J	315	323	283	313 J	442	208	162	162 J	107				
Chloride (dissolved)	mg/L	250	1500	2,38	2,56	10,8	10,2 J	3,79	63,1	54,7	61,9 J	43,1	133	131 J	86,4	86,4				
Conductivity	uS/cm	--	--	466	469	623	640 J	566	841	780	862 J	958	991	1020	964 J	722				
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)	ND (0.100)	ND (0.100)	ND (0.100) J	ND (0.100)	ND (0.100)	ND (0.100)	ND (0.100) J	ND (0.100)				
Hardness	mg/L	--	--	252	257	343	316 J	327	424	346	371 J	463	380	339	361 J	240				
Sulfate (dissolved)	mg/L	500	[b]	2.04	2.02	14.2	13.6 J	3.82	11.7	11.2	10.1 J	8.76	47.2	30.0	35.4 J	35.4				
Total dissolved solids (TDS)	mg/L	--	--	269 J	269 J	416	391 J	352	535 J	525	568 J	618	634	748	696 J	498				
<b>Nutrients</b>																				
Ammonia-N	mg/L	--	[a]	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)	ND (0.0122)	0.0109	0.0110 J	0.0116	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)				
Nitrate (as N)	mg/L	10	400	1.70	1.69	3.37	4.88 J	2.14	9.69	15.4*	12.4 J*	5.30 J	14.2*	27.2*	23.9 J*	16.8*				
Nitrite (as N)	mg/L	1	[c]	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050) J	0.217	0.135	0.0672 J	0.0434				
Nitrite/Nitrate	mg/L	10	400	1.70	1.69	3.37	4.88 J	2.14	9.68	15.8*	12.4 J*	5.30 J	14.4*	27.3*	27.0 J*	16.8*				
<b>Dissolved Metals</b>																				
Aluminum (dissolved)	ug/L	9500	--	1.4	1.1	1.1	ND (1)	1.2	1	ND (1)	1.6	ND (1)	1.5	1.4	1.1	7.6				
Antimony (dissolved)	ug/L	5	90	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)				
Arsenic (dissolved)	ug/L	10	50	ND (0.1)	ND (0.1)	0.11	0.13	0.13	0.12	0.1	0.12	0.13	0.14	0.14	0.13	0.15				
Barium (dissolved)	ug/L	1000	10000	5.85	5.98	8.65	7.85	7.45	15.7	14.1	14.4	16.2	13.8	13.6	14.6	9.36				
Beryllium (dissolved)	ug/L	8	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)				
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)				
Boron (dissolved)	ug/L	5000	12000	34	35	69	127	73	174	119	152	275	148	145	148	107				
Cadmium (dissolved)	ug/L	5	[b]	0.0083	0.0054	0.0108	0.0102	0.0064	0.0561	0.0387	0.0429	0.0729	0.0405	0.0316	0.0363	0.0193				
Caesium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Calcium (dissolved)	ug/L	--	--	76000	77600	103000	95200	127000	10000	110000	139000	110000	101000	109000	71700	71700				
Chromium (dissolved)	ug/L	50	10	1.24	1.26	ND (0.5)	ND (0.5)	1.27	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)				
Cobalt (dissolved) [1]	ug/L	1	40	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.36	0.24	0.26	0.56	0.74	0.58	0.61	0.44	0.44				
Copper (dissolved)	ug/L	1500	[b]	ND (0.2)	ND (0.2)	0.9	0.84	0.32	2.08	1.33	1.48	4.21	5.09	3.77	3.29	3.29				
Iron (dissolved) [2]	ug/L	6500	--	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)				
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)				
Lithium (dissolved)	ug/L	8	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1.1	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)				
Magnesium (dissolved)	ug/L	--	--	15200	15200	20900	18900	19000	25900	23000	22800	28200	21000	24900	14900	14900				
Manganese (dissolved) [3]	ug/L	1500	--	ND (0.1)	ND (0.1)	0.27	ND (0.1)	0.27	369	309	403	502	565	193	279	150				
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)				
Molybdenum (dissolved)	ug/L	250	10000	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.099	0.11	0.111	0.111	0.096	0.067	0.07	0.088				
Nickel (dissolved)	ug/L	80	[b]	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.1	0.75	0.84	2.1	1.34	1.05	1.06	0.66				
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)				
Potassium (dissolved)	ug/L	--	--	1260	1240	1510	1440	1460	2260	2200	2150	2440	1720	1740	1320	1320				
Rubidium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Selenium (dissolved)	ug/L	10	20	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.156	0.074	0.072	0.066				
Silica (dissolved)	ug/L	--	--	11400	11300	12300	12300	12300	12600	12600	14700	9540	9540	9530	9330	9330				
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)				
Sodium (dissolved)	ug/L	200000	--	6260	6230	7370	8030	8280	24800	22800	27900	30600	42100	56200	59600	47100				
Strontium (dissolved)	ug/L	2500	--	161	172	227	216	203	323	278	286	296	297	292	302	189				
Sulphur (dissolved)	ug/L	--	--	750	830	4910	5230	1470	4320	4330	4980	4180	17600	13000	13000	12800				
Tellurium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)				
Thorium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Tin (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)				
Titanium (dissolved)	ug/L	--	1000	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)				
Tungsten (dissolved)	ug/L	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Uranium (dissolved)	ug/L	20	85	0.188	0.196	0.33	0.302	0.242	0.747	0.743	0.624	0.663	0.881	0.595	0.508	0.381				
Vanadium (dissolved)	ug/L	20	--	1.65	1.63	1.7	1.62	1.76	1.61	1.67	1.58	1.79	3.32	2.87	3.08	3.26				
Zinc (dissolved)	ug/L	3000	[b]	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)				
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)				

**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	Units	EBA11-3										EBA11-4			
		BC CSR Schedule 3.2		WG-030723-CS-53 03/07/2023	WG-051723-CS-13 05/17/2023	WG-081323-CS-03 08/13/2023	WG-081323-CS-04 08/13/2023 Duplicate	WG-111323-CS-03 11/13/2023	WG-030723-CS-54 03/07/2023	WG-051723-CS-14 05/17/2023	WG-051723-CS-15 05/17/2023	WG-081323-CS-05 08/13/2023	WG-111323-CS-04 11/13/2023	WG-111323-CS-05 11/13/2023 Duplicate	
		DW a	FAW b												
<b>Parameters</b>															
<b>Field Parameters</b>															
Conductivity, field	uS/cm	--	--	126	126	106	106	108	121	119	119	123	139	139	
Oxidation reduction potential (ORP), field	mV	--	--	295	290	232	242	286	286	220	220	236	243	243	
pH, field	--	--	--	7.75	7.73	7.90	7.90	7.88	7.98	7.97	7.97	8.00	8.05	8.05	
Temperature, field	Deg C	--	--	10.01	11.41	12.07	12.07	10.16	9.51	11.48	11.48	11.93	10.04	10.04	
Total dissolved solids, field (TDS)	mg/L	--	--	62	62	69	69	70	79	77	77	80	80	80	
Turbidity, field	NTU	--	--	9.1	0.0	2.6	2.6	3.7	121	61.0	61.0	30.0	25.8	25.8	
<b>General Chemistry</b>															
Alkalinity, bicarbonate	mg/L	--	--	55.8	55.3	53.9 J	54.0 J	54.4	50.9	53.2	52.0	57.4 J	61.3	61.4	
Alkalinity, carbonate	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Alkalinity, hydroxide	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	
Alkalinity, total (as CaCO3)	mg/L	--	--	55.8	55.3	53.9 J	54.0 J	54.4	50.9	53.2	52.0	57.4 J	61.3	61.4	
Chloride (dissolved)	mg/L	250	1500	4.22	3.74	1.94 J	1.94 J	1.41	5.59	4.56	4.56	3.01 J	2.84	2.84	
Conductivity	uS/cm	--	--	124	118	114 J	114 J	110	121	118	120	131 J	140	140	
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020) J	ND (0.020)	0.021	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)	ND (0.020)	
Hardness	mg/L	--	--	59.5	55.7	50.6 J	48.8 J	51.2	53.6	51.0	49.4	54.8 J	63.4	63.4	
Sulfate (dissolved)	mg/L	500	[b]	2.51	2.40	2.29 J	2.29 J	2.49	2.22	1.75	1.75	4.34 J	6.14	6.14	
Total dissolved solids (TDS)	mg/L	--	--	87 J	81	60 J	85 J	68	72 J	77	84	90 J	93	93	
<b>Nutrients</b>															
Ammonia-N	mg/L	--	[a]	0.0055	ND (0.0050)	ND (0.0050) J	ND (0.0050) J	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)	ND (0.0050)	
Nitrate (as N)	mg/L	10	400	0.230	0.280	0.106 J	0.106 J	0.0480	0.277	0.245	0.246	0.534 J	0.471	0.468	
Nitrite (as N)	mg/L	1	[c]	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010) J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0010)	
Nitrite/Nitrate	mg/L	10	400	0.230	0.280	0.106 J	0.106 J	0.0480	0.277	0.245	0.246	0.534 J	0.471	0.468	
<b>Dissolved Metals</b>															
Aluminum (dissolved)	ug/L	9500	--	1.9	1.7	1.4	1.4	3.9	3.8	3.3	2.4	8.9	5.5	3.1	
Antimony (dissolved)	ug/L	6	90	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Arsenic (dissolved)	ug/L	10	50	0.2	0.2	0.21	0.21	0.2	ND (0.1)	2	2.14	1.68	1.57	1.54	
Barium (dissolved)	ug/L	1000	10000	0.63	0.48	0.42	0.43	0.41	1.37	1.48	1.48	1.78	1.87	1.87	
Beryllium (dissolved)	ug/L	8	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	
Boron (dissolved)	ug/L	5000	12000	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	
Cadmium (dissolved)	ug/L	5	[b]	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Caesium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	
Calcium (dissolved)	ug/L	--	--	19400	18000	18000	15800	15900	15900	15400	16600	17000	17000	17000	
Chromium (dissolved)	ug/L	50	10	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.84	1.97	2.08	0.75	0.73	0.76	
Cobalt (dissolved) <sup>21</sup>	ug/L	1	40	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Copper (dissolved)	ug/L	1500	[b]	0.88	ND (0.2)	ND (0.2)	ND (0.2)	0.24	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	0.26	0.29	
Iron (dissolved) <sup>20</sup>	ug/L	6500	--	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	
Lithium (dissolved)	ug/L	8	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	
Magnesium (dissolved)	ug/L	--	--	2690	2620	2460	2520	2360	2710	2750	2650	3450	3450	3450	
Manganese (dissolved) <sup>23</sup>	ug/L	1500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.1	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	
Molybdenum (dissolved)	ug/L	250	10000	0.128	0.147	0.146	0.158	0.132	0.094	0.109	0.118	0.072	0.061	0.065	
Nickel (dissolved)	ug/L	80	[b]	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	50	53	ND (50)	ND (50)	ND (50)	
Potassium (dissolved)	ug/L	--	--	281	312	264	292	300	821	815	788	1010	1200	1200	
Rubidium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	
Selenium (dissolved)	ug/L	10	20	0.15	0.154	0.236	0.18	0.102	0.255	0.28	0.331	0.142	0.151	0.129	
Silicon (dissolved)	ug/L	--	--	4340	4710	4640	4630	4630	5710	6240	6220	5660	5140	5170	
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Sodium (dissolved)	ug/L	200000	--	2390	2180	2240	2220	2500	2970	2750	2670	3210	3150	3200	
Strontium (dissolved)	ug/L	2500	--	33.2	32.2	29.7	29.7	26.7	31.9	30.1	29.3	34.1	32.4	32.8	
Sulphur (dissolved)	ug/L	--	--	690	880	660	650	1000	ND (500)	750	660	1390	2200	2660	
Tellurium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	
Thorium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tin (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	
Titanium (dissolved)	ug/L	--	1000	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	
Tungsten (dissolved)	ug/L	3	--	--	--	--	--	--	--	--	--	--	--	--	
Uranium (dissolved)	ug/L	20	85	0.041	0.037	0.035	0.036	0.032	0.282	0.263	0.262	0.328	0.383	0.397	
Vanadium (dissolved)	ug/L	20	--	3.78	3.81	3.78	3.75	4.11	16.4	17.7	17.3	14.7	14.4	14.4	
Zinc (dissolved)	ug/L	3000	[b]	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	

**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	BC CSR Schedule 3.2 DW a	FAW b	HBFS-2				MW01-16				MW02-18					
			WG-030223-CS-39 03/02/2023	WG-051723-CS-22 05/17/2023	WG-081623-CS-23 08/16/2023	WG-111623-CS-23 11/16/2023	WG-022723-CS-39 02/27/2023	WG-051023-CS-01 05/10/2023	WG-081323-CS-01 08/13/2023	WG-111323-CS-01 11/13/2023	WG-022723-CS-43 02/27/2023	WG-022723-CS-44 02/27/2023 Duplicate	WG-051023-CS-06 05/10/2023	WG-081423-CS-13 08/14/2023	WG-111523-CS-16 11/15/2023	
			Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	Units	
<b>Field Parameters</b>																
Conductivity, field	uS/cm	--	641	642	452	468	75	78	67	90	522	522	698	766	547	
Oxidation reduction potential (ORP), field	mV	--	5	-23	1	32	309	255	240	125	125	125	89	96	93	
pH, field	s.u.	--	7.20	7.23	7.35	7.38	7.29	7.48	7.40	7.33	6.95	6.95	6.97	6.87	6.97	
Temperature, field	Deg C	--	11.86	14.80	17.69	11.25	15.15	19.45	12.28	11.38	10.99	10.99	12.85	14.07	11.27	
Total dissolved solids, field (TDS)	mg/L	--	410	410	294	304	49	43	58	334	334	447	450	350		
Turbidity, field	NTU	--	5.1	0.0	1.8	0.0	10.9	0.0	2.9	3.1	0.0	0.0	0.7	0.5		
<b>General Chemistry</b>																
Alkalinity, bicarbonate	mg/L	--	254	238	205 J	188	34.4	37.3	35.8 J	44.9	204	203	291	354 J	237	
Alkalinity, carbonate	mg/L	--	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Alkalinity, hydroxide	mg/L	--	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	
Alkalinity, total (as CaCO3)	mg/L	--	254	238	205 J	188	34.4	37.3	35.8 J	44.9	204	203	291	354 J	237	
Chloride (dissolved)	mg/L	250	47.5	49.2	35.1 J	37.7	0.81	1.03	0.88 J	0.78	33.6	33.3	47.4	55.5 J	34.2	
Conductivity	uS/cm	--	612	593	464 J	473	74.3	79.9	75.9 J	91.8	498	496	691	800 J	576	
Fluoride	mg/L	1.5	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.100)	ND (0.020) J	ND (0.020)	
Hardness	mg/L	--	250	223	179 J	155	31.8	36.1	34.0 J	43.6	141	139	200	292 J	192	
Sulfate (dissolved)	mg/L	500	2.87	3.16	1.84 J	2.39	2.35	2.53	2.12 J	2.68	2.59	2.64	2.11	3.54 J	2.78	
Total dissolved solids (TDS)	mg/L	--	357 J	355	273 J	308	50	63	57 J	58	248	248	354	421 J	291	
<b>Nutrients</b>																
Ammonia-N	mg/L	--	7.02	8.86	5.76 J	4.52	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)	12.6	12.2	14.8	19.9 J	13.7	
Nitrite (as N)	mg/L	10	0.0404	0.0241	ND (0.0050) J	0.0053	0.0614	0.0770	0.0686 J	0.126	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)	
Nitrite (as N)	mg/L	1	ND (0.0010)	0.0018	0.0035 J	0.0015	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0023 J	ND (0.0010)		
Nitrite/Nitrate	mg/L	10	0.0404	0.0259	ND (0.0051) J	-	0.0614	0.0770	0.0686 J	0.126	ND (0.0051)	ND (0.0051)	ND (0.0051)	ND (0.0051) J	ND (0.0051)	
<b>Dissolved Metals</b>																
Aluminum (dissolved)	ug/L	9500	--	4.1	3.2	3.8	20.9	4.6	2.3	8.5	2.8	ND (1)	ND (1)	1.1	ND (1)	1.1
Antimony (dissolved)	ug/L	5	98	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Arsenic (dissolved)	ug/L	10	50	1.66	1.67	1.48	1.35	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.5	0.18	0.21	0.21	0.21
Barium (dissolved)	ug/L	1000	10000	17.4	12.7	18.6	11.8	1.44	1.29	1.11	1.33	21.8	21.2	46.1	26.2	
Beryllium (dissolved)	ug/L	5	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Boron (dissolved)	ug/L	5000	12000	150	161	187	124	10	10	ND (10)	ND (10)	ND (10)	207	222	206	
Cadmium (dissolved)	ug/L	5	[b]	0.048	0.0603	0.0405	0.0395	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.0676	0.0613	0.0869	0.0739	
Caesium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Calcium (dissolved)	ug/L	--	--	84800	74900	60700	52400	10400	11900	11000	14300	42000	41800	65900	88000	48800
Chromium (dissolved)	ug/L	50	10	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Cobalt (dissolved) <sup>(1)</sup>	ug/L	1	40	0.18	0.2	0.17	0.16	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.86	0.86	1.4	1.4	1.02
Copper (dissolved)	ug/L	1500	[b]	0.26	0.22	0.41	0.41	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	8.41	8.25	8.25	5.56	
Iron (dissolved) <sup>(2)</sup>	ug/L	6500	--	371	389	278	202	ND (10)	ND (10)	18	ND (10)	22	22	35	26	28
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Lithium (dissolved)	ug/L	5	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Magnesium (dissolved)	ug/L	--	--	9300	8690	6630	5840	1420	1560	1600	1930	8870	8490	17500	9890	
Manganese (dissolved) <sup>(3)</sup>	ug/L	1500	--	1420	1160	922	1160	ND (0.1)	1.13	0.14	1440	1430	1430	2120*	2950*	1590*
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Molybdenum (dissolved)	ug/L	250	10000	0.132	0.14	0.125	0.151	0.21	0.164	0.122	0.137	0.768	0.754	0.636	0.632	0.702
Nickel (dissolved)	ug/L	80	[b]	1.38	1.72	0.87	0.84	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.75	1.69	1.75	1.99	2.01
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Potassium (dissolved)	ug/L	--	--	5290	5040	4430	4500	190	176	136	172	8540	8400	10000	12400	9250
Rubidium (dissolved)	ug/L	--	--	--	--	0.35	--	--	--	--	--	--	--	--	--	--
Selenium (dissolved)	ug/L	10	20	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	0.089	0.109	0.091	0.113	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Silicon (dissolved)	ug/L	--	--	7910	8650	8720	8110	4340	4280	3610	3870	13200	13100	14200	14800	13200
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Sodium (dissolved)	ug/L	200000	--	25200	27300	23400	22600	1140	1110	1040	1190	22000	21900	27500	30300	22300
Strontium (dissolved)	ug/L	2500	--	265	244	182	164	16.5	17.6	17.3	20	198	190	304	411	234
Sulphur (dissolved)	ug/L	--	--	1120	1170	1280	830	560	700	630	1000	720	740	800	1260	1140
Tellurium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Thorium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Titanium (dissolved)	ug/L	--	1000	ND (0.3)	ND (0.3)	ND (0.3)	2.11	ND (0.3)	ND (0.3)	0.49	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)
Tungsten (dissolved)	ug/L	3	--	--	--	--	ND (0.1)	--	--	--	--	--	--	--	--	--
Uranium (dissolved)	ug/L	20	85	0.11	0.111	0.069	0.08	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.22	0.221	0.365	0.479	0.288
Vanadium (dissolved)	ug/L	20	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1.91	1.59	1.09	1.35	1.64	1.58	1.64	1.72	1.62
Zinc (dissolved)	ug/L	3000	[b]	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	2.7	ND (1)	ND (1)	ND (1)
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)

**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	BC CSR Schedule 3.2		MW03-18					MW04-19				MW06-21				
	Units	DW a	WG-022823-CS-48	WG-091623-CS-08	WG-091523-CS-18	WG-111523-CS-20	WG-111523-CS-21	WG-030823-CS-58	WG-051723-CS-19	WG-081623-CS-22	WG-111423-CS-12	WG-030723-CS-49	WG-051023-CS-03	WG-081423-CS-11	WG-111423-CS-13	
			9/28/2023	05/16/2023	08/15/2023	11/15/2023	11/15/2023	03/08/2023	05/17/2023	08/16/2023	11/14/2023	03/07/2023	05/10/2023	08/14/2023	11/14/2023	
<b>Parameters</b>																
<b>Field Parameters</b>																
Conductivity, field	uS/cm	--	--	156	134	126	221	221	209	169	132	114	185	179	174	181
Oxidation reduction potential (ORP), field	mV/dms	--	--	285	210	214	241	241	226	210	185	202	260	234	238	222
pH, field	--	--	--	8.10	8.14	8.38	8.22	8.22	8.19	8.35	8.59	7.51	7.69	7.87	7.92	7.87
Temperature, field	Deq C	--	--	10.65	12.99	13.21	11.19	11.19	7.99	13.07	16.75	8.93	10.36	13.11	12.43	10.38
Total dissolved solids, field (TDS)	mg/L	--	--	102	87	82	144	144	136	110	86	74	120	116	113	118
Turbidity, field	NTU	--	--	0.0	0.0	0.4	0.3	0.3	1000	1000	345	354	385	166	10.7	51.8
<b>General Chemistry</b>																
Alkalinity, bicarbonate	mg/L	--	--	78.6	67.7	66.2	116	117	105	75.9	63.4 J	62.2	90.8	90.1	91.9 J	91.9
Alkalinity, carbonate	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Alkalinity, hydroxide	mg/L	--	--	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Alkalinity, total (as CaCO3)	mg/L	--	--	78.6	67.7	66.2	116	117	105	75.9	63.4 J	62.2	90.8	90.1	91.9 J	91.9
Chloride (dissolved)	mg/L	250	1500	1.26	1.26	1.29	2.74	2.74	5.99	5.39	4.33 J	4.13	2.56	2.72	2.58 J	2.60
Conductivity	uS/cm	--	--	156	135	129	230	231	198	161	134 J	138	185	186	181 J	188
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)	0.022	0.025	0.026 J	0.023
Hardness	mg/L	--	--	72.8	60.8	60.8	108	105	90.8	73.5	65.2 J	71.0	93.9	89.7	94.4 J	90.5
Sulfate (dissolved)	mg/L	500	[b]	2.12	1.96	1.99	2.83	2.84	5.10	4.54	3.27 J	3.60	1.79	2.09	2.10 J	1.77
Total dissolved solids (TDS)	mg/L	--	--	91	76	80	144	137	122 J	108	102 J	114	120 J	123	118 J	122
<b>Nutrients</b>																
Ammonia-N	mg/L	--	[a]	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0222)	0.0165	ND (0.0050) J	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)
Nitrate (as N)	mg/L	10	400	0.141	0.141	0.221	0.221	0.220	0.219	0.239	0.231 J	0.218 J	0.586	0.650	0.610 J	0.629 J
Nitrite (as N)	mg/L	1	[c]	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010)	0.0012	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010) J
Nitrate/Nitrite	mg/L	10	400	0.161	0.141	0.114	0.221	0.220	0.220	0.239	0.221 J	0.218 J	0.586	0.650	0.610 J	0.629 J
<b>Dissolved Metals</b>																
Aluminum (dissolved)	ug/L	9500	--	4.7	5.4	5	4	4.2	4.8	6.4	17.7	3220	6.2	3.5	147	3.4
Antimony (dissolved)	ug/L	5	90	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Arsenic (dissolved)	ug/L	10	50	0.52	0.6	0.63	0.55	0.52	0.17	0.22	0.31	0.58	0.3	0.27	0.29	0.26
Barium (dissolved)	ug/L	1000	10000	1.82	1.59	1.86	2.73	2.74	4.54	4.38	3.07	23.4	7.56	7.45	8.48	7.37
Beryllium (dissolved)	ug/L	8	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	0.038	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Boron (dissolved)	ug/L	5000	12000	35	24	16	16	15	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)
Cadmium (dissolved)	ug/L	5	[b]	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.0383	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Caesium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium (dissolved)	ug/L	--	--	25600	21400	21600	38200	37000	23700	19300	17800	18300	27000	27000	26000	26000
Chromium (dissolved)	ug/L	50	10	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	7.8	7.48	6.75	8.81	2.53	2.59	2.73	2.55
Cobalt (dissolved) <sup>(1)</sup>	ug/L	1	40	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	2.3*	ND (0.1)	ND (0.1)	0.16	ND (0.1)
Copper (dissolved)	ug/L	1500	[b]	0.28	ND (0.2)	ND (0.2)	0.47	0.47	ND (0.2)	ND (0.2)	ND (0.2)	18.1	ND (0.2)	ND (0.2)	0.93	ND (0.2)
Iron (dissolved) <sup>(2)</sup>	ug/L	6500	--	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	3870	ND (10)	ND (10)	201	ND (10)
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	1.325	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Lithium (dissolved)	ug/L	8	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	1.2	ND (1)	ND (1)	ND (1)	ND (1)
Magnesium (dissolved)	ug/L	--	--	2160	1800	1670	3180	3180	7680	6140	5130	6150	6430	6080	6420	6210
Manganese (dissolved) <sup>(3)</sup>	ug/L	1500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.15	75.1	0.1	ND (0.1)	7.54	ND (0.1)
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	1.2	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Molybdenum (dissolved)	ug/L	250	10000	0.106	0.152	0.154	0.102	0.102	0.092	0.105	0.125	0.104	0.152	0.164	0.153	0.165
Nickel (dissolved)	ug/L	80	[b]	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	240	ND (50)	ND (50)	ND (50)	ND (50)
Potassium (dissolved)	ug/L	--	--	506	516	526	706	701	772	755	661	1020	491	497	510	500
Rubidium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium (dissolved)	ug/L	10	20	0.127	0.142	0.125	0.13	0.127	0.255	0.252	0.288	0.282	0.117	0.125	0.101	0.092
Silicon (dissolved)	ug/L	--	--	4260	4610	4300	4410	4540	7310	7630	7860	13300	6120	6610	6740	6500
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.016	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Sodium (dissolved)	ug/L	200000	--	2310	2730	2880	3550	3550	4870	4070	3940	3960	2530	2330	2500	2420
Strontium (dissolved)	ug/L	2500	--	41.7	36.2	33.4	63.5	63	68.5	64.9	60.4	67	45.1	42.5	46.8	41.5
Sulphur (dissolved)	ug/L	--	--	1030	1060	640	1010	1130	1460	1340	1580	1060	560	560	ND (500)	ND (500)
Tellurium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.011	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Thorium (dissolved)	ug/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Tungsten (dissolved)	ug/L	--	--	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	ND (0.3)	0.34	192	11	11	ND (0.3)
Uranium (dissolved)	ug/L	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium (dissolved)	ug/L	20	85	0.056	0.044	0.041	0.093	0.092	0.309	0.221	0.144	0.198	0.261	0.227	0.265	0.229
Zinc (dissolved)	ug/L	3000	[b]	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	8.4	ND (1)	ND (1)	ND (1)	ND (1)
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	0.48	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)



**Table 4**  
**Groundwater Analytical Results - General Chemistry, Nutrients and Metals**  
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**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	BC CSR Schedule 3.2		MW07-21				MW08-21			
	DW a	FAW b	WG-030723-CS-51 03/07/2023	WG-051623-CS-10 05/16/2023	WG-081423-CS-16 08/14/2023	WG-111523-CS-17 11/15/2023	WG-022823-CS-46 02/28/2023	WG-051623-CS-11 05/16/2023	WG-081423-CS-09 08/14/2023	WG-111523-CS-07 11/15/2023
<b>Parameters</b>	Units									
<b>Field Parameters</b>										
Conductivity, field	µS/cm	--	136	136	157	165	492	476	406	472
Oxidation reduction potential (ORP), field	millivolt	--	255	219	194	169	256	256	251	252
pH, field	--	--	8.19	8.15	8.29	8.21	7.42	7.46	7.45	7.52
Temperature, field	Dea C	--	11.32	14.05	14.10	10.53	9.00	13.80	11.59	9.89
Total dissolved solids, field (TDS)	mg/L	--	91	88	102	107	320	309	264	307
Turbidity, field	NTU	--	8.4	4.9	4.9	8.7	267	157	58.8	61.0
<b>General Chemistry</b>										
Alkalinity, bicarbonate	mg/L	--	67.3	68.6	86.0 J	86.0	229	226	192 J	216
Alkalinity, carbonate	mg/L	--	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)
Alkalinity, hydroxide	mg/L	--	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)
Alkalinity, total (as CaCO3)	mg/L	--	67.3	68.6	86.0 J	86.0	229	226	192 J	216
Chloride (dissolved)	mg/L	250	1500	1.20	1.35	1.77 J	1.76	23.4	15.1 J	18.4
Conductivity	µS/cm	--	137	138	168 J	175	482	478	393 J	458
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)	88.1 J	ND (0.020)	ND (0.020)	ND (0.020) J	ND (0.020)
Hardness	mg/L	--	68.8	65.2	81.1 J	80.8	226	223	192 J	243
Sulfate (dissolved)	mg/L	500	[b]	2.37	1.95	2.48 J	2.61	6.31	6.25	6.15 J
Total dissolved solids (TDS)	mg/L	--	78 J	79	109 J	110	295	272	279 J	282
<b>Nutrients</b>										
Ammonia-N	mg/L	--	[a]	ND (0.0050)	ND (0.0050) J	ND (0.0050)	ND (0.0050)	ND (0.0050)	ND (0.0050) J	ND (0.0050)
Nitrate (as N)	mg/L	10	400	0.140	0.135	0.159 J	0.175	0.986	0.819	1.14 J
Nitrite (as N)	mg/L	1	[c]	ND (0.0010)	ND (0.0010) J	ND (0.0010)	ND (0.0010)	ND (0.0010)	ND (0.0010) J	ND (0.0010)
Nitrite/Nitrate	mg/L	10	400	0.140	0.135	0.159 J	0.175	0.986	0.819	1.14 J
<b>Dissolved Metals</b>										
Aluminum (dissolved)	µg/L	9500	--	5.6	5.9	7.3	12	4.3	19.8	6.6
Antimony (dissolved)	µg/L	5	50	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Arsenic (dissolved)	µg/L	10	50	0.33	0.35	0.32	0.35	ND (0.1)	ND (0.1)	ND (0.1)
Barium (dissolved)	µg/L	10000	--	1.51	2	2.48	1.93	8.7	8.92	7.44
Beryllium (dissolved)	µg/L	8	1.5	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
Bismuth (dissolved)	µg/L	--	--	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Boron (dissolved)	µg/L	5000	12000	14	13	11	17	17	14	15
Cadmium (dissolved)	µg/L	5	[b]	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	0.0051
Caesium (dissolved)	µg/L	--	--	--	--	--	--	--	--	--
Calcium (dissolved)	µg/L	--	--	24700	23200	28600	28600	70100	72600	70900
Chromium (dissolved)	µg/L	50	10	ND (0.5)	ND (0.5)	0.72	ND (0.5)	1.66	2	2
Cobalt (dissolved) <sup>(1)</sup>	µg/L	1	40	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Copper (dissolved)	µg/L	1500	[b]	0.21	0.24	0.52	0.42	0.2	ND (0.2)	ND (0.2)
Iron (dissolved) <sup>(2)</sup>	µg/L	6500	--	ND (10)	ND (10)	14	16	ND (10)	28	ND (10)
Lead (dissolved)	µg/L	10	[b]	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)	ND (0.05)
Lithium (dissolved)	µg/L	8	--	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Magnesium (dissolved)	µg/L	--	--	1720	1760	2180	2290	11900	12000	12000
Manganese (dissolved) <sup>(2)</sup>	µg/L	1500	--	ND (0.1)	ND (0.1)	0.33	0.77	0.16	0.5	0.1
Mercury (dissolved)	µg/L	1	0.25	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Molybdenum (dissolved)	µg/L	250	10000	0.115	0.123	0.13	0.13	ND (0.05)	ND (0.05)	ND (0.05)
Nickel (dissolved)	µg/L	80	[b]	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Phosphorus (dissolved)	µg/L	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
Potassium (dissolved)	µg/L	--	--	382	433	466	465	1300	1300	1200
Rubidium (dissolved)	µg/L	--	--	--	--	--	--	--	--	--
Selenium (dissolved)	µg/L	10	20	0.128	0.114	0.132	0.165	0.155	0.137	0.186
Silicon (dissolved)	µg/L	--	--	4160	4720	4530	4230	8090	8740	7960
Silver (dissolved)	µg/L	20	[b]	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Sodium (dissolved)	µg/L	200000	--	1930	1780	2280	1760	8060	6170	5780
Strontium (dissolved)	µg/L	2500	--	39.5	38.4	50.7	47.8	172	180	167
Sulphur (dissolved)	µg/L	--	--	680	820	1090	910	2700	2730	2010
Tellurium (dissolved)	µg/L	--	--	--	--	--	--	--	--	--
Thallium (dissolved)	µg/L	--	3	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Thorium (dissolved)	µg/L	--	--	--	--	--	--	--	--	--
Tin (dissolved)	µg/L	2500	--	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
Titanium (dissolved)	µg/L	--	1000	ND (0.3)	ND (0.3)	ND (0.3)	0.67	ND (0.3)	0.88	ND (0.3)
Tungsten (dissolved)	µg/L	3	--	--	--	--	--	--	--	--
Uranium (dissolved)	µg/L	20	85	0.039	0.039	0.053	0.057	0.343	0.342	0.32
Vanadium (dissolved)	µg/L	20	--	2.38	2.55	2.35	2.22	1.81	1.7	1.67
Zinc (dissolved)	µg/L	3000	[b]	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)
Zirconium (dissolved)	µg/L	--	--	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)

**Table 5**  
**Groundwater Analytical Results - Volatile Organic Compounds and Petroleum Products**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	Units	BC CSR		AG99-06		EBA04-7		EBA11-1	
		Schedule 3.2		WG-030723-CS-52	WG-081323-CS-06	WG-030823-CS-57	WG-081323-CS-07	WG-022823-CS-45	WG-081423-CS-10
		DW	FAW	03/07/2023	08/13/2023	03/08/2023	08/13/2023	02/28/2023	08/14/2023
<b>Parameters</b>		<b>a</b>	<b>b</b>						
<b>Petroleum Products</b>									
VHw6-10	ug/L	15000	15000	ND (100)	ND (100) J	ND (100)	ND (100) J	ND (100)	ND (100) J
VPHw	ug/L	--	1500	ND (100)	ND (100) J	ND (100)	ND (100) J	ND (100)	ND (100) J
<b>Volatile Organic Compounds</b>									
1,1,1,2-Tetrachloroethane	ug/L	6	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1,1-Trichloroethane	ug/L	8000	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1,2,2-Tetrachloroethane	ug/L	0.8	--	ND (0.20)	ND (0.20) J	ND (0.20)	ND (0.20) J	ND (0.20)	ND (0.20) J
1,1,2-Trichloroethane	ug/L	3	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1-Dichloroethane	ug/L	30	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1-Dichloroethene	ug/L	14	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichlorobenzene	ug/L	200	7	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichloroethane	ug/L	5	1000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichloropropane	ug/L	4.5	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,3-Dichlorobenzene	ug/L	--	1500	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,4-Dichlorobenzene	ug/L	5	260	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Benzene	ug/L	5	400	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Bromodichloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Bromoform	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Carbon tetrachloride	ug/L	2	130	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chlorobenzene	ug/L	80	13	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloroethane	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloroform (Trichloromethane)	ug/L	100	20	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloromethane (Methyl chloride)	ug/L	--	--	ND (5.0)	ND (5.0) J	ND (5.0)	ND (5.0) J	ND (5.0)	ND (5.0) J
cis-1,2-Dichloroethene	ug/L	8	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
cis-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	ug/L	--	--	ND (0.75)	ND (0.75) J	ND (0.75)	ND (0.75) J	ND (0.75)	ND (0.75) J
Dibromochloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Ethylbenzene	ug/L	140	2000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
m&p-Xylenes	ug/L	--	--	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
Methyl tert butyl ether (MTBE)	ug/L	95	34000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Methylene chloride	ug/L	50	980	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0) J
o-Xylene	ug/L	--	--	ND (0.30)	ND (0.30) J	ND (0.30)	ND (0.30) J	ND (0.30)	ND (0.30) J
Styrene	ug/L	800	720	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Tetrachloroethene	ug/L	30	1100	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Toluene	ug/L	60	5	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
trans-1,2-Dichloroethene	ug/L	80	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
trans-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Trichloroethene	ug/L	5	200	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Trichlorofluoromethane (CFC-11)	ug/L	1000	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Vinyl chloride	ug/L	2	--	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
Xylenes (total)	ug/L	90	300	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J

**Table 5**  
**Groundwater Analytical Results - Volatile Organic Compounds and Petroleum Products**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	Units	BC CSR		EBA11-3			EBA11-4		HBT94-2	
		Schedule 3.2		WG-030723-CS-53	WG-081323-CS-03	WG-081323-CS-04	WG-030723-CS-54	WG-081323-CS-05	WG-030823-CS-59	WG-081623-CS-23
		DW a	FAW b	03/07/2023	08/13/2023	08/13/2023 Duplicate	03/07/2023	08/13/2023	03/08/2023	08/16/2023
<b>Parameters</b>										
<b>Petroleum Products</b>										
VHw6-10	ug/L	15000	15000	ND (100)	ND (100) J	ND (100) J	ND (100)	ND (100) J	ND (100)	ND (100) J
VPHw	ug/L	--	1500	ND (100)	ND (100) J	ND (100) J	ND (100)	ND (100) J	ND (100)	ND (100) J
<b>Volatile Organic Compounds</b>										
1,1,1,2-Tetrachloroethane	ug/L	6	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1,1-Trichloroethane	ug/L	8000	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1,2,2-Tetrachloroethane	ug/L	0.8	--	ND (0.20)	ND (0.20) J	ND (0.20) J	ND (0.20)	ND (0.20) J	ND (0.20)	ND (0.20) J
1,1,2-Trichloroethane	ug/L	3	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1-Dichloroethane	ug/L	30	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,1-Dichloroethene	ug/L	14	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichlorobenzene	ug/L	200	7	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichloroethane	ug/L	5	1000	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,2-Dichloropropane	ug/L	4.5	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,3-Dichlorobenzene	ug/L	--	1500	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
1,4-Dichlorobenzene	ug/L	5	260	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Benzene	ug/L	5	400	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Bromodichloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Bromoform	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Carbon tetrachloride	ug/L	2	130	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chlorobenzene	ug/L	80	13	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloroethane	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloroform (Trichloromethane)	ug/L	100	20	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Chloromethane (Methyl chloride)	ug/L	--	--	ND (5.0)	ND (5.0) J	ND (5.0) J	ND (5.0)	ND (5.0) J	ND (5.0)	ND (5.0) J
cis-1,2-Dichloroethene	ug/L	8	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
cis-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	ug/L	--	--	ND (0.75)	ND (0.75) J	ND (0.75) J	ND (0.75)	ND (0.75) J	ND (0.75)	ND (0.75) J
Dibromochloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Ethylbenzene	ug/L	140	2000	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
m&p-Xylenes	ug/L	--	--	ND (0.40)	ND (0.40) J	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
Methyl tert butyl ether (MTBE)	ug/L	95	34000	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Methylene chloride	ug/L	50	980	ND (1.0)	ND (50.0) J	ND (50.0) J	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0) J
o-Xylene	ug/L	--	--	ND (0.30)	ND (0.30) J	ND (0.30) J	ND (0.30)	ND (0.30) J	ND (0.30)	ND (0.30) J
Styrene	ug/L	800	720	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Tetrachloroethene	ug/L	30	1100	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Toluene	ug/L	60	5	ND (0.40)	ND (0.40) J	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
trans-1,2-Dichloroethene	ug/L	80	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
trans-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Trichloroethene	ug/L	5	200	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Trichlorofluoromethane (CFC-11)	ug/L	1000	--	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J
Vinyl chloride	ug/L	2	--	ND (0.40)	ND (0.40) J	ND (0.40) J	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40) J
Xylenes (total)	ug/L	90	300	ND (0.50)	ND (0.50) J	ND (0.50) J	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50) J

**Table 5**  
**Groundwater Analytical Results - Volatile Organic Compounds and Petroleum Products**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

Sample Location: Sample ID: Sample Date:	Units	BC CSR		MW01-16		MW02-18			MW08-21
		Schedule 3.2		WG-022723-CS-39	WG-081323-CS-01	WG-022723-CS-43	WG-022723-CS-44	WG-081423-CS-13	WG-022823-CS-46
		DW a	FAW b	02/27/2023	08/13/2023	02/27/2023	02/27/2023 Duplicate	08/14/2023	02/28/2023
<b>Petroleum Products</b>									
VHw6-10	ug/L	15000	15000	ND (100)	ND (100) J	ND (100)	ND (100)	ND (100) J	ND (100)
VPHw	ug/L	--	1500	ND (100)	ND (100) J	ND (100)	ND (100)	ND (100) J	ND (100)
<b>Volatile Organic Compounds</b>									
1,1,1,2-Tetrachloroethane	ug/L	6	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,1,1-Trichloroethane	ug/L	8000	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,1,2,2-Tetrachloroethane	ug/L	0.8	--	ND (0.20)	ND (0.20) J	ND (0.20)	ND (0.20)	ND (0.20) J	ND (0.20)
1,1,2-Trichloroethane	ug/L	3	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,1-Dichloroethane	ug/L	30	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,1-Dichloroethene	ug/L	14	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,2-Dichlorobenzene	ug/L	200	7	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,2-Dichloroethane	ug/L	5	1000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,2-Dichloropropane	ug/L	4.5	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,3-Dichlorobenzene	ug/L	--	1500	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
1,4-Dichlorobenzene	ug/L	5	260	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Benzene	ug/L	5	400	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Bromodichloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Bromoform	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Carbon tetrachloride	ug/L	2	130	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Chlorobenzene	ug/L	80	13	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Chloroethane	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Chloroform (Trichloromethane)	ug/L	100	20	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Chloromethane (Methyl chloride)	ug/L	--	--	ND (5.0)	ND (5.0) J	ND (5.0)	ND (5.0)	ND (5.0) J	ND (5.0)
cis-1,2-Dichloroethene	ug/L	8	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
cis-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	ug/L	--	--	ND (0.75)	ND (0.75) J	ND (0.75)	ND (0.75)	ND (0.75) J	ND (0.75)
Dibromochloromethane	ug/L	100	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Ethylbenzene	ug/L	140	2000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
m&p-Xylenes	ug/L	--	--	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40)	ND (0.40) J	ND (0.40)
Methyl tert butyl ether (MTBE)	ug/L	95	34000	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	0.94 J	ND (0.50)
Methylene chloride	ug/L	50	980	ND (1.0)	ND (1.0) J	ND (1.0)	ND (1.0)	ND (1.0) J	ND (1.0)
o-Xylene	ug/L	--	--	ND (0.30)	ND (0.30) J	ND (0.30)	ND (0.30)	ND (0.30) J	ND (0.30)
Styrene	ug/L	800	720	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Tetrachloroethene	ug/L	30	1100	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Toluene	ug/L	60	5	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40)	ND (0.40) J	ND (0.40)
trans-1,2-Dichloroethene	ug/L	80	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
trans-1,3-Dichloropropene	ug/L	--	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Trichloroethene	ug/L	5	200	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Trichlorofluoromethane (CFC-11)	ug/L	1000	--	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)
Vinyl chloride	ug/L	2	--	ND (0.40)	ND (0.40) J	ND (0.40)	ND (0.40)	ND (0.40) J	ND (0.40)
Xylenes (total)	ug/L	90	300	ND (0.50)	ND (0.50) J	ND (0.50)	ND (0.50)	ND (0.50) J	ND (0.50)

Table 6a
Surface Water Analytical Results
2023 Annual Operations and Monitoring Report
Campbell River Waste Management Centre
Campbell River, British Columbia

Table with columns for Sample Location, Sample ID, Sample Date, Units, BC WQG, FAW, and various analytical parameters (Field Parameters, General Chemistry, Nutrients, Dissolved Metals, Total Metals) across multiple dates and locations.

**Table 6b  
Surface Water Analytical Results  
2023 Annual Operations and Monitoring Report  
Campbell River Waste Management Centre  
Campbell River, British Columbia**

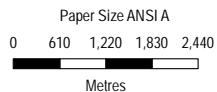
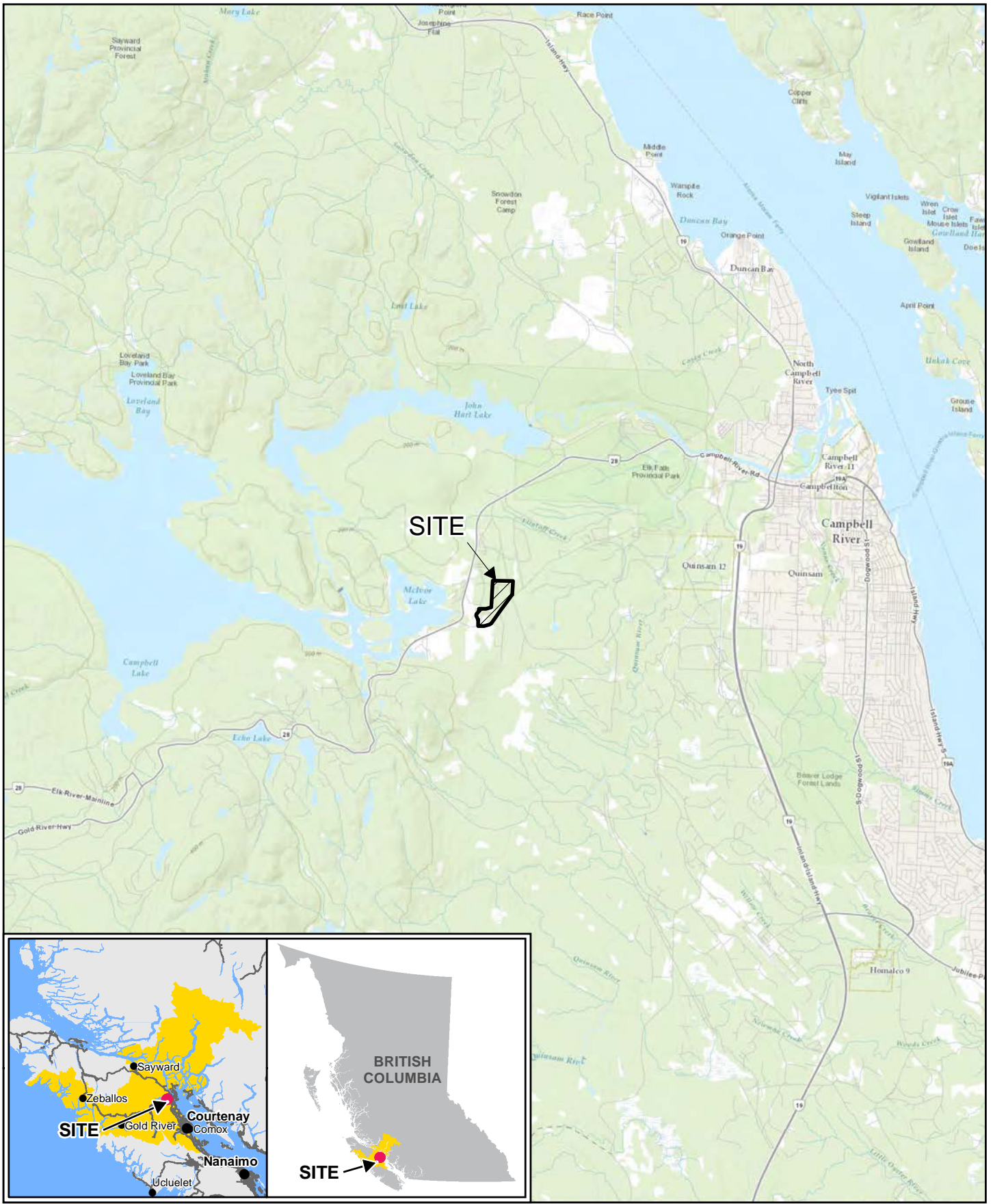
Sample Location: Sample ID: Sample Date:	Units	BC CSR Schedule 3.2		SWM Pond	
		DW a	FAW b	WS-030823-CS-11	WS-111523-CS-04
				03/03/2023	11/15/2023
<b>Parameters</b>					
<b>Field Parameters</b>					
Dissolved Oxygen, Field	mg/L	--	--	-	6.49
ORP, Field	millivolts	--	--	239	235
pH, Field	s.u.	--	--	7.40	7.85
Specific Conductance, Field	uS/cm	--	--	379	259
Temperature, Field	Deg C	--	--	8.19	8.88
Total dissolved solids, field (TDS)	mg/L	--	--	246	169
Turbidity, Field	NTU	--	--	46.3	1.2
<b>General Chemistry</b>					
Alkalinity, bicarbonate	mg/L	--	--	39.7	44.2
Alkalinity, carbonate	mg/L	--	--	ND (1.0)	ND (1.0)
Alkalinity, hydroxide	mg/L	--	--	ND (1.0)	ND (1.0)
Alkalinity, total (as CaCO3)	mg/L	--	--	39.7	44.2
Chloride (dissolved)	mg/L	250	1500	50.0	9.04
Conductivity	uS/cm	--	--	390	276
Dissolved organic carbon (DOC) (dissolved)	mg/L	--	--	-	9.10
Fluoride	mg/L	1.5	[b]	ND (0.020)	ND (0.020)
Hardness	mg/L	--	--	89.1	99.9
Hardness, calculation	mg/L	--	--	-	100
Sulphate (Dissolved)	mg/L	500	[b]	29.1	54.2
Total dissolved solids (TDS)	mg/L	--	--	234	198
<b>Nutrients</b>					
Ammonia-N	mg/L	--	[a]	0.0054	0.0102
Nitrate (as N)	mg/L	10	400	10.9 µg <sup>a</sup>	4.44
Nitrite (as N)	mg/L	1	[c]	0.0062 J	0.0075
Nitrite/Nitrate	mg/L	10	400	10.9 µg <sup>a</sup>	4.45
<b>Dissolved Metals</b>					
Aluminum (dissolved)	ug/L	9500	--	20.4	10.5
Antimony (dissolved)	ug/L	6	90	0.11	0.23
Arsenic (dissolved)	ug/L	10	50	0.16	0.21
Barium (dissolved)	ug/L	1000	10000	4.49	7.2
Beryllium (dissolved)	ug/L	8	1.5	ND (0.02)	ND (0.02)
Bismuth (dissolved)	ug/L	--	--	ND (0.05)	ND (0.05)
Boron (dissolved)	ug/L	5000	12000	22	38
Cadmium (dissolved)	ug/L	5	[b]	0.0208	0.0232
Calcium (dissolved)	ug/L	--	--	27000	31800
Chromium (dissolved)	ug/L	50	10	ND (0.5)	ND (0.5)
Cobalt (dissolved) <sup>(1)</sup>	ug/L	1	40	ND (0.1)	0.1
Copper (dissolved)	ug/L	1500	[b]	2.66	4.59
Iron (dissolved) <sup>(2)</sup>	ug/L	6500	--	24	ND (10)
Lead (dissolved)	ug/L	10	[b]	ND (0.05)	ND (0.05)
Lithium (dissolved)	ug/L	8	--	ND (1)	ND (1)
Magnesium (dissolved)	ug/L	--	--	5270	4980
Manganese (dissolved) <sup>(3)</sup>	ug/L	1500	--	34.4	0.73
Mercury (dissolved)	ug/L	1	0.25	ND (0.005)	ND (0.005)
Molybdenum (dissolved)	ug/L	250	10000	0.239	0.286
Nickel (dissolved)	ug/L	80	[b]	ND (0.5)	ND (0.5)
Phosphorus (dissolved)	ug/L	--	--	ND (50)	ND (50)
Potassium (dissolved)	ug/L	--	--	1000	2060
Selenium (dissolved)	ug/L	10	20	0.092	0.109
Silicon (dissolved)	ug/L	--	--	4900	8200
Silver (dissolved)	ug/L	20	[b]	ND (0.01)	ND (0.01)
Sodium (dissolved)	ug/L	200000	--	37600	8670
Strontium (dissolved)	ug/L	2500	--	97.4	130
Sulfur (dissolved)	ug/L	--	--	9330	17200
Thallium (dissolved)	ug/L	--	3	ND (0.01)	ND (0.01)
Tin (dissolved)	ug/L	2500	--	ND (0.1)	ND (0.1)
Titanium (dissolved)	ug/L	--	1000	0.69	ND (0.3)
Uranium (dissolved)	ug/L	20	85	ND (0.01)	ND (0.01)
Vanadium (dissolved)	ug/L	20	--	ND (0.5)	14.8
Zinc (dissolved)	ug/L	3000	[b]	6.6	7.8
Zirconium (dissolved)	ug/L	--	--	ND (0.2)	ND (0.2)
<b>Total Metals</b>					
Aluminum	ug/L	9500	--	299	17.7
Antimony	ug/L	6	90	0.12	0.24
Arsenic	ug/L	10	50	0.24	0.21
Barium	ug/L	1000	10000	5.37	7.36
Beryllium	ug/L	8	1.5	ND (0.02)	ND (0.02)
Bismuth	ug/L	--	--	ND (0.05)	ND (0.05)
Boron	ug/L	5000	12000	23	39
Cadmium	ug/L	5	[b]	0.0246	0.0219
Caesium	ug/L	--	--	ND (0.01)	-
Calcium	ug/L	--	--	26900	31400
Chromium	ug/L	50	10	ND (0.5)	ND (0.5)
Cobalt	ug/L	1	40	0.24	0.11
Copper	ug/L	1500	[b]	3.9	5
Iron	ug/L	6500	--	306	14
Lead	ug/L	10	[b]	0.313	ND (0.05)
Lithium	ug/L	8	--	ND (1)	ND (1)
Magnesium	ug/L	--	--	5050	5280
Manganese	ug/L	1500	--	41.5	1.26
Mercury	ug/L	1	0.25	ND (0.005)	ND (0.005)
Molybdenum	ug/L	250	10000	0.229	0.285
Nickel	ug/L	80	[b]	ND (0.5)	0.51
Phosphorus	ug/L	--	--	ND (50)	ND (50)
Potassium	ug/L	--	--	947	2050
Rubidium	ug/L	--	--	0.64	-
Selenium	ug/L	10	20	0.081	0.111
Silicon	ug/L	--	--	5040	8110
Silver	ug/L	20	[b]	0.011	ND (0.01)
Sodium	ug/L	200000	--	37600	8900
Strontium	ug/L	2500	--	99.1	132
Sulphur	ug/L	--	--	9040	18300
Tellurium	ug/L	--	--	ND (0.2)	-
Thallium	ug/L	--	3	ND (0.01)	ND (0.01)
Thorium	ug/L	--	--	ND (0.1)	-
Tin	ug/L	2500	--	ND (0.1)	ND (0.1)
Titanium	ug/L	--	1000	20.8	0.62
Tungsten	ug/L	3	--	ND (0.1)	-
Uranium	ug/L	20	85	0.017	ND (0.01)
Vanadium	ug/L	20	--	1.38	15.8
Zinc	ug/L	3000	[b]	8.9	8.1
Zirconium	ug/L	--	--	ND (0.2)	ND (0.2)

**Analytical Results Tables Notes**  
**2023 Annual Operations and Monitoring Report**  
**Campbell River Waste Management Centre**  
**Campbell River, British Columbia**

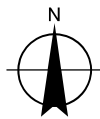
BC ENV	British Columbia Ministry of Environment and Climate Change Strategy
CSR	ENV British Columbia Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards (2021)
WQG	ENV British Columbia Approved (March 2021), Working (June 2021) and Source Drinking (December 2020) Water Quality Guidelines (WQG). Most stringent guideline is presented unless otherwise indicated.
FAW	Guideline/standard for the protection of freshwater aquatic life
DW	Guideline/standard for the protection of drinking water
IW	Guideline/standard for the protection of irrigation water. Applies to all soil types.
LW	Guideline/standard for the protection of livestock water
STM	Short term maximum WQG FAW (generally less stringent than LTA guidelines)
LTA	Long term average WQG FAW (generally most stringent guideline). WQGs presented are LTA unless otherwise specified.
a	WQG DW
b	WQG FAW
c	CSR DW
d	CSR FAW
w	Working WQG. Provides benchmarks for those substances that have not yet been fully assessed and endorsed by the ENV.
Interim	Interim WQG developed when insufficient data available to meet the minimum requirement of a full guideline.
AO	Aesthetic objective. Parameters may impair the taste, smell or colour of water or interfere with the supply of good quality water. Parameters do not cause adverse health effects.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
R	Rejected result
[a]	Limit varies with pH.
[b]	Limit varies with Hardness.
[c]	Limit varies with Chloride (mg/L).
[d]	Limit varies with pH and Temperature.
[e]	Limit varies with Dissolved Calcium.
[f]	Limit varies with Methyl Mercury.
[h]	Standard varies with pH, temperature and substance isomer.
calca	$EXP(1.6-3.327 \cdot pH + 0.402 \cdot pH^2)$ mg/L
calcb	$EXP(0.736 \cdot LN(Hardness) - 4.943)$ ug/L
calcc	$0.04 \cdot Hardness$ ug/L
calcd	$3.31 + (EXP(1.273 \cdot LOG(Hardness) - 4.704))$ ug/L
calce	$0.0044 \cdot Hardness + 0.605$ mg/L
calch	$Exp(0.76 \cdot LN(Hardness) + 1.06)$ ug/L
calcf	$7.5 + (0.75 \cdot (Hardness - 90))$ ug/L
[i]	Cobalt concentrations in groundwater do not exceed the referenced cobalt interim background groundwater concentration estimate. Standard confirmed in email received from ENV, November 7, 2017.
[j]	Limit varies with dissolved calcium
[l]	Limit varies with crop.
{iii}	Standard varies with pH, temperature and substance isomer. Consult a director for further advice.
<span style="border: 1px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Exceeds indicated standard or guideline
Blue text	Laboratory detection limit is greater than indicated standard or guideline
(c)	Background dependant. Comparison to background not complete or background location has not been established.
(1)	The interim regional background cobalt concentration of 20 ug/L is applied. Note 2, Table 1 BC Protocol 9 for Contaminated Sites, Version 4, February 1, 2023.
(2)	BC CSR criteria for iron does not apply to the Site as the Site is not used for an industrial or commercial purpose or activity listed under footnote 43 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
(3)	BC CSR criteria for manganese does not apply to the Site as the Site is not used for an industrial or commercial purpose or activity listed under footnote 43 of BC CSR Schedule 3.2. Criteria is voluntarily applied for assessment purposes only.
SS	Site-specific objective for the lower Columbia River, BC
Dissolved Oxygen, field	WQG specific to buried embryo/alevin life stages of aquatic life (most conservative).
Temperature, field (stream)	WQG specific to streams with unknown fish distributions.
Turbidity, field	WQG applies to water during clear flows or clear water
Cadmium, dissolved	WQG LTA applies to water hardnesses between 3.4 and 285 mg/L CaCO <sub>3</sub> .
Copper, total	WQG LTA applies to water hardnesses between 50 and 250 mg/L CaCO <sub>3</sub> .
Lead, total	WQG LTA and STM apply to water hardnesses between 8 and 360 mg/L CaCO <sub>3</sub> .
Manganese, total	WQG LTA applies to water hardnesses between 37 and 450 mg/L CaCO <sub>3</sub> .
Phosphorous, total (lakes)	WQG applies to total phosphorous in lakes where salmonoids are predominant fish species and during the spring overturn (if residence time of the epilimnetic water exceeds 6 months) or the mean phosphorous epilimnetic growing season concentration (if time of the epilimnetic water is less than 6 months) residence
Selenium, total	Alert concentration = 1 ug/L.
Zinc, total	WQG LTA applies to water hardnesses between 90 and 330 mg/L CaCO <sub>3</sub> .
**	Chloride guideline only applies to total Chloride. Guideline has been included for reference only.

# Figures





Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 10N

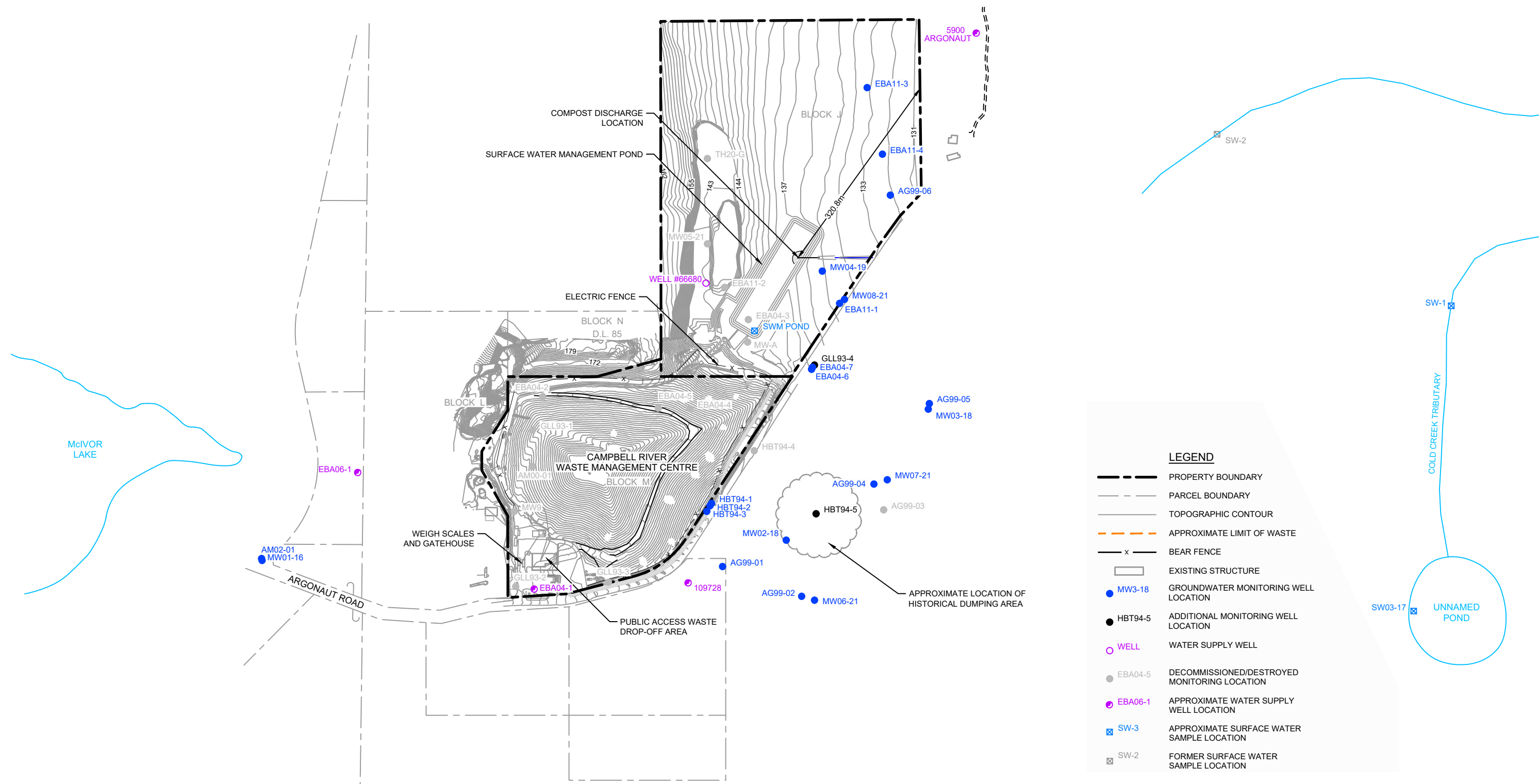


COMOX-STRAITHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11208296  
 Revision No. -  
 Date Dec 14, 2023

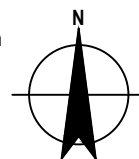
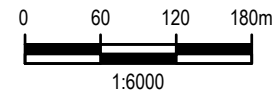
SITE LOCATION

FIGURE 1



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED MAY 6, 2023.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.

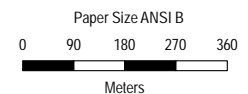
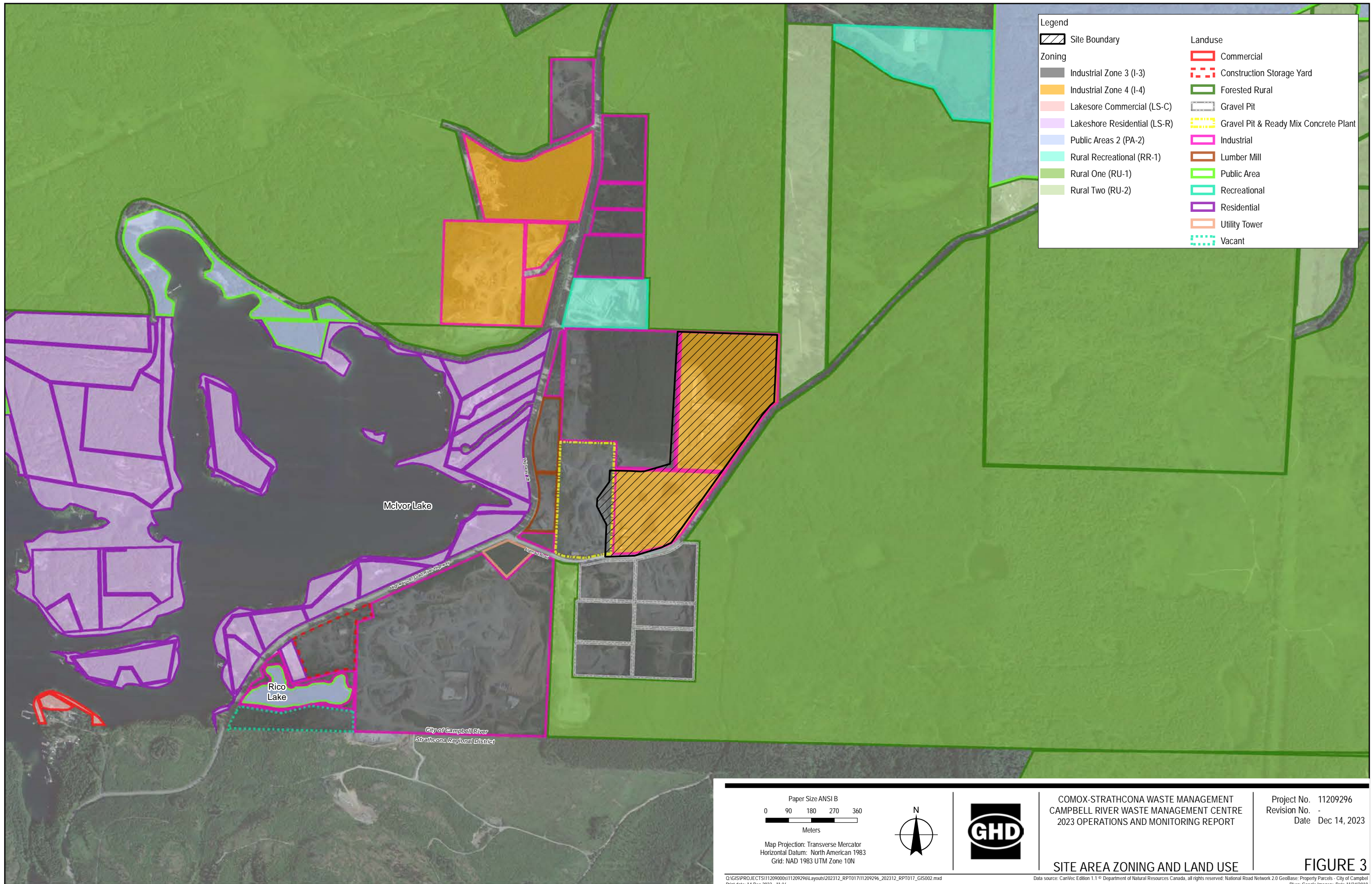


COMOX - STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

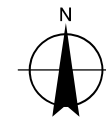
Project No. 11209296  
 Date March 2023

SITE PLAN AND MONITORING  
 LOCATIONS

FIGURE 2



Map Projection: Transverse Mercator  
Horizontal Datum: North American 1983  
Grid: NAD 1983 UTM Zone 10N

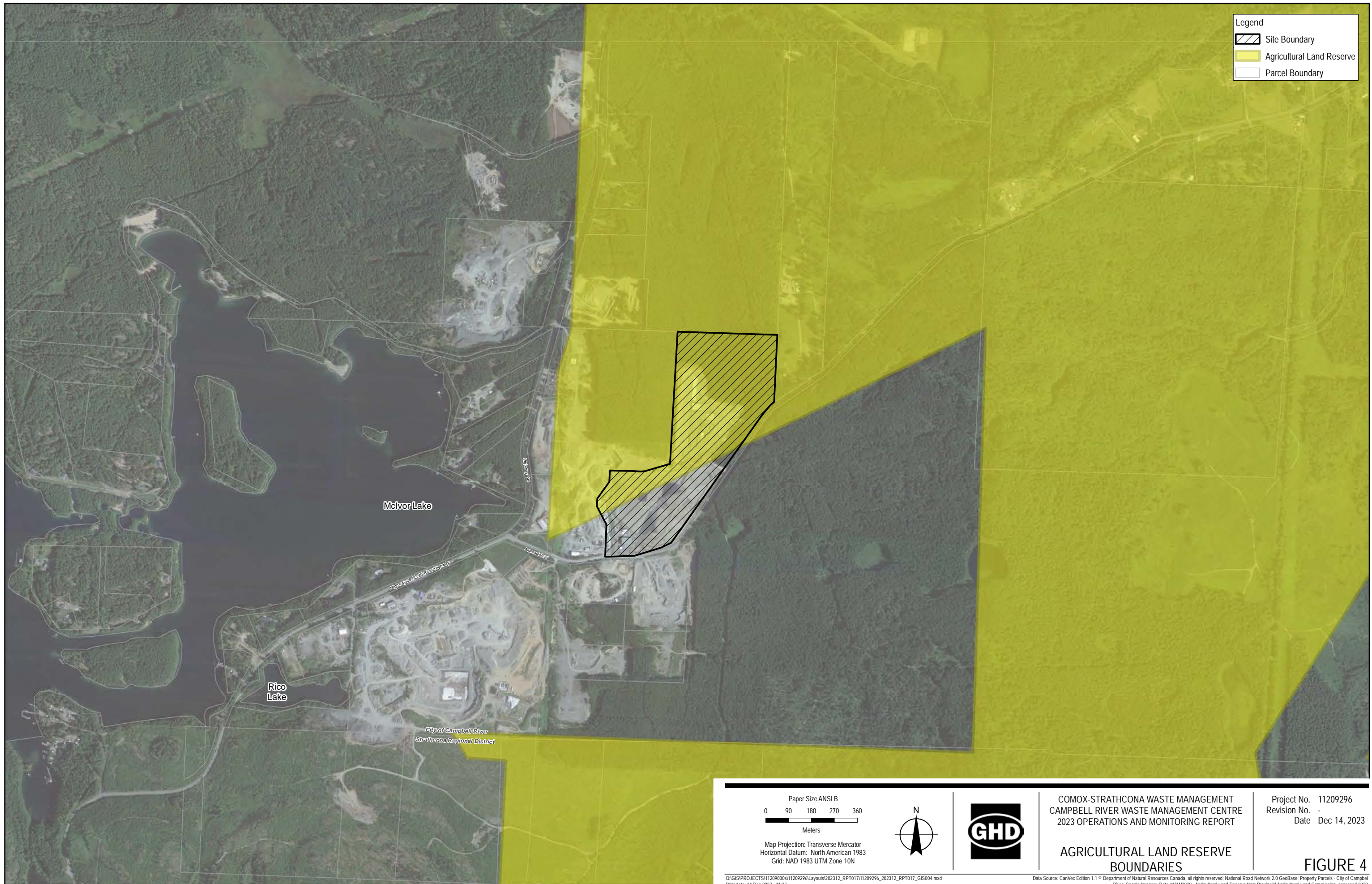


COMOX-STRAITHCONA WASTE MANAGEMENT  
CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
Revision No. -  
Date Dec 14, 2023

SITE AREA ZONING AND LAND USE


FIGURE 3



**Legend**

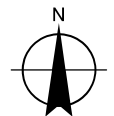
- Site Boundary
- Agricultural Land Reserve
- Parcel Boundary

Paper Size ANSI B



Meters

Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 10N



COMOX-STATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

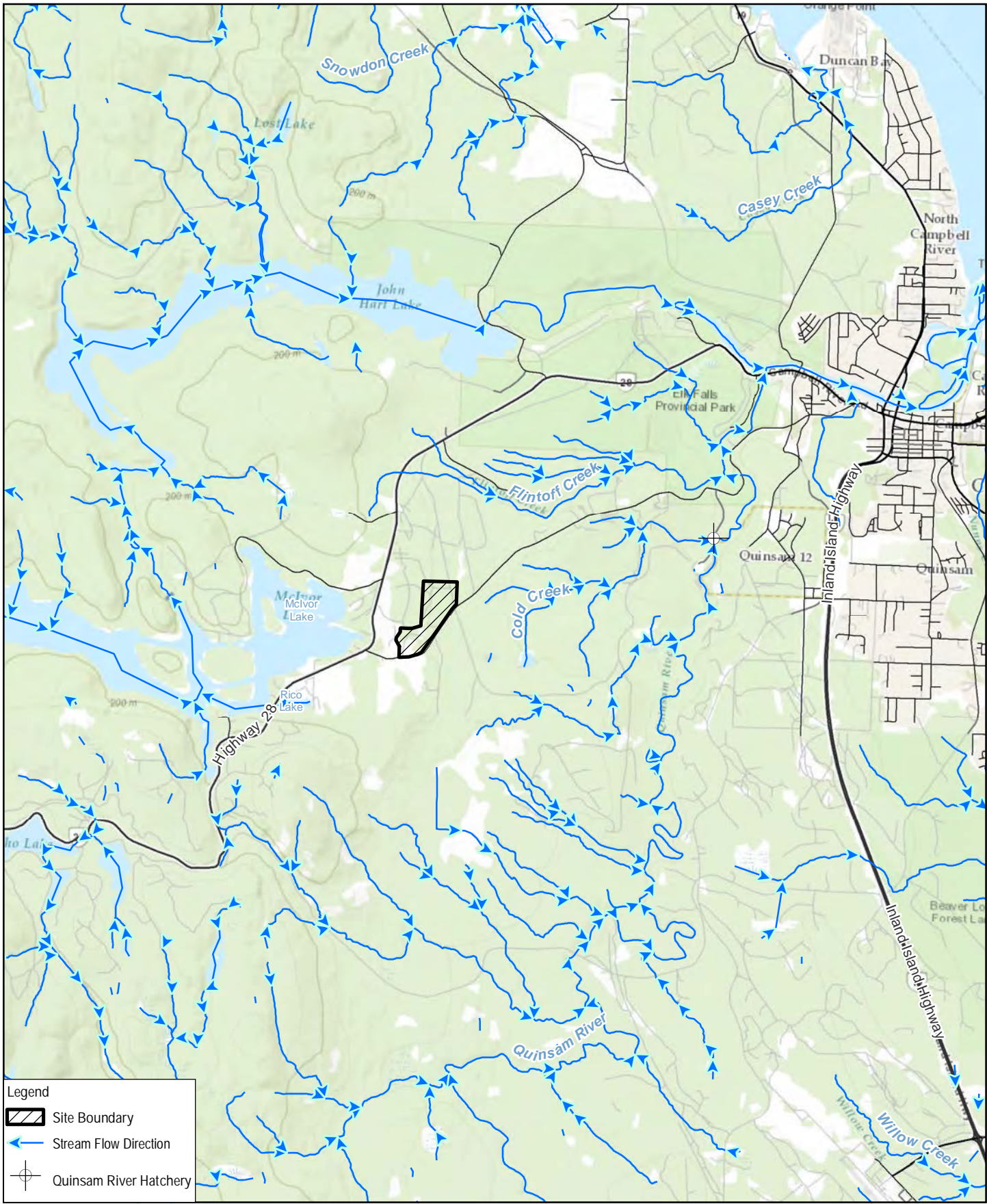
**AGRICULTURAL LAND RESERVE  
 BOUNDARIES**

Project No. 11209296  
 Revision No. -  
 Date Dec 14, 2023




**FIGURE 4**

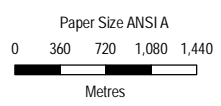
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 Print date: 14 Dec 2023 - 11:27

Data Source: CanVec Edition 1.1 © Department of Natural Resources Canada, all rights reserved; National Road Network 2.0 GeoBase; Property Parcels - City of Campbell River; Google Imagery, Date 11/24/2019, Agricultural Land Reserve from Provincial Agricultural Land Commission, accessed 2020

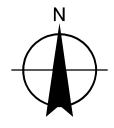


**Legend**

-  Site Boundary
-  Stream Flow Direction
-  Quinsam River Hatchery



Map Projection: Transverse Mercator  
 Horizontal Datum: North American 1983  
 Grid: NAD 1983 UTM Zone 10N

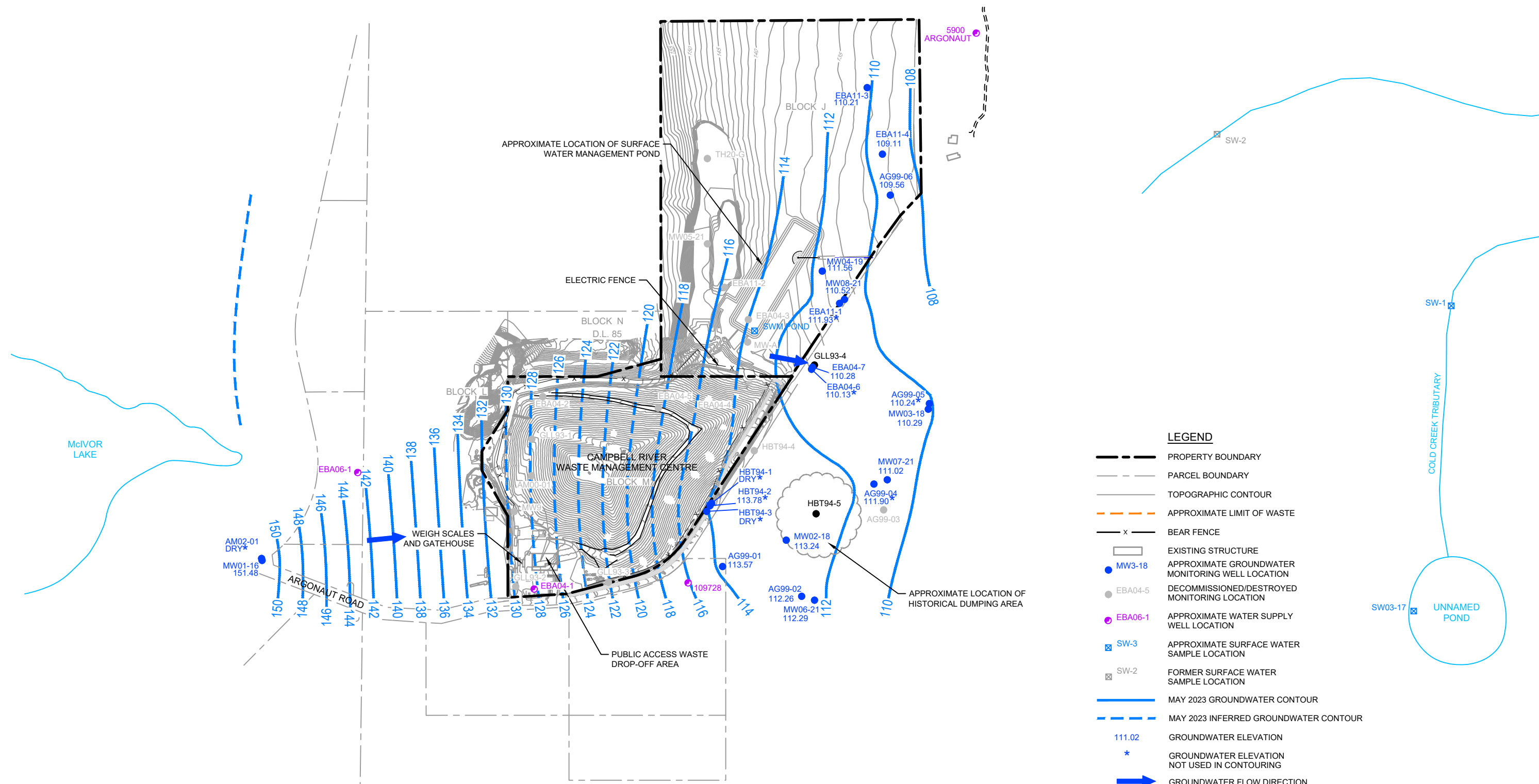


COMOX-STRAETHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Revision No. -  
 Date Apr 9, 2024

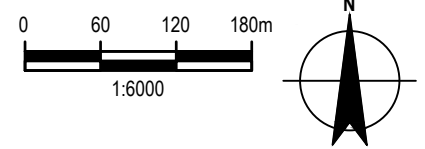
DRAINAGE MAP

FIGURE 5



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED MAY 6, 2023.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.

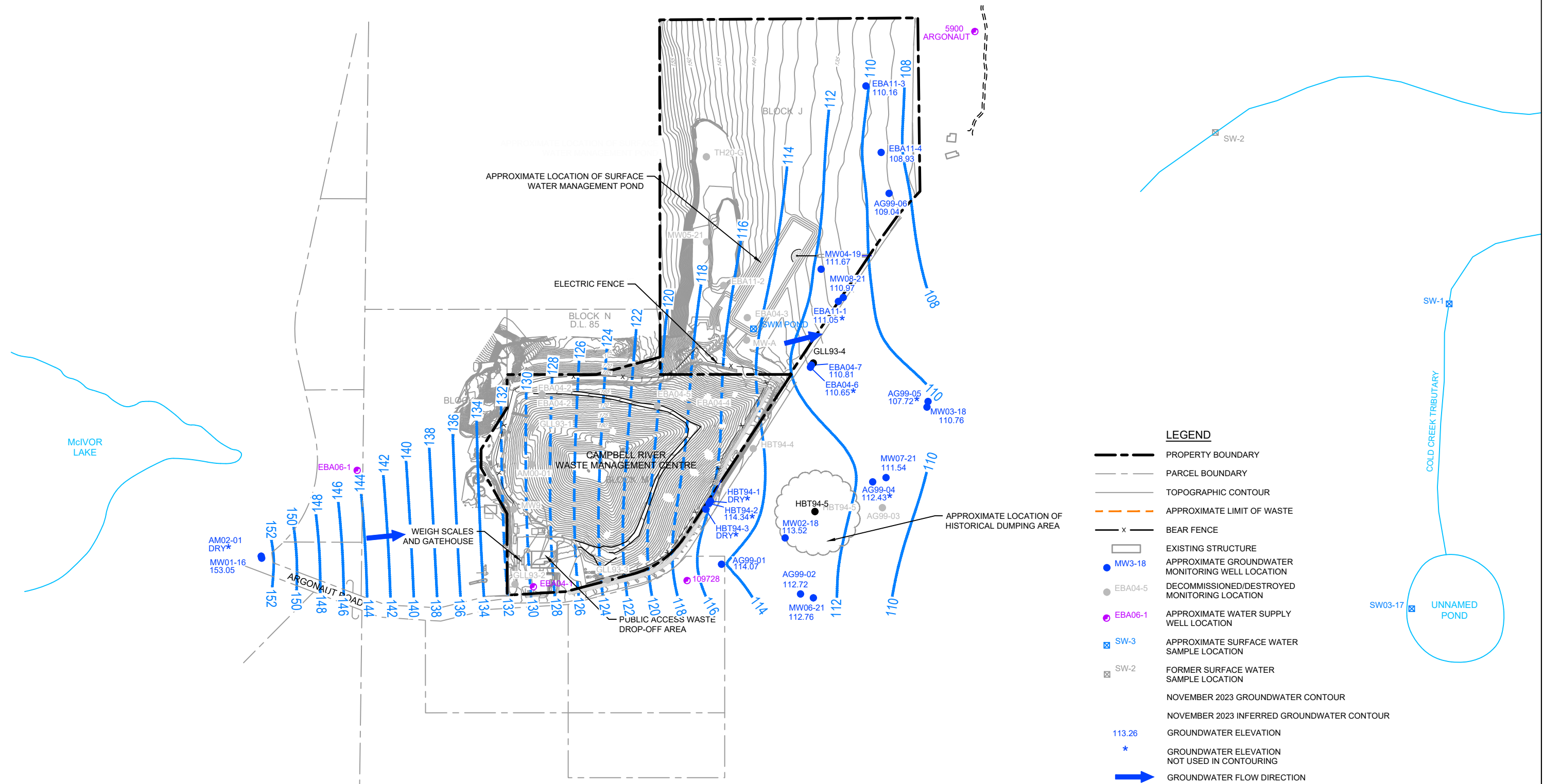


COMOX - STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Date March 2023

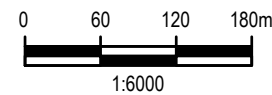
GROUNDWATER CONTOURS  
 MAY 2023

FIGURE 6



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED MAY 6, 2023.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.

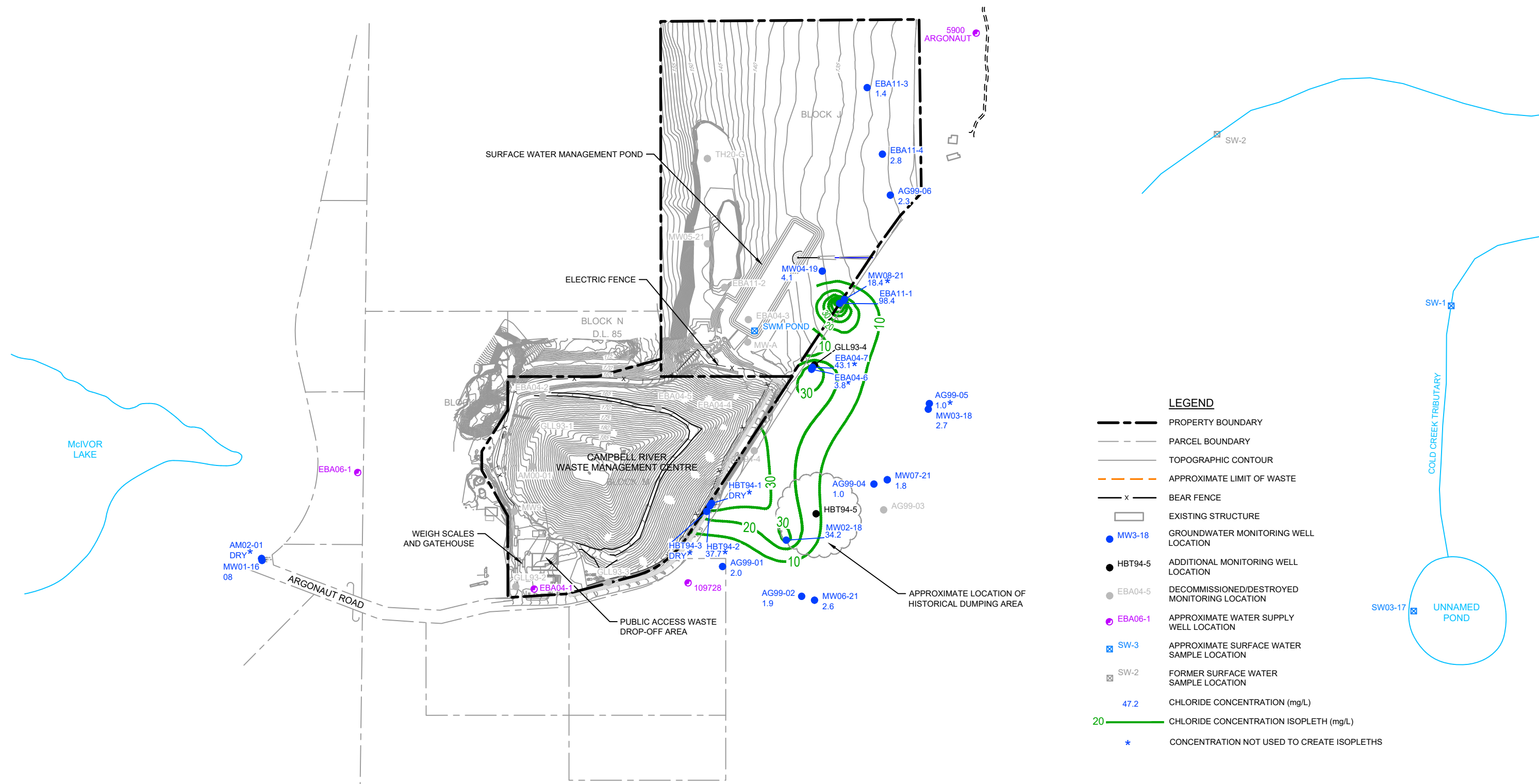


COMOX - STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Date February 2024

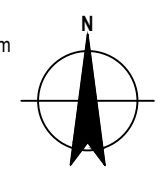
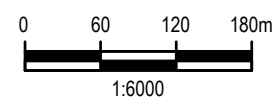
GROUNDWATER CONTOURS  
 NOVEMBER 2023

FIGURE 7



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED MAY 6, 2023.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.



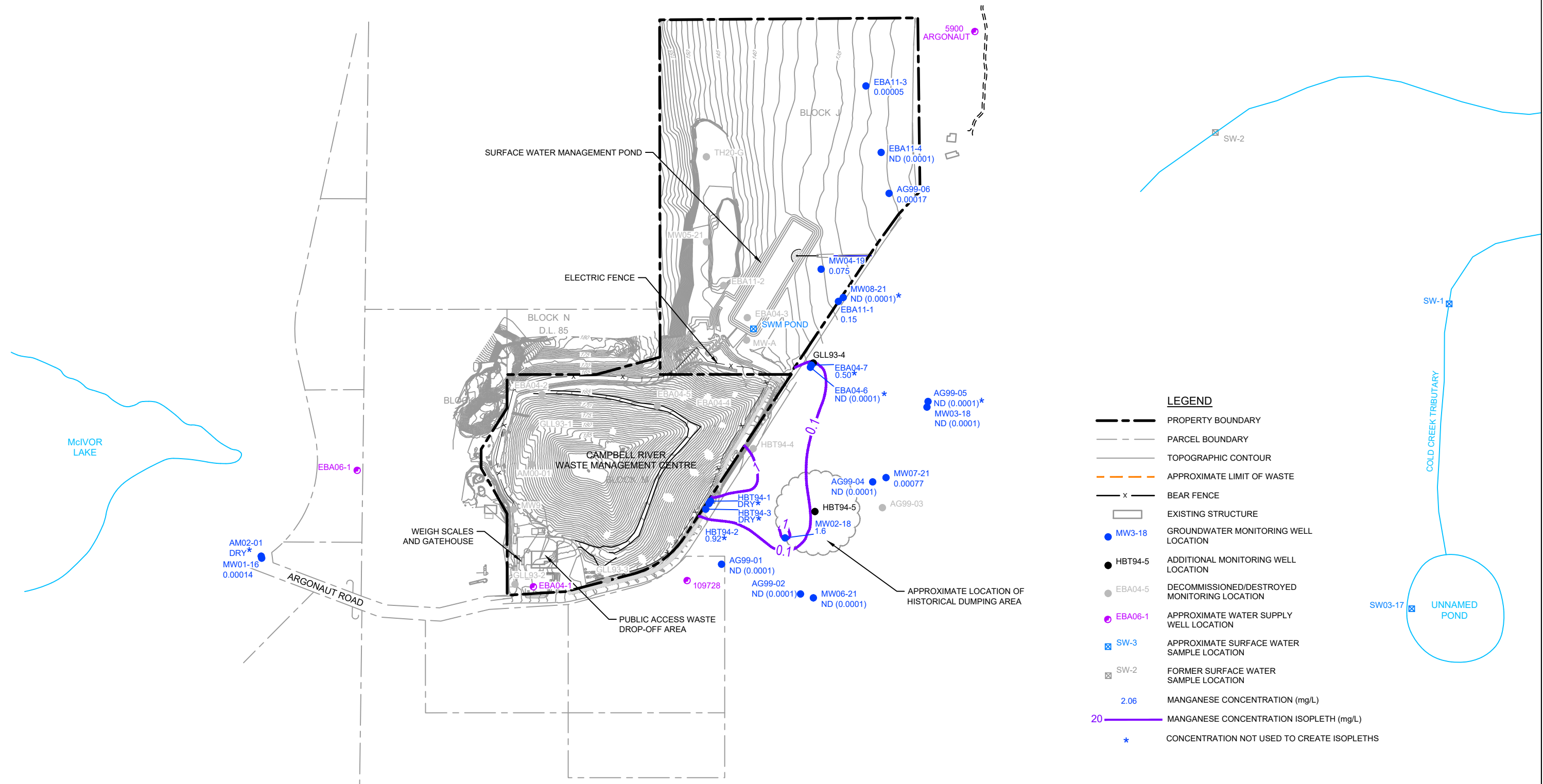
COMOX STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Date February 2024

CHLORIDE ISOPLETHS  
 NOVEMBER 2023

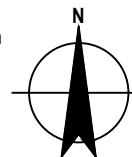
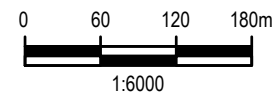
FIGURE 8





NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED MAY 6, 2023.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.

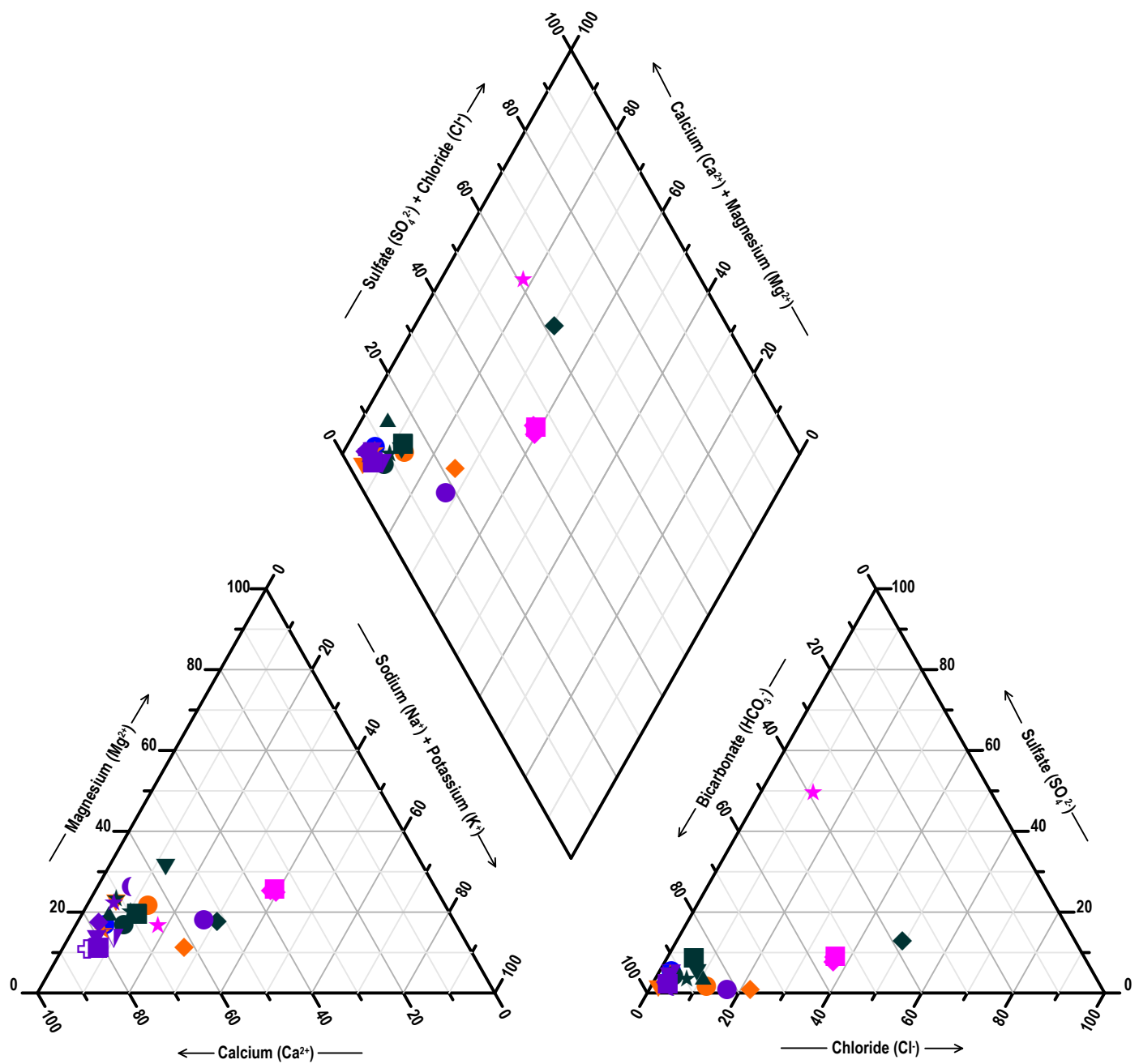


COMOX STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

MANGANESE ISOPLETHS  
 NOVEMBER 2023

Project No. 11209296  
 Date February 2024

FIGURE 9



### LEGEND

Background  
● MW01-16

Landfill Vicinity  
● EBA04-7  
◆ HBT94-1  
◆ HBT94-2  
★ EBA04-1  
▼ EBA04-6

Block J Vicinity  
● EBA11-3  
■ EBA11-4  
■ EBA11-4  
◆ EBA11-1  
★ AG99-06  
▼ MW04-19  
▲ MW08-21

Downgradient Off-Site  
● MW02-18  
■ MW03-18  
■ MW03-18  
◆ AG99-01  
★ AG99-02  
▼ AG99-04  
▼ AG99-05  
▼ MW06-21  
+ MW07-21

Surface Water  
◆ SW-1  
◆ SW03-17  
◆ SWM Pond



CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
COMOX STRATHCONA WASTE MANAGEMENT  
2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296-52  
Date April 2024

PIPER PLOT - NOVEMBER 2023

FIGURE 10

# Appendices

# **Appendix A**

**Operational Certificate OC-2401**



May 19, 2020

Tracking Number: 371230  
Authorization Number: 2401

Comox Valley Regional District  
600 Comox Rd  
Courtenay BC V9N 3P6

Dear Operational Certificate Holder,

Application for Operational Certificate amendments dated March 23, 2018, under the Environmental Management Act

In response to the subject application, and pursuant to Section 16 of the Environmental Management Act, Operational Certificate 2401 (Appendix A) is hereby amended as follows:

1. Subsection 1.4. is amended from:

The location of the facilities for the management of waste and recyclable material to which this operational certificate is applicable is Block C of District Lot 85, Sayward Land District, approximately located as shown on attached Site Plan A.

to:

The location of the facilities for the management of waste and recyclable material to which this operational certificate is applicable is Block M and Block J of District Lot 85, Sayward Land District, approximately located as shown on attached Site Plan A

2. Section 1.5 is added:

**1.5 Stormwater**

1.5.1 The operational certificate holder must manage stormwater such that the stormwater is infiltrated into the ground with the authorized works.

1.5.2 The infiltrating stormwater must not include the concentration of any leachate substance in the stormwater greater than the Contaminated

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)

Luc Lachance, P.Eng  
for Director, *Environmental Management Act*  
Authorizations - South Region

Sites Regulation Generic Numerical Water Standards for Drinking Water (DW) and Aquatic Life (AW) for freshwater for that substance.

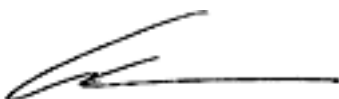
- 1.5.3 (a) The operational certificate holder must ensure that the Facility does not cause the concentration of Total Suspended Solids in the stormwater flowing from the Facility Site Boundary to be of worse quality than allowable concentrations specified in the British Columbia Approved and Working Water Quality Guidelines for a 24-hour duration during high flow conditions.
- (b) The operational certificate holder must cause a Qualified Professional to determine the applicable water use(s) for stormwater discharging from the Landfill Site and the applicable, maximum allowable concentration specified in the British Columbia Approved and Working Water Quality Guidelines and include such determinations in the Annual Operations and Monitoring Report.
- (c) The director may specify more stringent stormwater quality standards than those set out in this section.
- 1.5.4 The authorized works are mid slope swales, ditches, surface water management pond with energy dissipation and sediment traps, stormwater infiltration area, and related appurtenances approximately located as shown on Site Plan A.
- 1.5.5 The operational certificate holder must ensure that adequate authorized works to manage stormwater are complete and fully operational at all times.
- 1.5.6 The location of stormwater discharge to which this operational certificate is applicable is Block J of District Lot 85, Sayward Land District, approximately located as shown on attached Site Plan A.

3. Subsection 2.0 is added:

## 2.0 Glossary

The following terms when capitalized in this authorization have the meanings ascribed below. Other terms used in this authorization have the same meaning as those defined in the *Environmental Management Act*, applicable regulations, and the Landfill Criteria, unless the context indicates a contrary intent.

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



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Authorizations - South Region

“**Facility**” Means the landfill including all works related to stormwater management in Section 1.5.4.

“**Landfill Criteria**” means the *Landfill Criteria for Municipal Solid Waste*, Second Edition, June 2016, as it is amended or replaced from time to time, or other appropriate guidance or regulation in place at the time, as determined by the Director;

“**Qualified Professional**” in relation to a duty or function referred to in this Operational Certificate, means an individual who:

- (a) is registered in British Columbia with a professional organization, is acting under that organization's code of ethics and is subject to disciplinary action by that organization, and
- (b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function;

4. Subsection 2.1. is amended from:

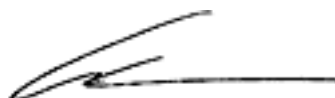
All facilities and information, including works, plans, assessments, investigations, surveys, programs and reports, must be certified by qualified professionals.

to:

The operational certificate holder must cause a Qualified Professional to:

- (a) Design and inspect the construction of the Facility, and,
- (b) Certify documents related to the Facility including plans, specifications, drawings, construction reports, assessments, reviews, investigations, studies, surveys, programs, reports and as-built record drawings.
- (c) Submit a completed Declaration of Competency and a Conflict of Interest Disclosure Statement with each document.

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



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Authorizations - South Region

5. Subsection 2.2.1 is amended from:

2.2.1 Plans

Site development, operating, leachate management, closure and post closure plans must be submitted to the Regional Waste Manager by December 31, 2003.

to:

(a) The operational certificate holder must cause a Qualified Professional to certify and submit an up to date DOCP, for the Facility, to the director before January 1, 2022. The landfill closure component of the DOCP must be submitted to the director by October 1, 2020 for approval.

(b) The DOCP must comply with the requirements of this operational certificate, include the information specified in all the items listed in the Landfill Criteria Section 10.3 Design, Operations and Closure Plan, and, if a Landfill Criteria Upgrading Plan is required pursuant to section 2.7 of this operational certificate, conform with the Landfill Criteria Upgrading Plan.

(c) The operational certificate holder must cause a Qualified Professional to certify and submit an updated DOCP to the director, as necessary to keep the DOCP up to date, at least once every five years after the date specified in the preceding (a).

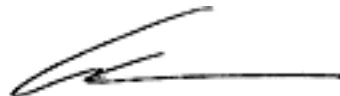
(d) The operational certificate holder must carry out the most recent DOCP and design, construct, operate, inspect, maintain, monitor, and close the Facility, in compliance with most recent DOCP and this operational certificate.

6. Subsection 2.4 is amended from:

When 100,000 tonnes of waste have been discharged at the landfill, an assessment of the potential for landfill gas generation must be submitted to the Regional Waste Manager.

The landfill gas assessment must address, but is not limited to, subsections 4.2 and 6.4 of the Landfill Criteria for Municipal Solid Waste and section 6 of the Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills.

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



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Authorizations - South Region



2.4.1 The potential for landfill gas generation is to be re-assessed at least once every 5 years after the initial assessment.

to:

2.4.1 The operational certificate holder must ensure that:

(a) The Facility does not cause:

(i) combustible gas concentrations to exceed the lower explosive limit of methane (5 percent by volume), or a lower concentration specified by the director, in soil at the Landfill Site Boundary;

(ii) combustible gas concentrations to exceed 20 percent of the lower explosive limit of methane (1 percent by volume) in any building;

(iii) federal, provincial, or local ambient air quality objectives and standards to be exceeded in air at the Landfill Site Boundary.

7. Subsection 2.7. is added:

(a) The operational certificate holder must cause a Qualified Professional to certify and submit a Landfill Criteria Conformance Review to the director, on or before January 1, 2022.

(b) The Landfill Criteria Conformance Review must be in accordance with the Landfill Criteria Section 2.2 Conformance of Existing Landfills, and include:

(i) A comparison and evaluation of the conformance status of the Facility with all applicable sections of the Landfill Criteria, and,

(ii) if non-conformance(s) with the Landfill Criteria are identified, a Landfill Criteria Upgrading Plan, including an action plan and schedule for all proposed upgrades to conform to the Landfill Criteria, and technical and environmental justification for any proposed exceptions from the Landfill Criteria.

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



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for Director, *Environmental Management Act*  
Authorizations - South Region

8. Site Plan A is replaced by the following updated Site Plan A (Appendix B).

All other terms and conditions of the operational certificate remain in full force and effect.

Please note that although a revised operational certificate document has not been produced at this time a copy of this letter is being placed on the permit file, as an addendum to the operational certificate, to formally reflect the amendments.

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 permittee. This permit is issued pursuant to the provisions of the Environmental Management Act to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee 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.

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



Luc Lachance, P.Eng  
for Director, *Environmental Management Act*  
Authorizations - South Region

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Documents pertinent to the operational certificate are to be submitted by email or electronic transfer to the Director, in accordance with the ministry Data & Report Submissions website at: <http://www2.gov.bc.ca/gov/content/environment/waste-management/waste-discharge-authorization/data-and-report-submissions>, or as further instructed. If you have any questions or concerns, please contact Authorizations - South at [Authorizations.South@gov.bc.ca](mailto:Authorizations.South@gov.bc.ca).

Yours truly,



Luc Lachance, P.Eng  
for Director, *Environmental Management Act*  
Authorizations - South Region

ENCL:

Appendix A - Operational Certificate 2401 (December 2, 2003)  
Appendix B – Site Plan A (April 22, 2020)

Date issued: November 29, 1973  
Date amended: May 19, 2020  
(most recent)



Luc Lachance, P.Eng  
for Director, *Environmental Management Act*  
Authorizations - South Region

## Appendix A

Operational Certificate 2401 (December 2, 2003)



Date: DEC 02 2003

File: MR-2401

**REGISTERED MAIL**

Regional District of  
Comox-Strathcona  
600 Comox Rd  
Courtenay BC V9N 3P6

Dear Regional District of Comox-Strathcona:

Enclosed is Operational Certificate MR-2401 issued under the provisions of the *Waste Management Act*. Your attention is respectfully directed to the terms and conditions outlined in the operational certificate. An annual operational certificate fee will be determined according to the Waste Management Operational certificate Fees Regulation.

This operational certificate does not authorise entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the operational certificate holder. This operational certificate is issued pursuant to the provisions of the *Waste Management Act* to ensure compliance with Section 54(3) of that statute, which makes it an offence to discharge waste without proper authorisation. It is also the responsibility of the operational certificate holder to ensure that all activities conducted under this authorisation 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. Notice of the appeal must (1) be in writing, (2) include the grounds for appeal, (3) be directed by registered mail or personally delivered to the Chair, Environmental Appeal Board, 4th Floor 836 Yates Street, Victoria, British Columbia, V8V 1X4, (4) be delivered within 30 days from the date notice of the decision is given, and (5) be accompanied by a fee of \$25, payable to the Minister of Finance. For further information, please contact the Environmental Appeal Board at 250 387-3464.

.../2

Ministry of  
Water, Land and Air  
Protection

Vancouver Island Region

Mailing Address:  
2080A Labeux Road  
Nanaimo BC V9T 6J9

Telephone: 250 751-3100  
Facsimile: 250 751-3103

Administration of this operational certificate will be carried out by staff from our regional office located at 2080-A Labieux Road, Nanaimo, British Columbia, V9T 6J9, telephone 250 751-3100. Plans, data and reports pertinent to the operational certificate are to be submitted to the Regional Waste Manager, at this address.

Yours truly,



B. W. Medlar  
Assistant Regional Waste Manager  
Vancouver Island Region

Enclosure



**OPERATIONAL CERTIFICATE**  
MR-02401

*Under the Provisions of the Waste Management Act*

**Regional District of Comox-Strathcona**  
**600 Comox Road**  
**Courtenay, British Columbia**  
**V9N 3P6**

is authorised to manage waste and recyclable material from the Regional District of Comox-Strathcona and environs at the Campbell River landfill located on Argonaut Road, Campbell River, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the *Waste Management Act* and may result in prosecution.

**1. MANAGEMENT OF WASTE AND RECYCLABLE MATERIAL**

**1.1. Sanitary Landfill**

- 1.1.1. This subsection applies to the discharge of waste to a sanitary landfill.
- 1.1.2. Waste may be discharged to the sanitary landfill shown on attached Site Plan A.
- 1.1.3. The characteristics of the discharge must be municipal solid waste as defined under the *Waste Management Act* and other wastes as approved in writing by the Regional Waste Manager.
- 1.1.4. The authorised works are a sanitary landfill, and related appurtenances approximately located as shown on attached Site Plan A.
- 1.1.5. The authorised works must be complete and in operation on and from the date of this operational certificate.

**1.2. Leachate**

- 1.2.1. This subsection applies to leachate from the landfill.
- 1.2.2. The characteristics of the leachate must not exceed concentrations set in the *British Columbia Approved Water Quality Guidelines (Criteria)* and *A Compendium of Working Water Quality Guidelines for British Columbia* at the property boundary. Where natural background water quality concentrations

DEC 02 2003

B. W. Medlar  
Assistant Regional Waste Manager

exceed the aforementioned guidelines, characteristics of the leachate must not exceed background concentrations.

**1.3. Entrance facilities**

- 1.3.1. The authorised facilities are signs, weigh scales, recyclable material and waste drop-off and storage facilities and related appurtenances.
- 1.3.2. The authorised facilities must be complete and in operation on and from the date of this operational certificate.

**1.4. Location of Authorised Facilities**

The location of the facilities for the management of waste and recyclable material to which this operational certificate is applicable is Block C of District Lot 85, Sayward Land District, approximately located as shown on attached Site Plan A.

**2. GENERAL REQUIREMENTS**

**2.1. Qualified Professionals**

All facilities and information, including works, plans, assessments, investigations, surveys, programs and reports, must be certified by qualified professionals.

**2.2. Plans**

- 2.2.1. Site development, operating, leachate management, closure and post closure plans must be submitted to the Regional Waste Manager by December 31, 2003.
- 2.2.2. The plans referenced in subsection 2.2.1 must address, but not be limited to, each of the subsections in the *Landfill Criteria for Municipal Solid Waste* including performance, siting, design, operational and closure and post-closure criteria.
- 2.2.3. The facilities must be developed, operated and closed in accordance with the plans referenced in subsection 2.2.1.

**2.3. Bear-Proof Facilities**

- 2.3.1. Bears must not access putrescible waste at the landfill facility. All putrescible waste that arrives at the landfill facility must be immediately contained within a bear-proof bin or an area enclosed by a bear-proof electric fence. Grass, leaves, weeds, branches and woodwaste are exempt from bear-proofing requirements.
- 2.3.2. A bear-proof electric fence must be installed around the landfill facilities.



- 2.3.3. The bear-proof fence must be designed, constructed, operated and maintained to prevent bears from penetrating the fence.
- 2.3.4. The bear-proof electric fence and bear-proof bins must be installed and in operation by March 30, 2004.

#### **2.4. Landfill Gas**

- 2.4.1. When 100,000 tonnes of waste have been discharged at the landfill, an assessment of the potential for landfill gas generation must be submitted to the Regional Waste Manager.
- 2.4.2. The landfill gas assessment must address, but is not limited to, subsections 4.2 and 6.4 of the *Landfill Criteria for Municipal Solid Waste* and section 6 of the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*.
- 2.4.3. The potential for landfill gas generation is to be re-assessed at least once every 5 years after the initial assessment.

#### **2.5. Seismic and Fault Activity**

A report that assesses the risk from seismic and fault activity must be submitted to the Regional Waste Manager by December 31, 2003.

#### **2.6. Additional Facilities or Works**

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

### **3. MONITORING AND REPORTING**

#### **3.1. Monitoring Program**

- 3.1.1. A monitoring program must be developed to identify any impacts to the environment and public health from the landfill.
- 3.1.2. 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*.
- 3.1.3. Monitoring must be conducted in accordance with the monitoring program.

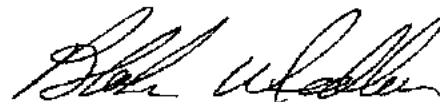
### **3.2. Annual Operating and Monitoring Report**

- 3.2.1. An annual operating and monitoring report for the preceding 12 month period from January 1 to December 31 must be submitted to the Regional Waste Manager by April 30 of each year.
- 3.2.2. The report must include:
- An executive summary;
  - Tonnage of each type of waste discharged to the landfill for the year;
  - Remaining site life and capacity;
  - Review of the preceding year of operation, plans for the next year and any new information or proposed changes relating to the facilities and plans;
  - Comparison of the monitoring data with the performance criteria in section 4 of the *Landfill Criteria for Municipal Solid Waste* and the *Guidelines for Environmental Monitoring at Municipal Solid Waste Landfills*, interpretation of the monitoring data, identification and interpretation of irregularities and trends, recommendations, and any proposed changes to the monitoring program.

## **4. SITE CLOSURE**

### **4.1. Closure and Post-Closure Fund**

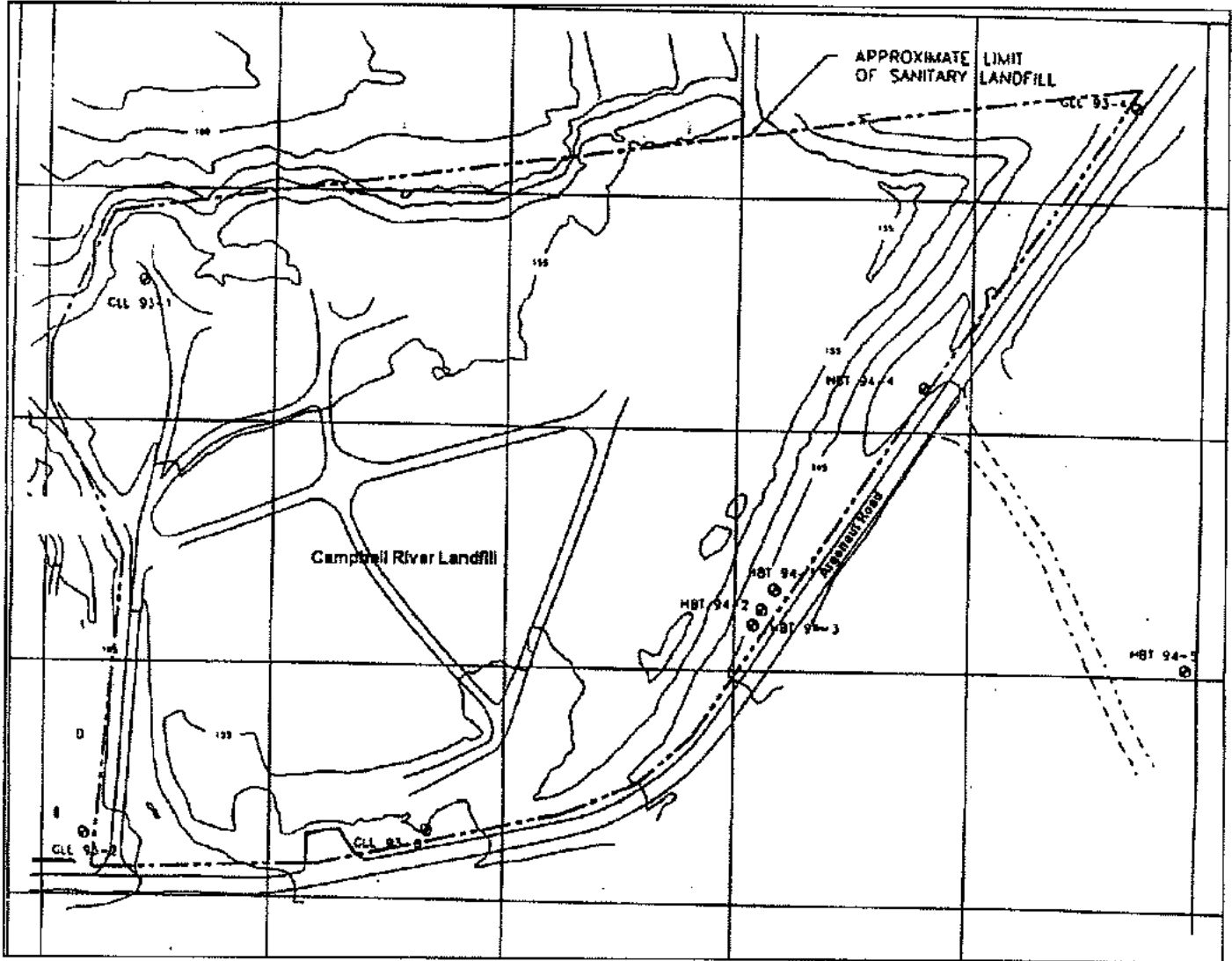
A closure and post-closure financial security trust fund must be built up over time. The closure and post-closure fund must ultimately meet or exceed the estimated closure and post-closure costs plus a reasonable contingency for any remediation that may be required.



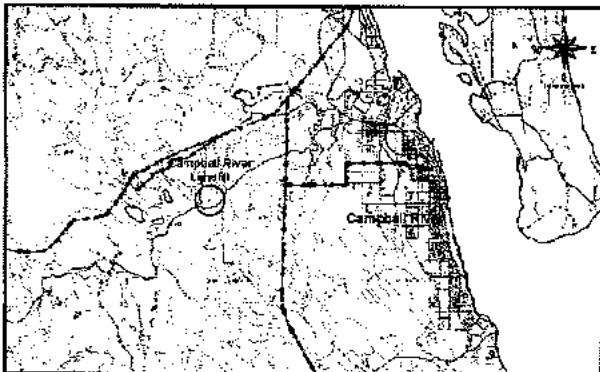
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B. W. Medlar  
Assistant Regional Waste Manager

### SITE PLAN A



Location Map



Scale: Not to Scale

Operational Certificate: MR-02401

Date: DEC 02 2003

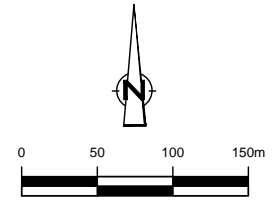
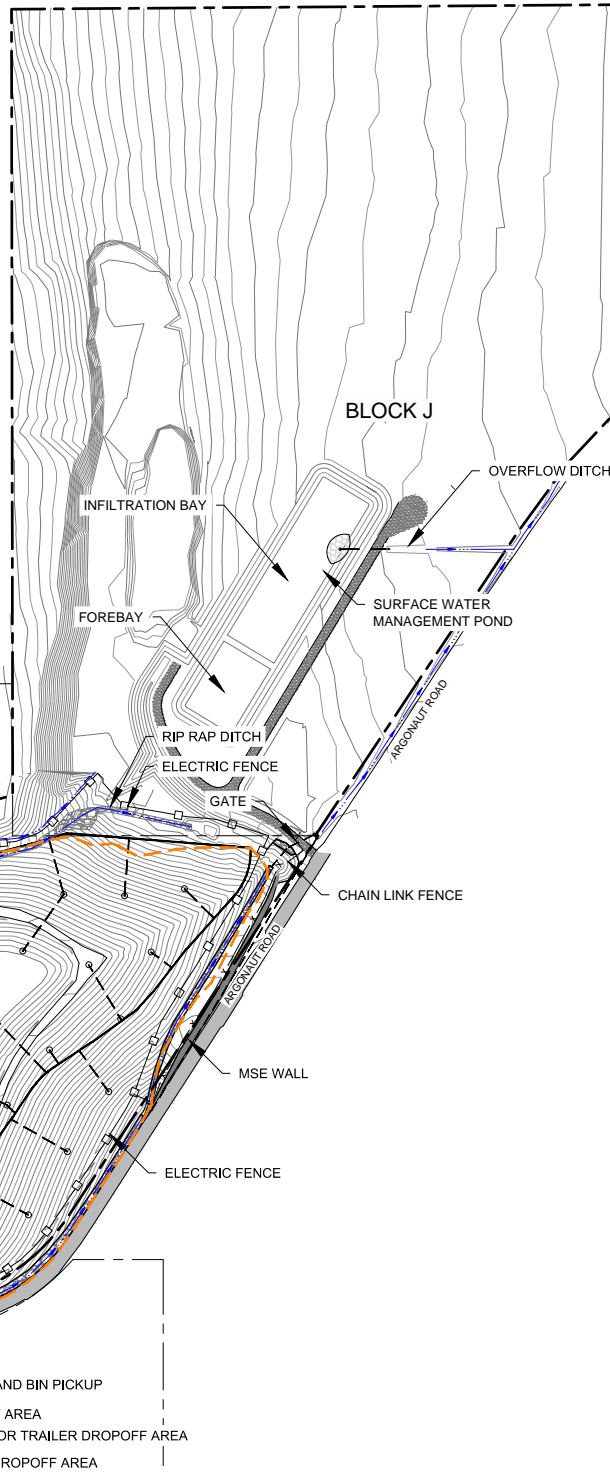
B. W. Medlar  
Assistant Regional Waste Manager  
Vancouver Island Region

# Appendix B

Site Plan (April 22,2020)



SITE PLAN



LEGEND:

- MAJOR CONTOUR (2m INTERVAL)
- MINOR CONTOUR (1m INTERVAL)
- LEGAL BOUNDARY
- LANDFILL SITE BOUNDARY
- APPROXIMATE LIMIT OF SANITARY LANDFILL
- DRAINAGE DITCH
- CHAIN LINK FENCE
- ELECTRIC FENCE
- PROPOSED LFG HEADER PIPE
- PROPOSED LFG LATERAL PIPE
- GRAVEL ROADWAY
- ASPHALT ROADWAY
- RIP RAP DITCH
- CULVERT
- PROPOSED LFG EXTRACTION WELL

- GRAVEL AREA
- YARD WASTE COLLECTION AREA
- DRYWALL BUILDING
- RAMP
- BLOCK L
- PROPOSED LFG FLARE COMPOUND
- SHOP
- OFFICE
- SCALE HOUSE
- PAVED AREA
- SCALES
- OFFICE
- PUBLIC ACCESS
- HHW STORAGE AREA
- STAFF PARKING AND BIN PICKUP
- PUBLIC DROPOFF AREA
- 53' WALKING FLOOR TRAILER DROPOFF AREA
- RECYCLING BIN DROPOFF AREA
- BLOCK M
- BLOCK N
- BLOCK J
- INFILTRATION BAY
- FOREBAY
- RIP RAP DITCH
- ELECTRIC FENCE
- GATE
- MSE WALL
- CHAIN LINK FENCE
- ARGONAUT ROAD
- OVERFLOW DITCH
- SURFACE WATER MANAGEMENT POND

EXISTING TOPOGRAPHICAL SURVEY COMPLETED OCTOBER 24, 2018.

# **Appendix B**

## **Borehole Logs**

# GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

## SAMPLE TYPES and TESTS

▬	SS	Split Spoon Sample	
⊗	SN	Non-Standard Split Spoon Sample	
I	ST	Shelby Tube Sample : (unconfined compression or unconsolidated undrained test)	- ◆
▬	DS	Denison Type Sample	
□	PS	Piston Type Sample	
≡	CS	Continuous Sample	
∇	GS	Grab Sample	
▬	WS	Wash Sample	
▬	BQ	BQ Core Sample	
▬	HQ	HQ Core Sample	
▬	NQ	NQ Core Sample	
▬	DT	Dynamic Penetration Test	
▬	VT	Field Vane Test (undisturbed)	- +
▬	VT	Field Vane Test (remoulded)	- ⊕

## PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split spoon sampler for a distance of 300 mm (12 in.).

## ABBREVIATIONS

DTPL: Drier Than Plastic Limit  
 APL: About Plastic Limit  
 WTPL: Wetter Than Plastic Limit  
 K: Hydraulic Conductivity (m/s)  
 $C_u$ : Undrained Shear Strength (kPa)  
 % REC : Percentage of Sample Recovered  
 % RQD : Indirect Measure of the Number of Fractures and Soundness of Rock Mass  
 ≡ Approximate Water Table

## GRAIN SIZE CLASSIFICATION %

trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

## SOIL DESCRIPTIONS

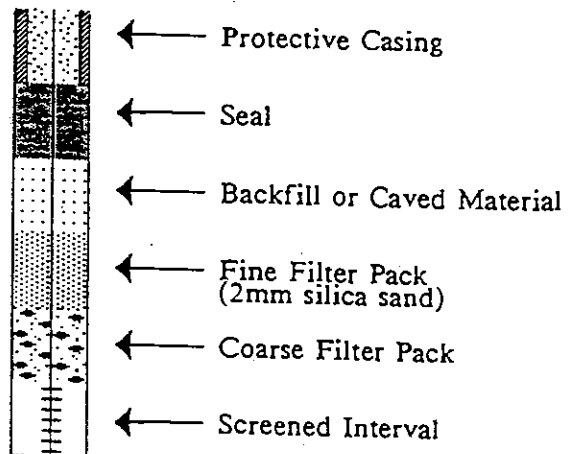
### Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

### Cohesive Soils

Consistency	$C_u$ (kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

## MONITOR DETAILS









<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 92-746	<b>BOREHOLE:</b> 2	1 of 2
<b>CAMPBELL RIVER SANITARY LANDFILL</b> <b>CAMPBELL RIVER, BRITISH COLUMBIA</b> <b>FOR: DISTRICT OF CAMPBELL RIVER</b>		<b>DATE:</b> 12 January 1993 <b>GEOLOGIST</b> SRB <b>ELEVATION</b> 165.9 m ASL	

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				N VALUE				WATER CONTENT (%)									
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD											
											15	30	45	60	10	20	30	40			
1		<b>SAND AND GRAVEL</b> Medium brown fine to medium sand, trace silt and fine subrounded gravel, moist, loose.				GS															
2																					
3																					
4																					
5								GS													
6																					
7																					
8																					
9																					
10																					
11																					
12																					
13																					
14																					
15.2																					
16		<b>SAND</b> Medium brown fine to medium sand, trace silt, a few fine pieces of gravel, moist, loose.				GS															
17																					
18																					
18				- Gravel layer at 18.30 m to 18.50 m.																	
19																					













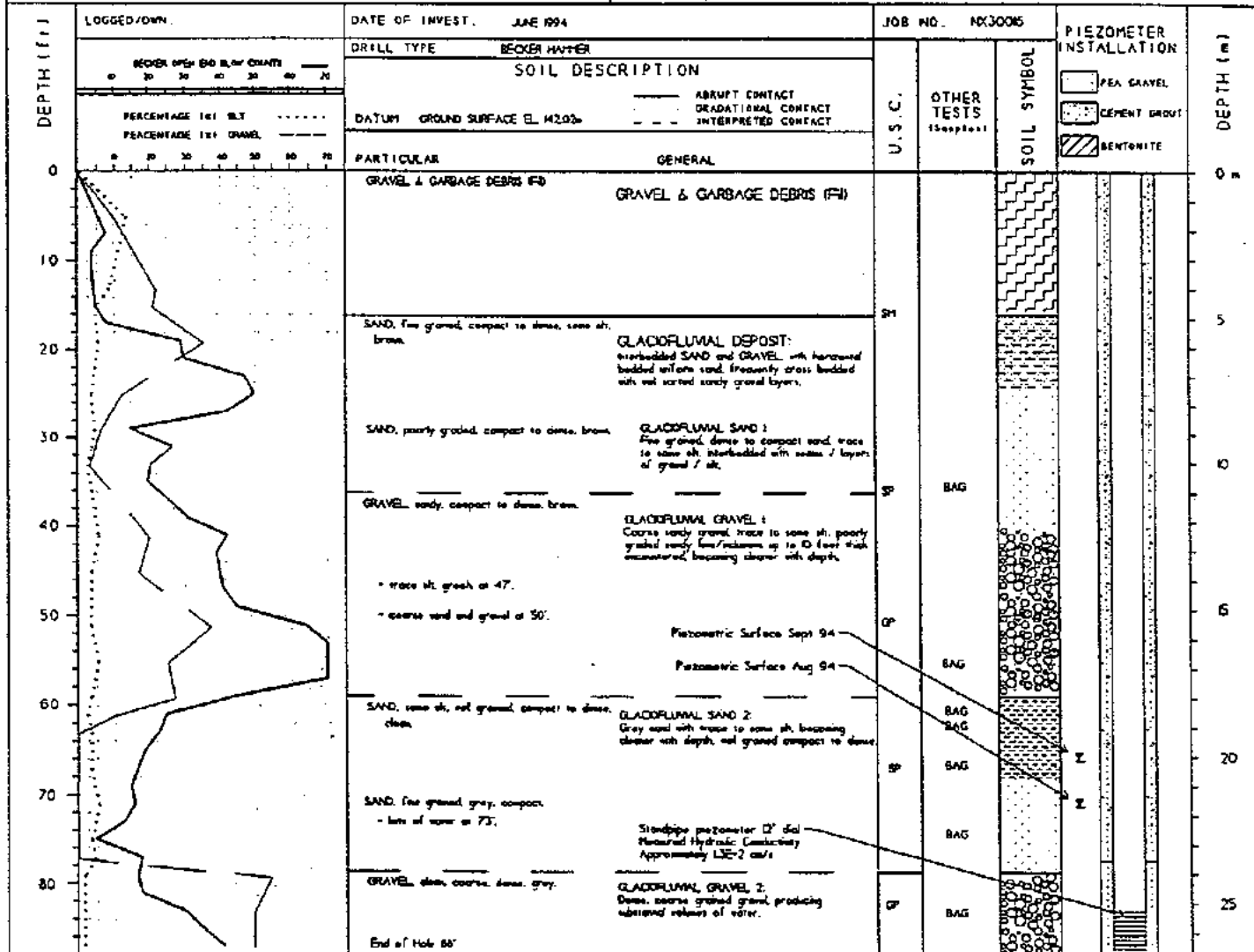




**AGRA**  
Earth & Environmental

LOG OF BOREHOLE NO. HBT 94-3

DISTRICT OF CAMPBELL RIVER LANDFILL, ARGONAUT ROAD  
1994 HYDROGEOLOGIC INVESTIGATIONS

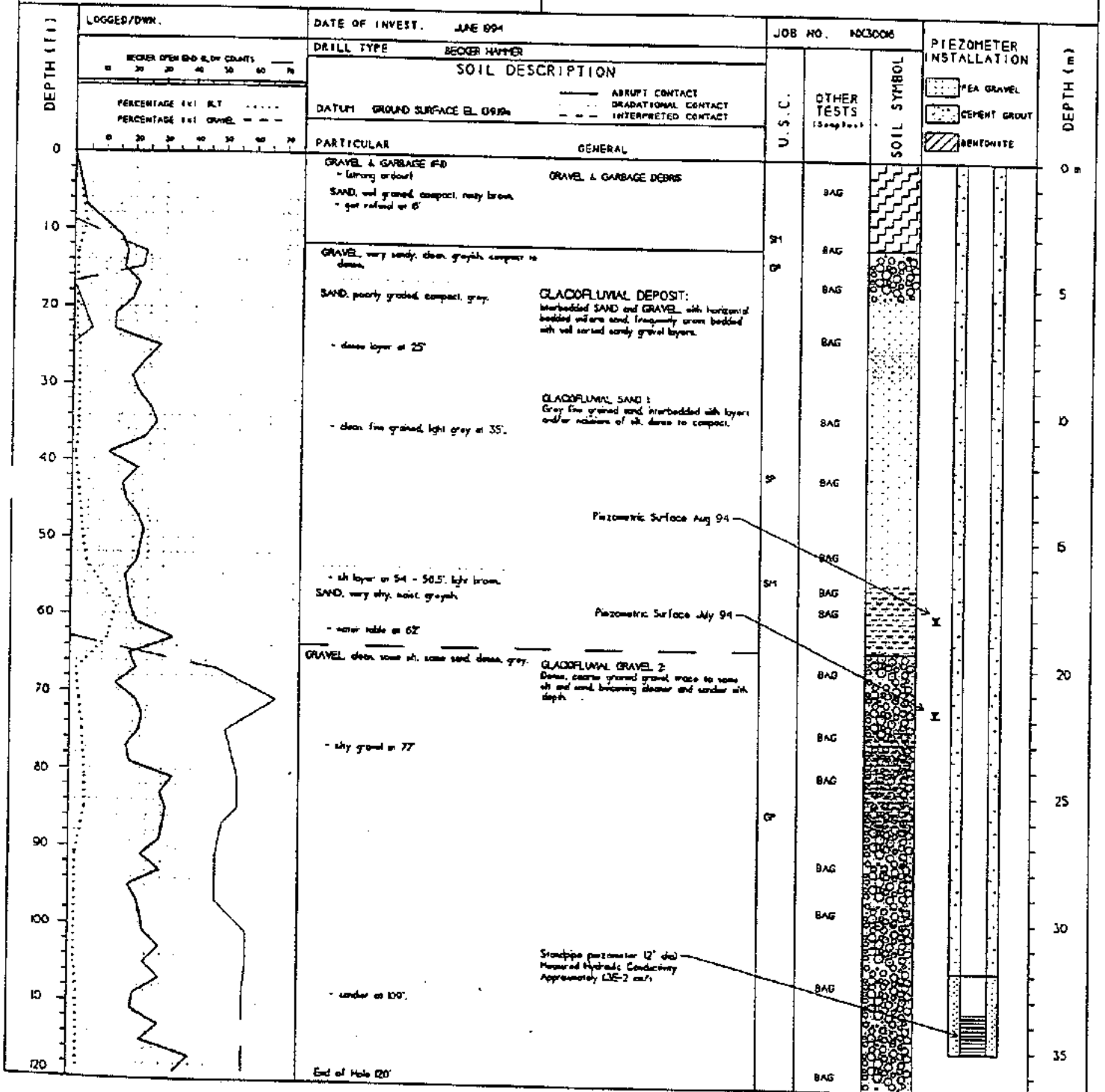




AGRA  
Earth & Environmental

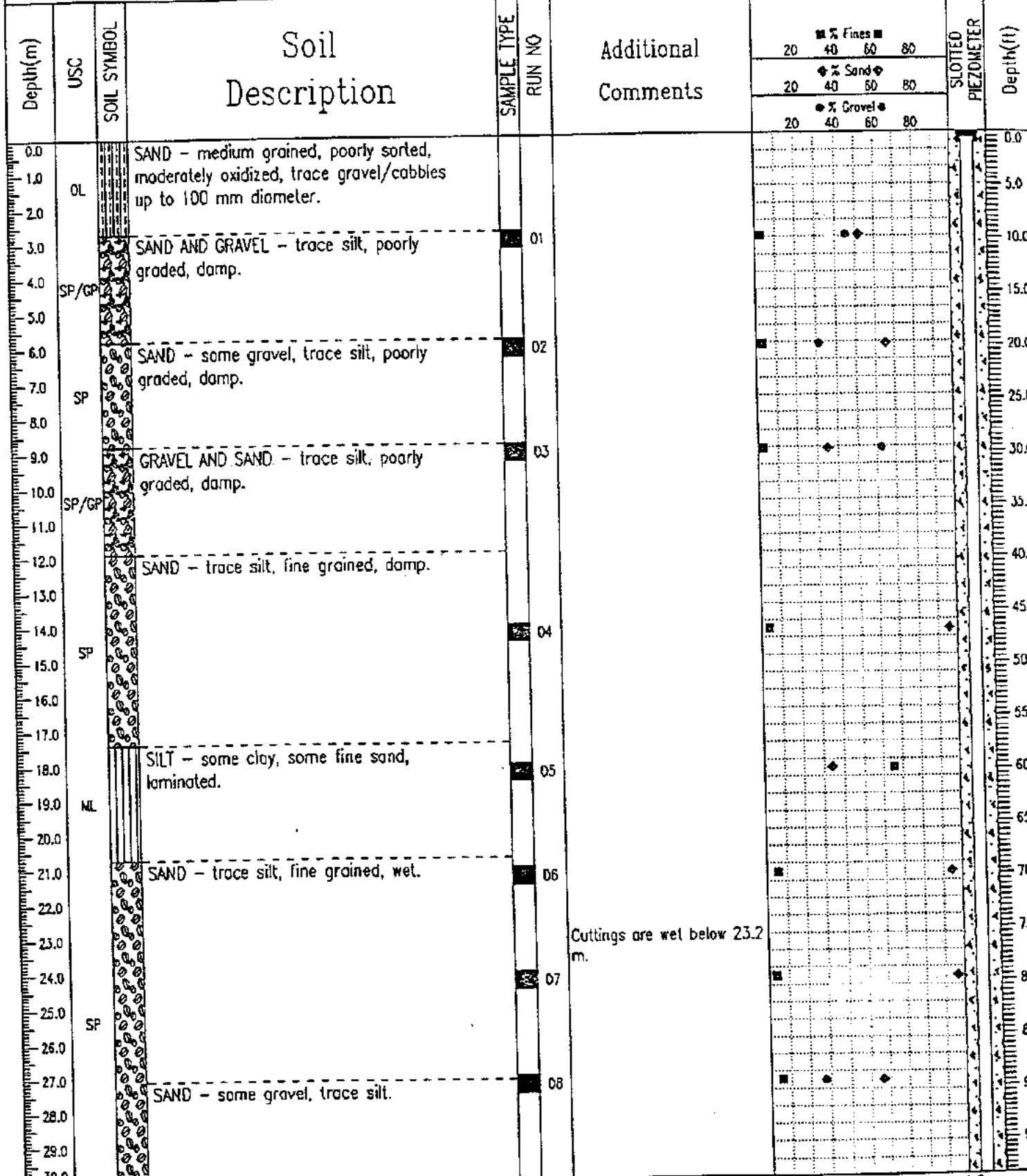
LOG OF BOREHOLE NO. HBT 94-4

DISTRICT OF CAMPBELL RIVER LANDFILL ARGONAUT ROAD  
1994 HYDROGEOLOGIC INVESTIGATIONS





SAMPLE TYPE	<input type="checkbox"/> GRAS (SOIL)	<input checked="" type="checkbox"/> GRAS (WATER)
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL
	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT
	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND FILTER PK.



AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW  
REVIEWED BY: JR

COMPLETION DEPTH: 48.5 m  
COMPLETE: 17/06/99

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)  
 BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK

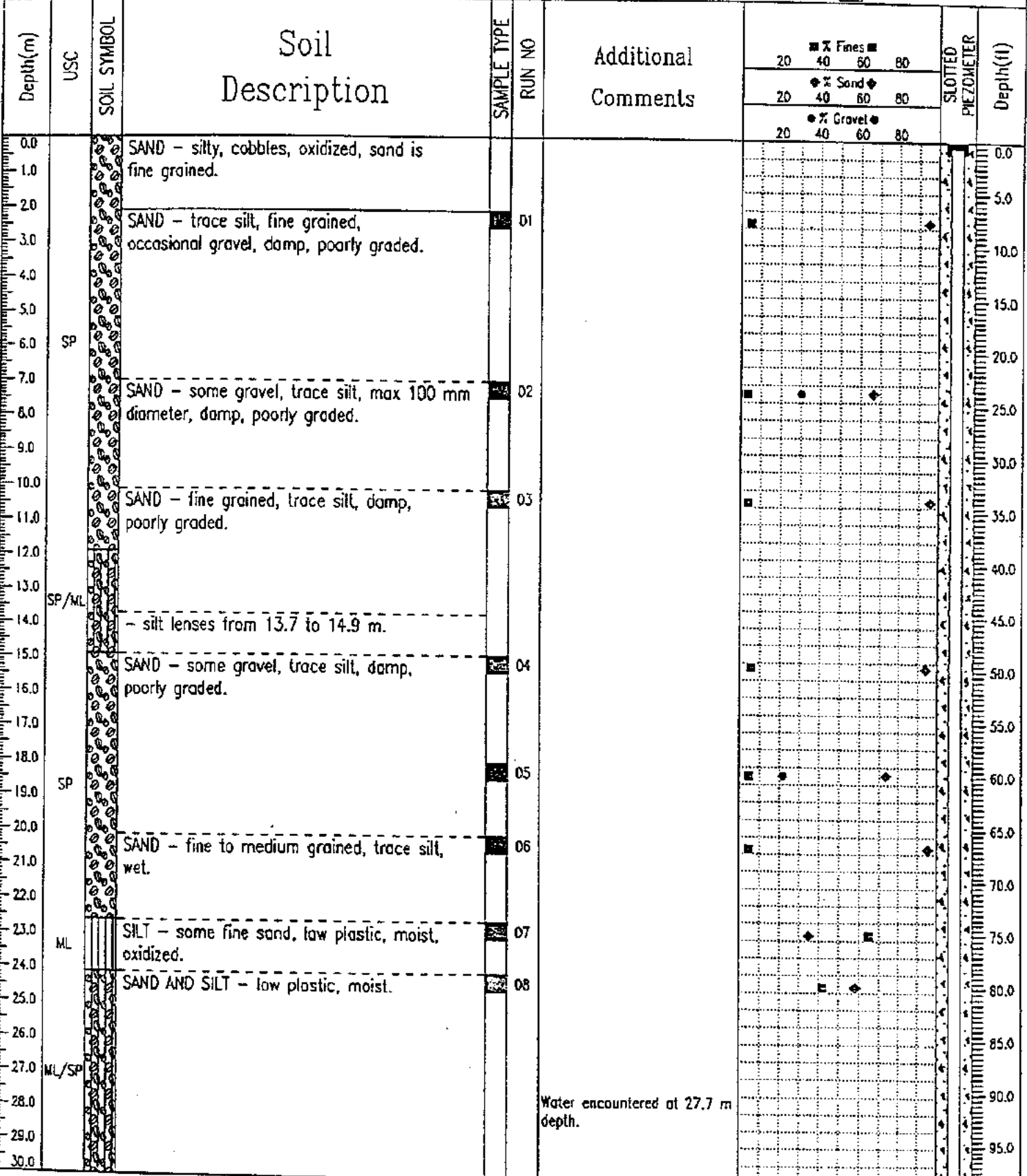
Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Fines			Sand			Gravel			SLOTTED PIEZOMETER	Depth(ft)			
							20	40	60	80	20	40	60	80	20			40	60	80
30.0	SP																			
31.0			SAND AND SILT - low plastic, wet.		09												100			
32.0	SM/ML																105			
33.0																				
34.0			SAND - some silt, fine grained, wet.		11												110			
35.0	SM																115			
36.0																				
37.0			SAND - trace silt, fine grained, wet.		12												120			
38.0																	125			
39.0																				
40.0																	130			
41.0	SP																135			
42.0																	140			
43.0																	145			
44.0																				
45.0																	150			
46.0			GRAVEL - little sand, clean, wet, occasional cobbles/cobble fragments up to 120 mm diameter.		14												155			
47.0	GP																160			
48.0																	165			
49.0			End of Hole at 48.5 m.														170			
50.0																	175			
51.0																	180			
52.0																	185			
53.0																	190			
54.0																	195			
55.0																				
56.0																				
57.0																				
58.0																				
59.0																				
60.0																				

07/03/23 04:01PM (BOREHOLE)

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-02
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013504
		ELEVATION:

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

SACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK



AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW	COMPLETION DEPTH: 51.51 m
REVIEWED BY: JR	COMPLETE: 18/06/99

Page 1 of 2

02/01/23 04:51 PM (608701)

REGIONAL DISTRICT OF COMOX-STRATHCONA      Drilling Contractor: BECK Drilling      BOREHOLE NO: AG99-02  
 ADDITIONAL MONITORING WELL INSTALLATION      Method: Becker Hammer      PROJECT NO: RX2013004  
 ELEVATION:

SAMPLE TYPE     GRAB (SOIL)     GRAB (WATER)  
 BACKFILL TYPE     BENTONITE     PEA GRAVEL     SLOUGH     GROUT     DRILL CUTTINGS     SAND FILTER PK

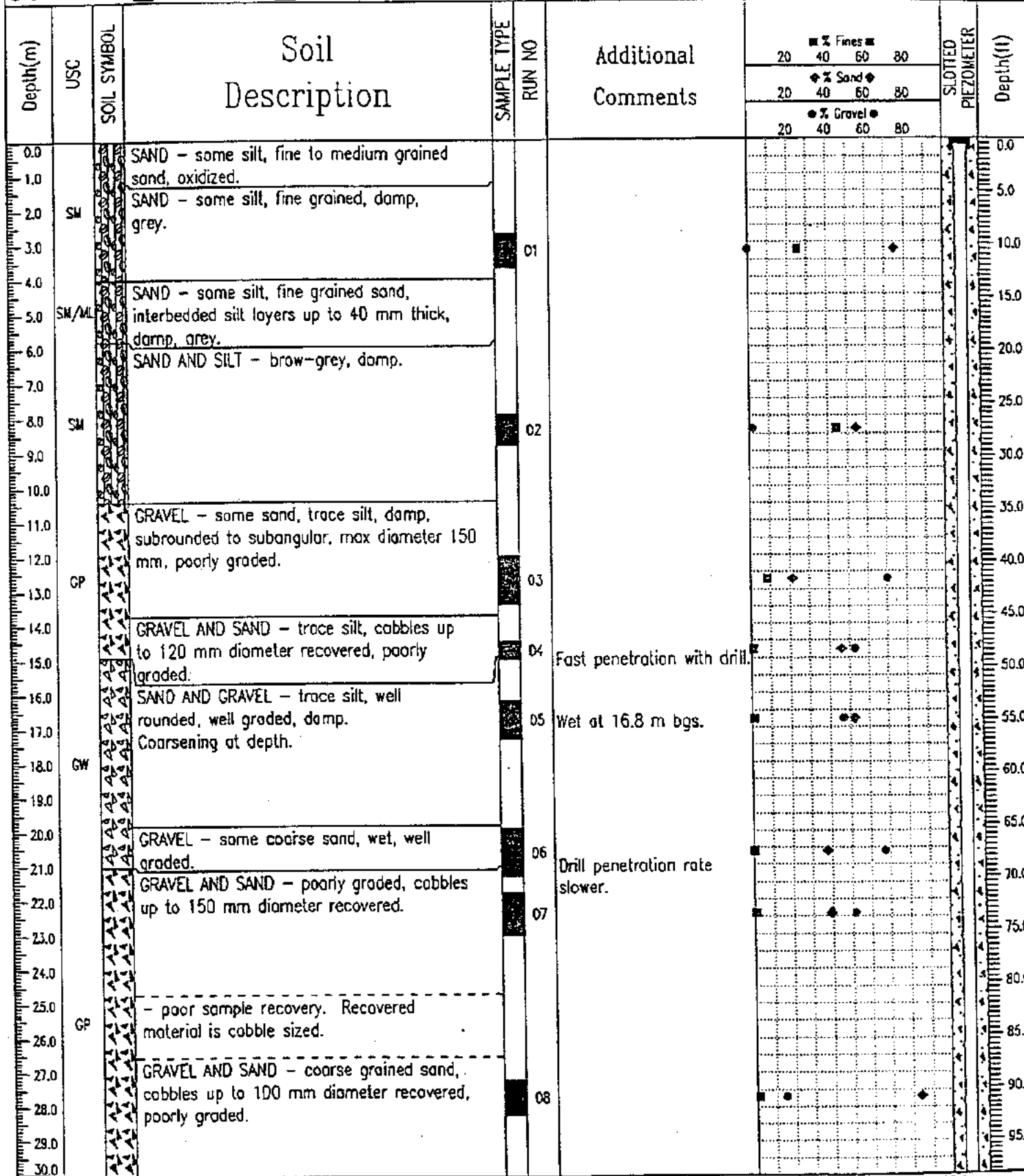
Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Fines			Sand			% Gravel			SLOTTED PIEZOMETER	Depth(ft)
							20	40	60	80	20	40	60	80	20		
30.0			SAND - little silt, poorly graded, wet.		09												100.0
31.0	SW																105.0
32.0																	110.0
33.0			SAND - trace silt, fine grained, wet.		10												115.0
34.0																	120.0
35.0																	125.0
36.0						Rapid drill penetration.											130.0
37.0					11												135.0
38.0																	140.0
39.0																	145.0
40.0																	150.0
41.0	SB																155.0
42.0																	160.0
43.0					12												165.0
44.0																	170.0
45.0																	175.0
46.0					13												180.0
47.0																	185.0
48.0																	190.0
49.0					14												195.0
50.0	GW		GRAVEL - some sand, some cobbles, clean.														
51.0																	
52.0			End of Hole at 51.5 m.														
53.0			Well installed.														
54.0																	
55.0																	
56.0																	
57.0																	
58.0																	
59.0																	
60.0																	

AGRA Earth & Environmental  
 Nanaimo, B.C.

LOGGED BY: JW      COMPLETION DEPTH: 51.51 m  
 REVIEWED BY: JR      COMPLETE: 18/06/99

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DREL CUTTINGS  SAND FILTER PK



AGRA Earth & Environmental  
Nanaimo, B.C.

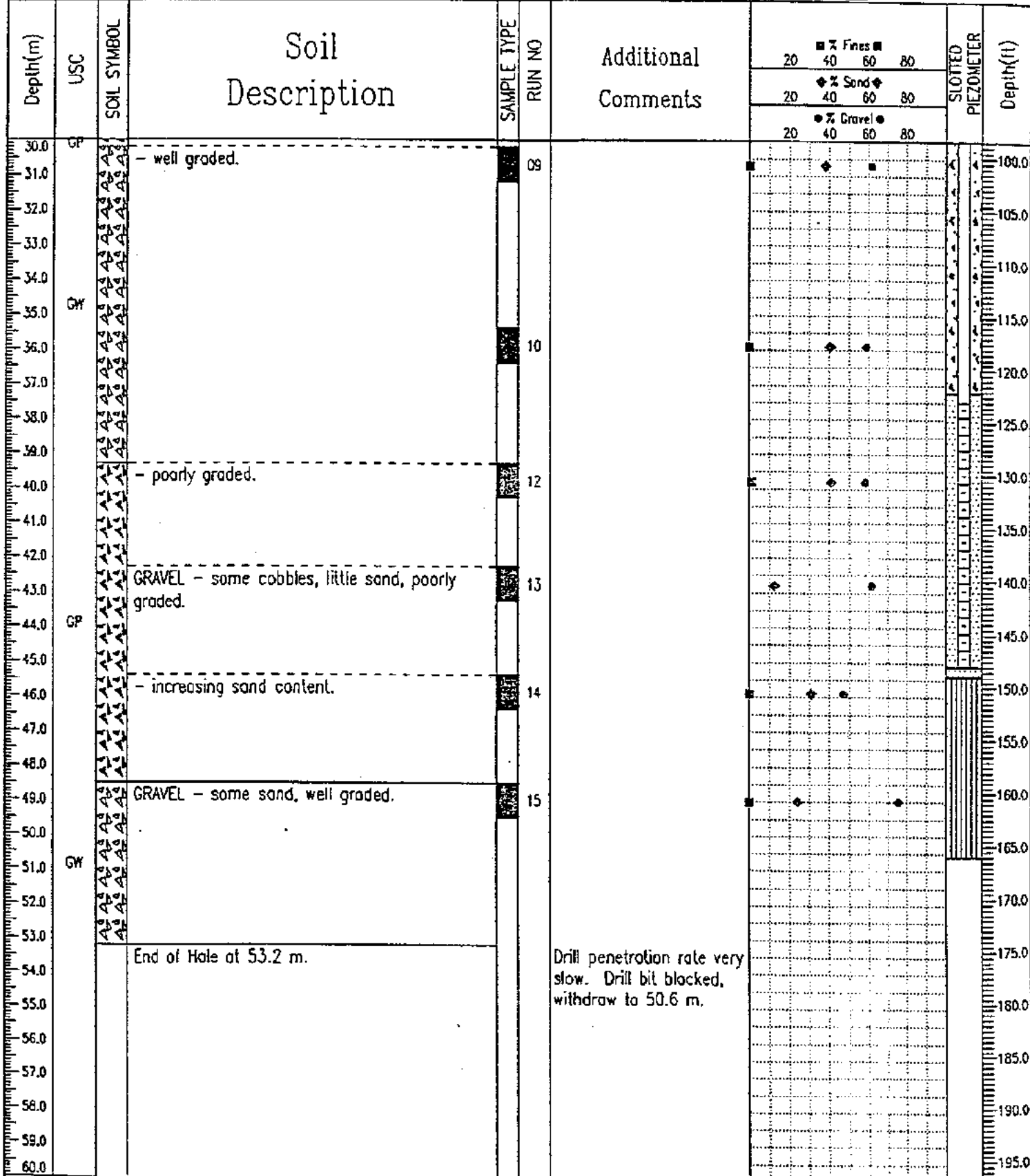
LOGGED BY: JR  
REVIEWED BY: JW

COMPLETION DEPTH: 53.2 m  
COMPLETE: 18/06/99



SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK



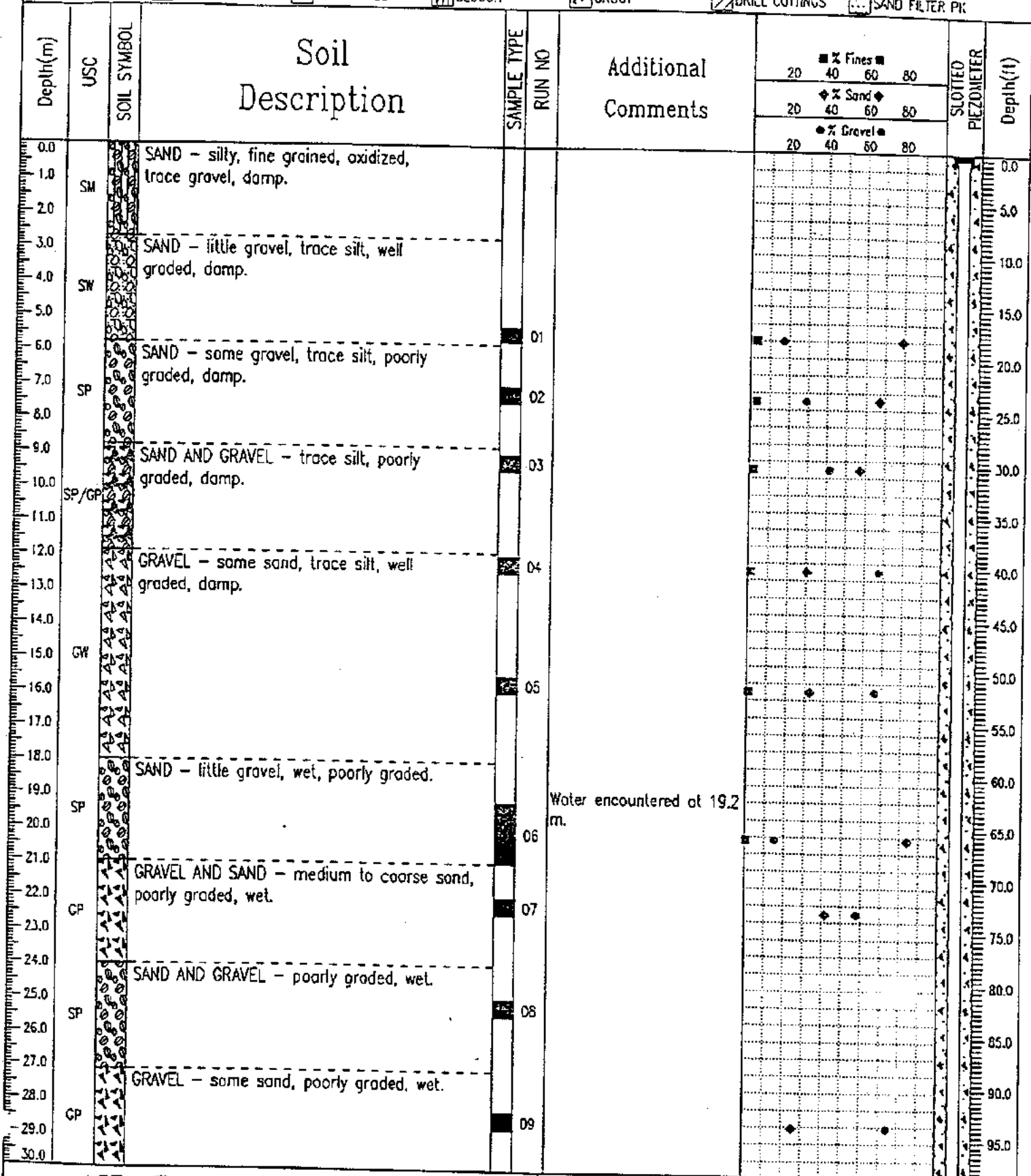
AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JR  
REVIEWED BY: JW

COMPLETION DEPTH: 53.2 m  
COMPLETE: 16/06/99

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK

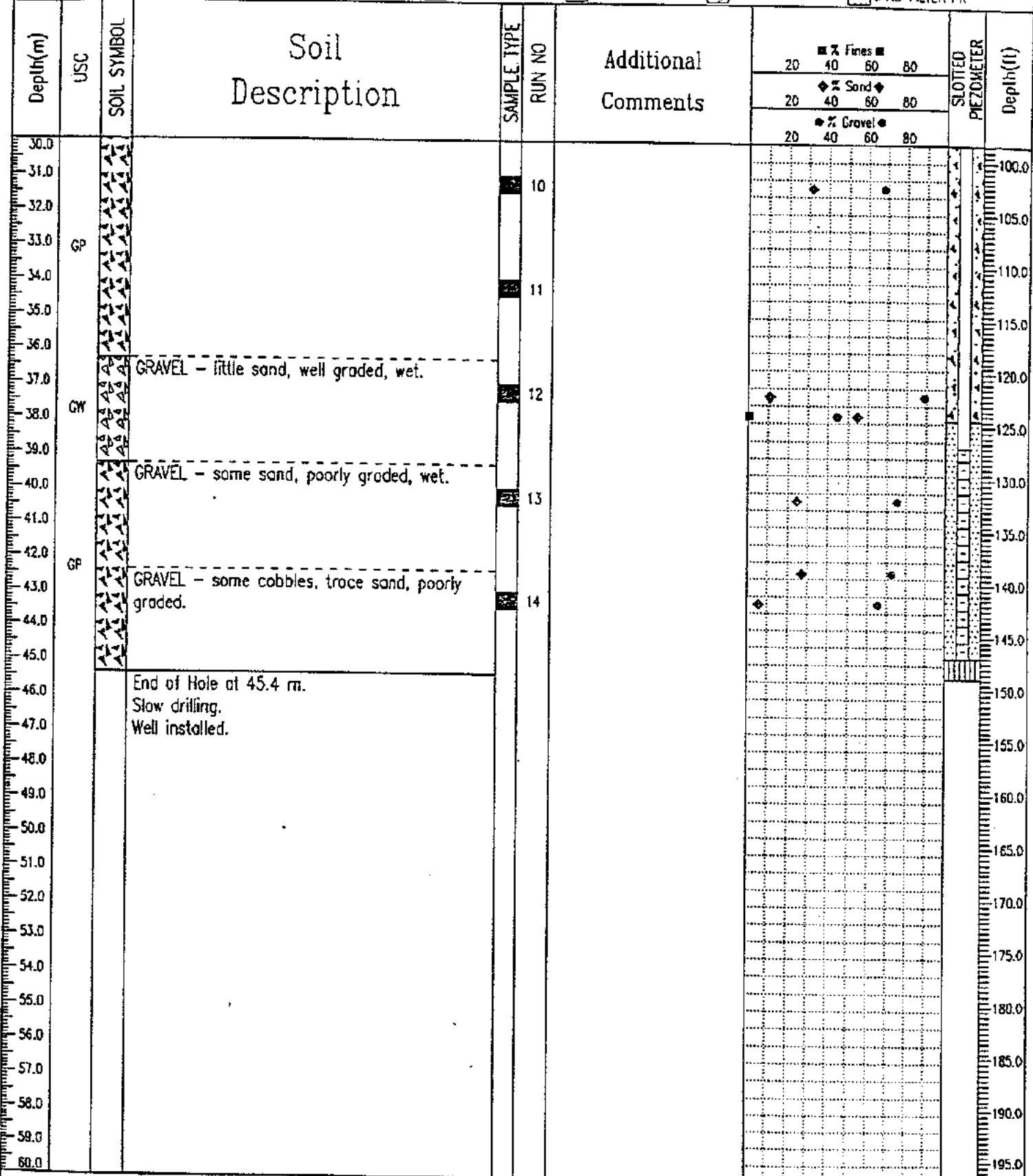


AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW	COMPLETION DEPTH: 45.42 m
REVIEWED BY: JR	COMPLETE: 17/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA      Drilling Contractor: BECK Drilling      BOREHOLE NO: AG99-04  
 ADDITIONAL MONITORING WELL INSTALLATION      Method: Backer Hammer      PROJECT NO: HX2013604  
 ELEVATION:

SAMPLE TYPE     GRAB (SOIL)     GRAB (WATER)  
 BACKFILL TYPE     BENTONITE     PEA GRAVEL     SLOUGH     GROUT     DRILL CUTTINGS     SAND FILTER PK



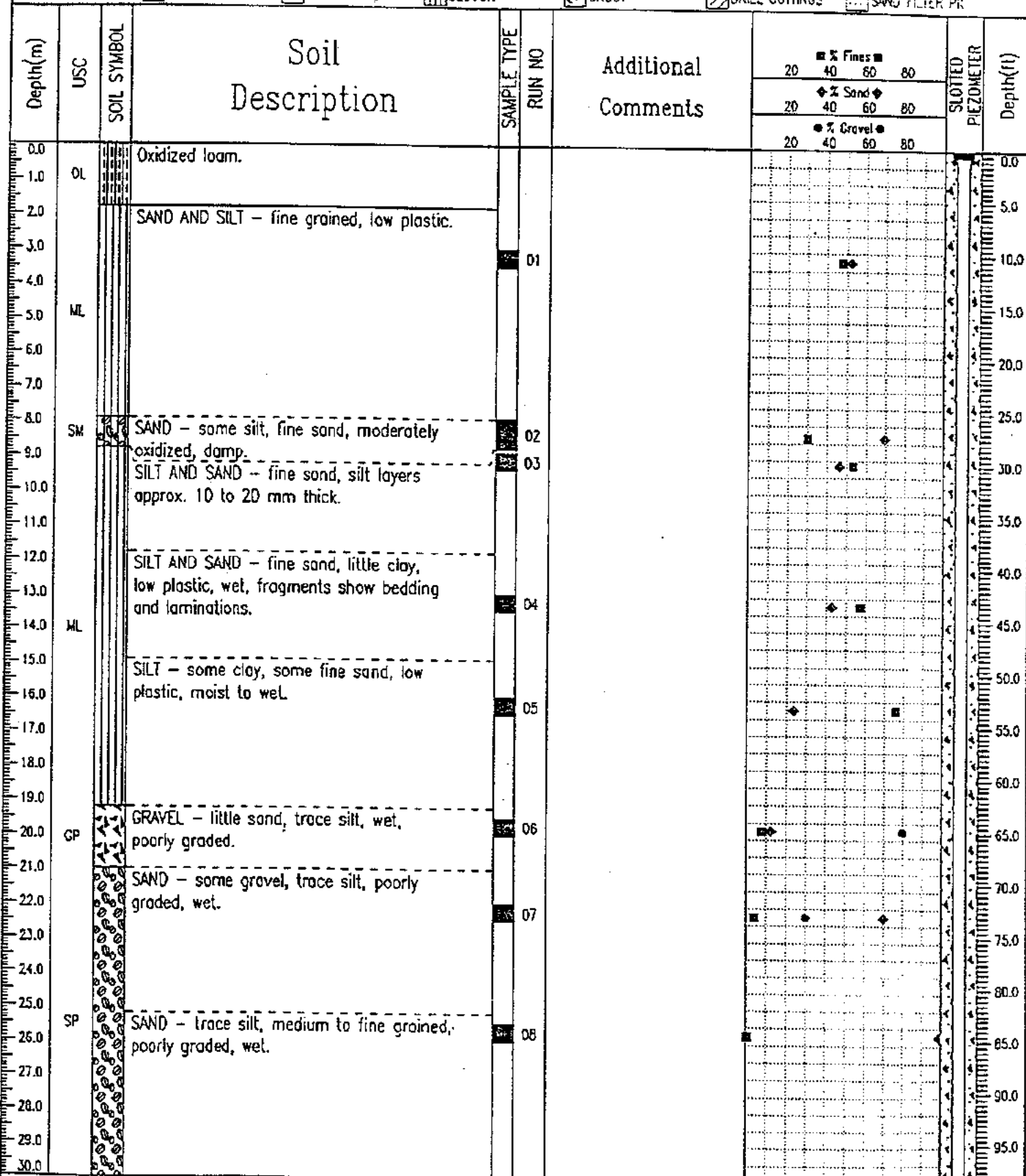
AGRA Earth & Environmental  
 Nanaimo, B.C.

LOGGED BY: JW      COMPLETION DEPTH: 45.42 m  
 REVIEWED BY: JR      COMPLETE: 17/06/99  
 Page 2 of 2

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: A099-05
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2015604
		ELEVATION:

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK



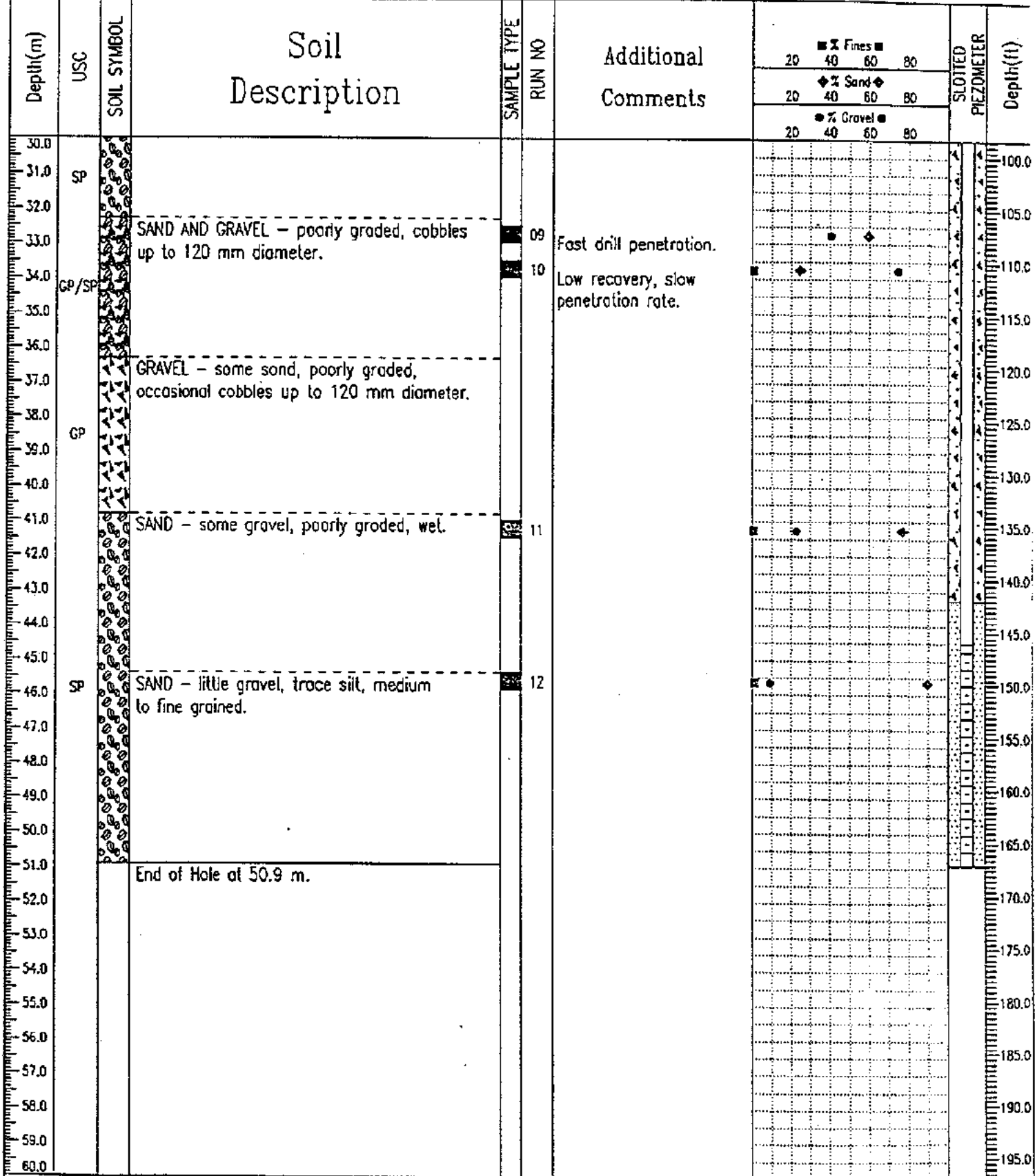
AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW  
REVIEWED BY: JR

COMPLETION DEPTH: 50.9 m  
COMPLETE: 18/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: A099-05
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NY2013604
		ELEVATION:

SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB (SOIL)	<input type="checkbox"/> GRAB (WATER)				
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND FILTER PK



AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW  
REVIEWED BY: JR

COMPLETION DEPTH: 50.9 m  
COMPLETE: 16/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-06
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: M2313604
		ELEVATION:

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	Grain Size Analysis				SLOTTED PIEZOMETER	Depth(ft)
							% Fines	% Sand	% Gravel			
0.0			SAND - medium grained.				20	40	60	80		0.0
1.0							20	40	60	80		3.3
2.0							20	40	60	80		6.6
3.0							20	40	60	80		9.9
4.0							20	40	60	80		13.1
5.0							20	40	60	80		16.4
6.0							20	40	60	80		19.7
7.0							20	40	60	80		22.9
8.0							20	40	60	80		26.2
9.0							20	40	60	80		29.5
10.0							20	40	60	80		32.8
11.0							20	40	60	80		36.1
12.0							20	40	60	80		39.4
13.0							20	40	60	80		42.6
14.0			- grades to fine sand.				20	40	60	80		45.9
15.0							20	40	60	80		49.2
16.0							20	40	60	80		52.5
17.0							20	40	60	80		55.8
18.0			SAND - some gravel, little silt, moist, medium grained sand.				20	40	60	80		59.1
19.0			SAND - little silt, fine grained sand.		01		20	40	60	80		62.4
20.0							20	40	60	80		65.7
21.0							20	40	60	80		69.0
22.0							20	40	60	80		72.3
23.0							20	40	60	80		75.6
24.0							20	40	60	80		78.9
25.0							20	40	60	80		82.2
26.0			Silt - sandy, fine grained, wet.		02		20	40	60	80		85.5
27.0							20	40	60	80		88.8
28.0							20	40	60	80		92.1
29.0							20	40	60	80		95.4
30.0							20	40	60	80		98.7

AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW  
REVIEWED BY: JR  
COMPLETION DEPTH: 45.11 m  
COMPLETE: 16/06/99

REGIONAL DISTRICT OF COMOX-STRATHCONA	Drilling Contractor: BECK Drilling	BOREHOLE NO: AG99-06
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer	PROJECT NO: NX2013604
		ELEVATION:

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK

Depth(m)	USC	SOIL SYMBOL	Soil Description	SAMPLE TYPE	RUN NO	Additional Comments	% Fines			SLOTTED PIEZOMETER	Depth(ft)
							20	40	60		
30.0			- interbedded fine SAND and SILT layers, very wet.		03						
31.0											
32.0			SILT - some sand, some clay, low plastic, soft.		04						
33.0			SILT - some fine sand, some clay, wet.		05						
34.0											
35.0											
36.0											
37.0											
38.0											
39.0			SILT AND SAND - fine sand, wet, occasional silt lense approx. 0.3 m thick slows drill penetration rate.								
40.0											
41.0											
42.0											
43.0			- low recovery, silty fine SANDS.								
44.0											
45.0			End of Hole at 45.1 m. Hole sloughed in to 39.3 m, attempt to redrill, rods blocked. Grout from 39.3 m to 25 m. Install well.								
46.0											
47.0											
48.0											
49.0											
50.0											
51.0											
52.0											
53.0											
54.0											
55.0											
56.0											
57.0											
58.0											
59.0											
60.0											

AGRA Earth & Environmental  
Nanaimo, B.C.

LOGGED BY: JW	COMPLETION DEPTH: 45.11 m
REVIEWED BY: JR	COMPLETE: 18/06/99

REGIONAL DISTRICT OF COMOX-STRAATHCONA

Contractor: BECK Drilling

BOREHOLE NO: AM00-01

ADDITIONAL MONITORING WELL INSTALLATION

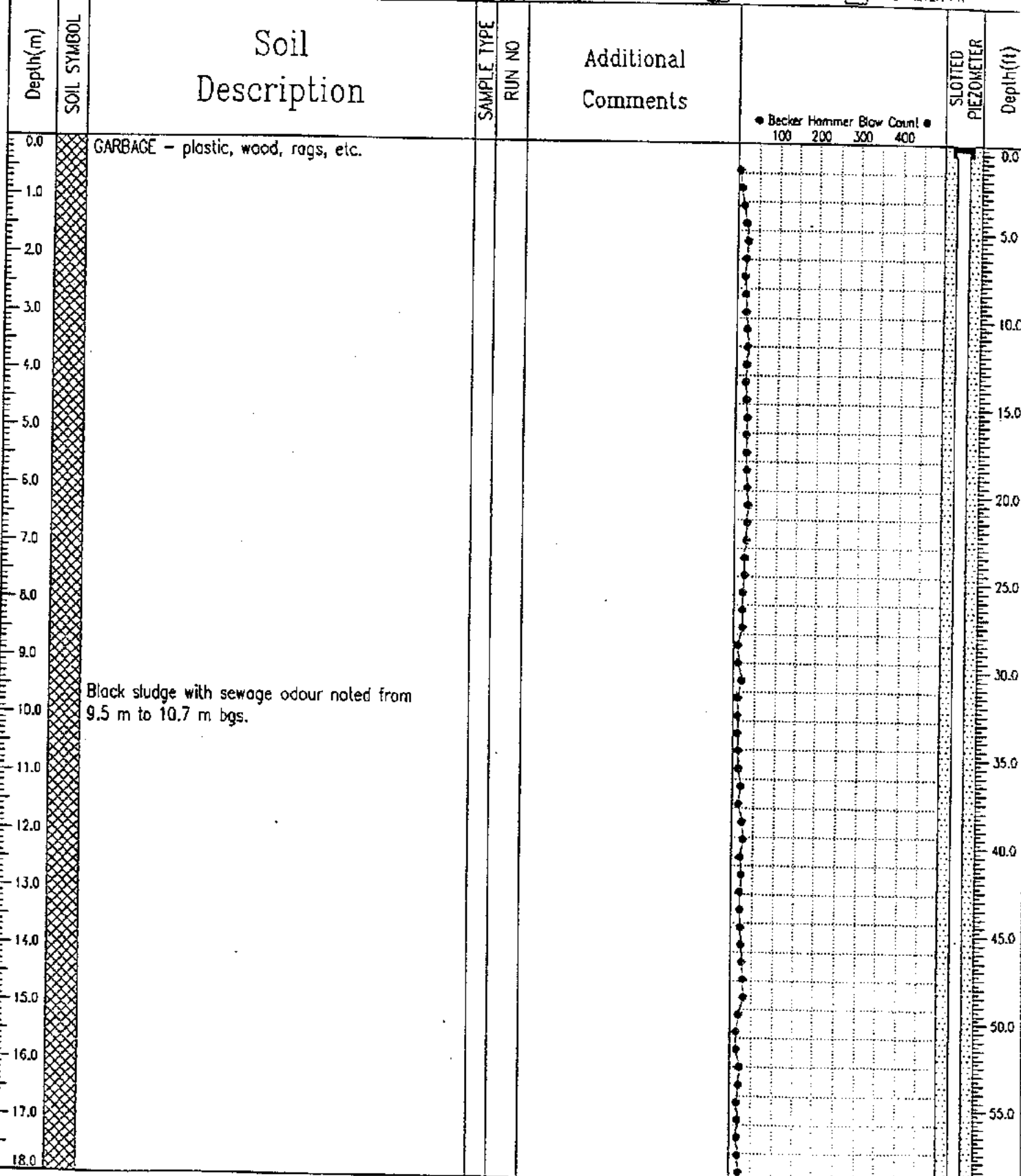
Method: Becker Hammer, Hollow Stem

PROJECT NO: IX2025502-503

ELEVATION:

SAMPLE TYPE  GRAB (SOIL)  GRAB (WATER)  SPT

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND FILTER PK



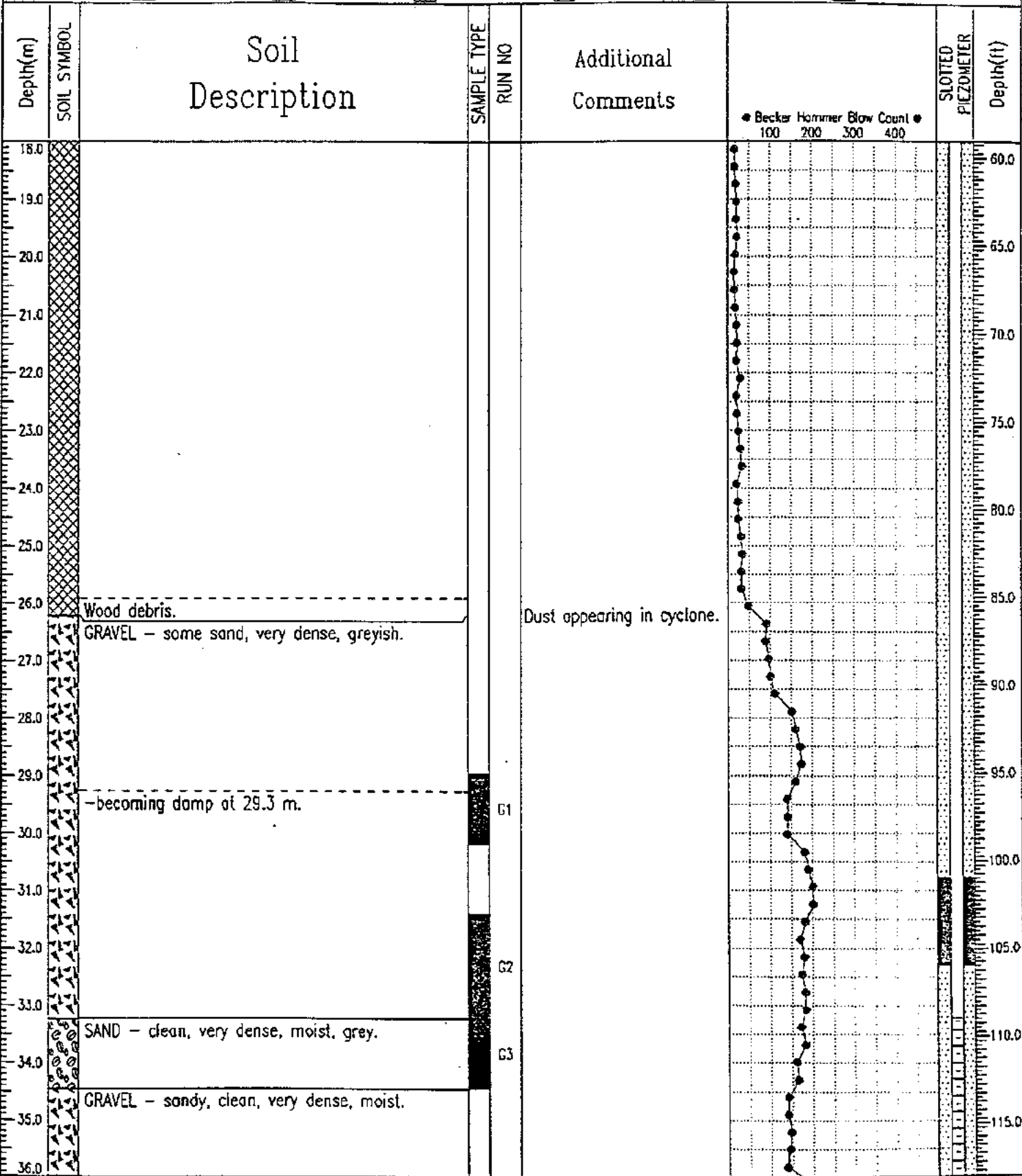
AMEC Earth & Environmental Limited  
Nanaimo, B.C.

LOGGED BY: BH  
REVIEWED BY: CM

COMPLETION DEPTH: 48.463 m  
COMPLETE: 21/09/00

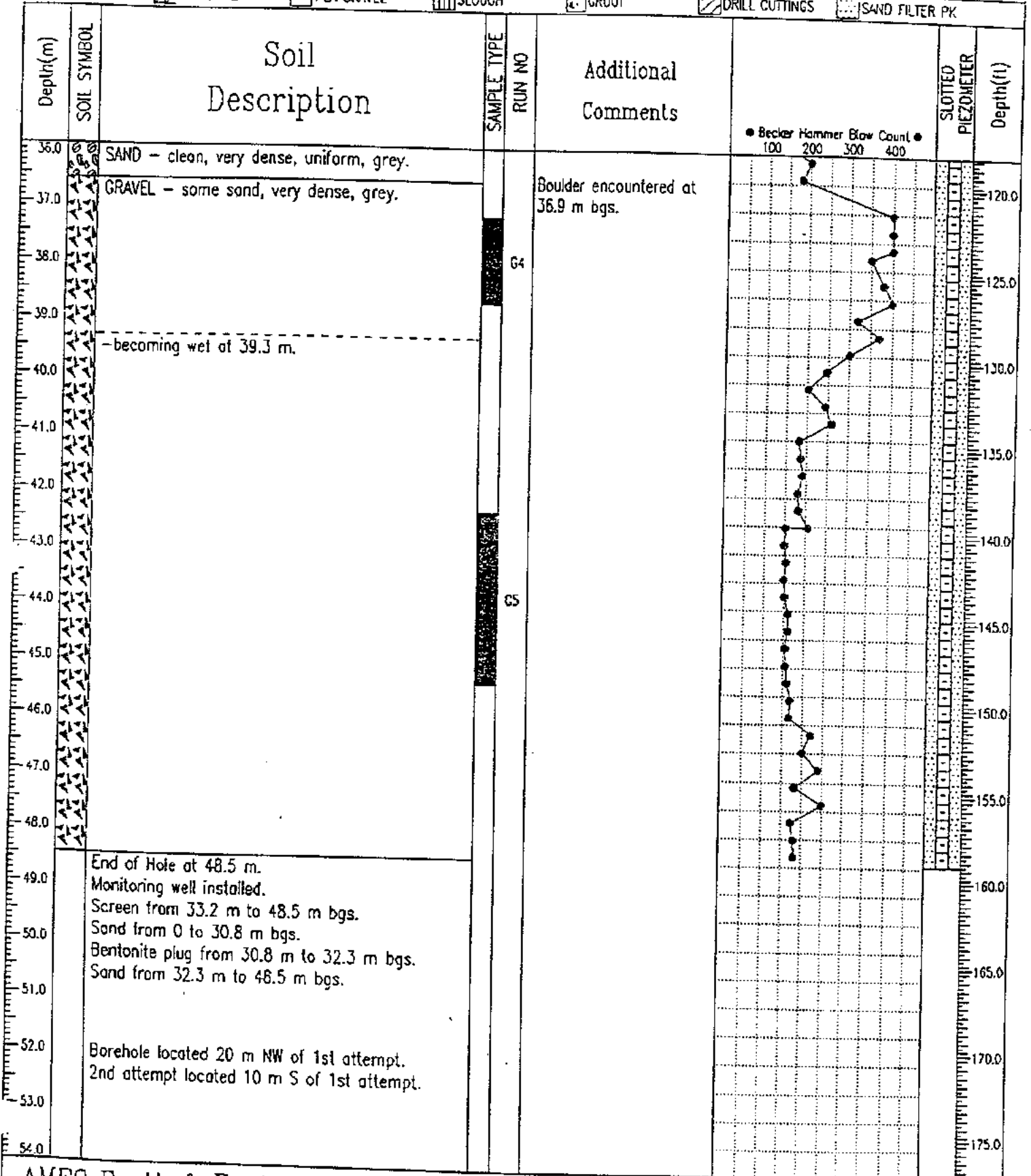


REGIONAL DISTRICT OF COMOX-STRAATHCOMA.	Contractor: BECK Drilling	BOREHOLE NO: AM00-01
ADDITIONAL MONITORING WELL INSTALLATION.	Method: Becker Hammer, Hollow Stem	PROJECT NO: NY2025502-603
		ELEVATION:
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB (SOIL) <input checked="" type="checkbox"/> GRAB (WATER) <input checked="" type="checkbox"/> SPT	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input checked="" type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND FILTER PK	



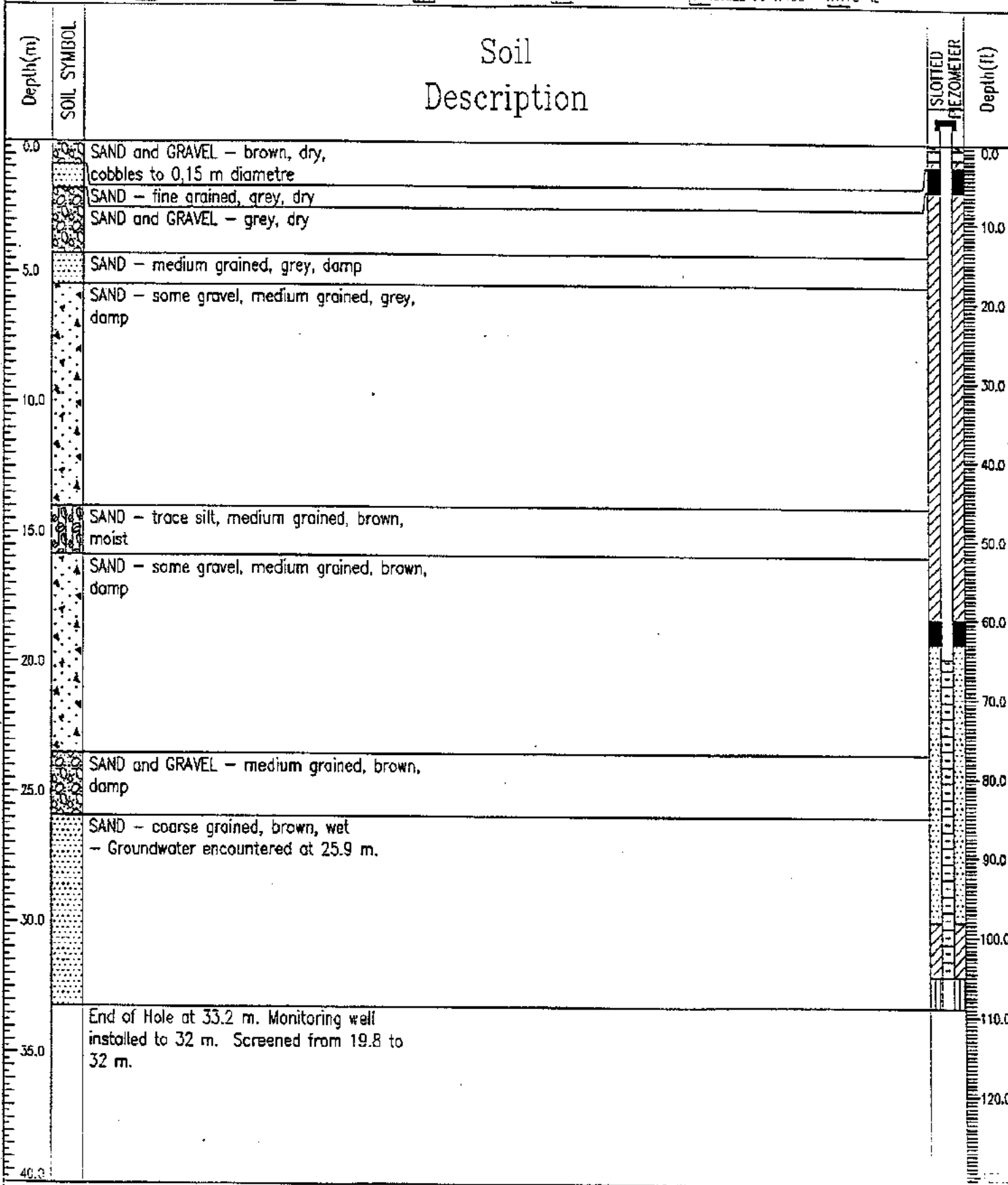
AMEC Earth & Environmental Limited Nanaimo, B.C.	LOGGED BY: BH REVIEWED BY: CM	COMPLETION DEPTH: 48.463 m COMPLETE: 21/09/00
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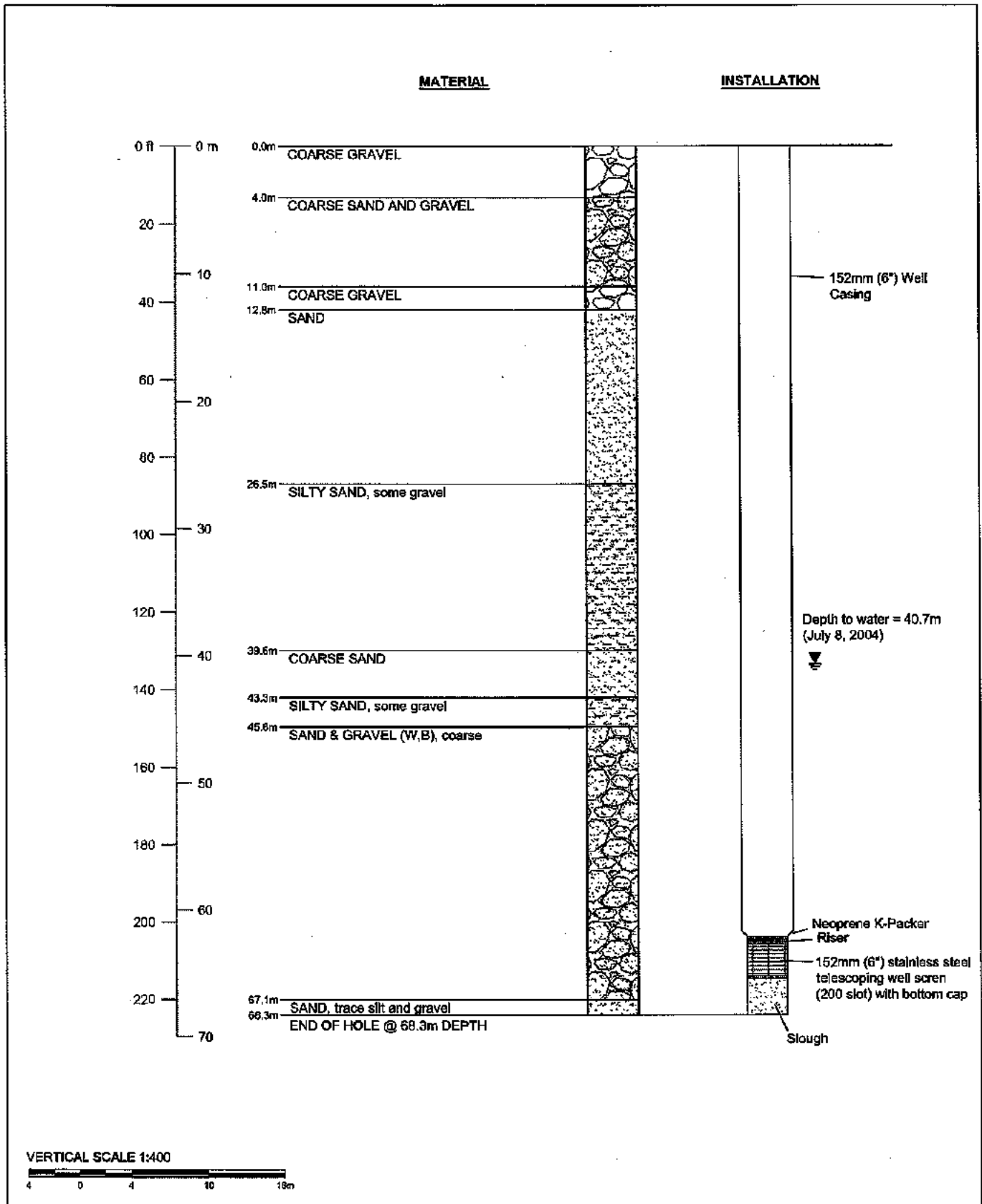
REGIONAL DISTRICT OF COMOX-STRAATHCOM	Contractor: BECK Drilling	BOREHOLE NO: AM03-01
ADDITIONAL MONITORING WELL INSTALLATION	Method: Becker Hammer, Hollow Stem	PROJECT NO: NY2025592-800
ELEVATION:		
SAMPLE TYPE	<input type="checkbox"/> GRAB (SOIL) <input type="checkbox"/> GRAB (WATER) <input checked="" type="checkbox"/> ISPT	
BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input checked="" type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND FILTER PK	



Annual Groundwater Monitoring	BECK Drilling and Environmental Services	BOREHOLE NO: AM02-1
Regional District of Comox-Strother	Acker Tractor Air Rotary Drill	PROJECT NO: WAC025506
		ELEVATION:

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  CORELL CUTTINGS  SAND





VERTICAL SCALE 1:400



**EBA Engineering Consultants Ltd.**



PROJECT INSTALLATION OF PROD. WELL AND ADDITIONAL MONITORING WELLS, CAMPBELL RIVER LANDFILL

CLIENT

REGIONAL DISTRICT OF COMOX-STRATHCONA

TITLE

EBA04-1 WELL SCHEMATIC

DATE 2004/08/17

DWN.

YL

CHKD.

SB

FILE NO.

0807-2840017.010

Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-2
Regional District of Comox-Strothcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND

Depth (m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth (ft)
0.0		GRAVEL CAP	CASING LEFT IN GROUND TO DEPTH OF 33.5m.		0.0
1.0		WOOD FIBRE			5.0
2.0		GARBAGE			10.0
3.0		WOOD FIBRE			15.0
4.0		GARBAGE			20.0
5.0		SAND & GRAVEL			25.0
6.0					30.0
7.0					35.0
8.0		COARSE GRAVEL			40.0
9.0					45.0
10.0			50.0		
11.0			55.0		
12.0			60.0		
13.0			65.0		
14.0			70.0		
15.0			75.0		
16.0			80.0		
17.0			85.0		
18.0			90.0		
19.0			95.0		
20.0			100.0		
21.0			105.0		
22.0			110.0		
23.0					
24.0					
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MK	COMPLETION DEPTH: 65.5 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

04/02/96 02:57 PM (SHILLY)

Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-2
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND
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Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0		SAND & GRAVEL			155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					195.0
52.0					200.0
53.0					205.0
54.0					210.0
55.0					215.0
56.0					220.0
57.0					225.0
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0		END OF HOLE @ 65.5m BELOW SURFACE			
67.0		NOTE: SOILS LOGGED BY DRILLWELL STAFF.			
68.0					
69.0					
70.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MK	COMPLETION DEPTH: 65.5 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

Monitoring Wells Campbell River Landfill	Drilwell Enterprises Ltd.	BOREHOLE NO: EBA04-3
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND



Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m.		0.0
1.0					5.0
2.0					10.0
3.0					15.0
4.0		SAND, some gravel			20.0
5.0					25.0
6.0		SAND AND GRAVEL			30.0
7.0					35.0
8.0					40.0
9.0					45.0
10.0					50.0
11.0		SILTY SAND	55.0		
12.0			60.0		
13.0		FINE SAND	65.0		
14.0			70.0		
15.0			75.0		
16.0		COARSE SAND	80.0		
17.0			85.0		
18.0		FINE SAND, some silt	90.0		
19.0			95.0		
20.0			100.0		
21.0			105.0		
22.0			110.0		
23.0					
24.0					
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0		SAND AND GRAVEL			
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 41.2 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

04/02/16 12:10PM (SIBL)

Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-3
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0	END OF HOLE @ 41.2 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.				170.0
47.0	175.0				
48.0	180.0				
49.0	185.0				
50.0	190.0				
51.0	195.0				
52.0	200.0				
53.0	205.0				
54.0	210.0				
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0					
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 41.2 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

07/12/10 12:00PM (SHELL)



Monitoring Wells Campbell River Landfill	Sonic Drilling Ltd.	BOREHOLE NO: EBA04-4
Regional District of Comox-Strathcona	Drilling Method: Sonic	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE  BENTONITE  PEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		GARBAGE			0.0
1.0					
2.0					
3.0					
4.0					
5.0					
6.0					
7.0					
8.0					
9.0					
10.0					
11.0					
12.0					
13.0					
14.0					
15.0					
16.0					
17.0					
18.0					
19.0					
20.0					
21.0					
22.0		SAND, fine to medium grained, well sorted, loose, damp			70.0
23.0					75.0
24.0					80.0
25.0					85.0
26.0		SILT, occasional gravel, trace silt, compact, moist			90.0
27.0		SAND, fine to medium grained, well sorted			95.0
28.0		SILT & CLAY with trace sand			100.0
29.0		SAND and SAND & GRAVEL interlayers			105.0
30.0					110.0
31.0					
32.0					
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 53.4 m
	REVIEWED BY: SB	COMPLETE: 15/07/04

07/12/18 DES/PAK (SHELD)

Monitoring Wells Campbell River Landfill		Sonic Drilling Ltd.	BOREHOLE NO: EBA04-4
Regional District of Comox-Strothcona		Drilling Method: Sonic	PROJECT NO: 2840017.010
			ELEVATION:
BACKFILL TYPE <input checked="" type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH <input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND			
Depth(m)	SOIL SYMBOL	Soil Description	Field Notes
35.0			
36.0			
37.0			
38.0			
39.0			
40.0			
41.0			
42.0			
43.0			
44.0			
45.0			
46.0			
47.0			
48.0			
49.0			
50.0			
51.0			
52.0			
53.0			
54.0	END OF HOLE @ 53.3 m BELOW SURFACE NOTE: SOILS LOGGED BY EBA STAFF.		175.0
55.0			
56.0			
57.0			
58.0			
59.0			
60.0			
61.0			
62.0			
63.0			
64.0			
65.0			
66.0			
67.0			
68.0			
69.0			
70.0			
EBA Engineering Consultants Ltd.		LOGGED BY: MC REVIEWED BY: SB	COMPLETION DEPTH: 53.4 m COMPLETE: 15/07/04

Monitoring Wells Campbell River Landfill	Sonic Drilling Ltd.	BOREHOLE NO: EBA04-5
Regional District of Comox-Strathcona	Drilling Method: Sonic	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND
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Depth (m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth (ft)
0.0		GARBAGE			0.0
1.0					5.0
2.0					10.0
3.0					15.0
4.0					20.0
5.0					25.0
6.0					30.0
7.0					35.0
8.0					40.0
9.0					45.0
10.0					50.0
11.0					55.0
12.0					60.0
13.0					65.0
14.0					70.0
15.0					75.0
16.0					80.0
17.0					85.0
18.0					90.0
19.0	95.0				
20.0		SAND & GRAVEL, medium to coarse grained, sub-angular, compact moist	WELLSCREEN FULL OF BENTONITE, WELL TO BE REDRILLED.		100.0
21.0					105.0
22.0					110.0
23.0					
24.0					
25.0					
26.0					
27.0					
28.0					
29.0					
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 67.1 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

04/12/10 02:30 PM (SILCO)

Monitoring Wells Campbell River Landfill	Sonic Drilling Ltd.	BOREHOLE NO: EBA04-5
Regional District of Comox-Strathcona	Drilling Method: Sonic	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE     BENTONITE     PEA GRAVEL     SLOUGH     GROUT     DRILL CUTTINGS     SAND

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth (ft)
35.0					115.0
36.0					120.0
37.0					125.0
38.0					130.0
39.0					135.0
40.0					140.0
41.0					145.0
42.0					150.0
43.0					155.0
44.0					160.0
45.0					165.0
46.0					170.0
47.0					175.0
48.0					180.0
49.0					185.0
50.0					190.0
51.0					195.0
52.0					200.0
53.0					205.0
54.0					210.0
55.0	215.0				
56.0	220.0				
57.0	225.0				
58.0	230.0				
59.0	235.0				
60.0	240.0				
61.0	245.0				
62.0	250.0				
63.0	255.0				
64.0	260.0				
65.0	265.0				
66.0	270.0				
67.0	275.0				
68.0	280.0				
69.0	285.0				
70.0	290.0				

- some cobbles @ 53.3m  
- little recovery between 53.3 to 67.1m

END OF HOLE @ 67.1 m BELOW SURFACE  
NOTE: SOILS LOGGED BY EBA STAFF.

<b>EBA Engineering Consultants Ltd.</b>	LOGGED BY: MC	COMPLETION DEPTH: 67.1 m
	REVIEWED BY: SB	COMPLETE: 07/07/04

04/12/96 0251PM (SHELLEY)

Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-6
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input checked="" type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND
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Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0			CASING LEFT IN GROUND TO DEPTH OF 26.2m.		0.0
1.0		SAND			5.0
2.0					10.0
3.0					15.0
4.0					20.0
5.0		SAND, some gravel			25.0
6.0		COARSE GRAVEL			30.0
7.0					35.0
8.0					40.0
9.0					45.0
10.0		SAND & FINER GRAVEL		50.0	
11.0				55.0	
12.0				60.0	
13.0				65.0	
14.0				70.0	
15.0				75.0	
16.0		SILTY SAND		80.0	
17.0		SAND		85.0	
18.0				90.0	
19.0				95.0	
20.0				100.0	
21.0				105.0	
22.0				110.0	
23.0		SAND & GRAVEL, slightly silty			
24.0					
25.0		SILTY SAND, brown			
26.0					
27.0					
28.0					
29.0		SAND & GRAVEL			
30.0					
31.0					
32.0					
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 39.6 m
	REVIEWED BY: SB	COMPLETE: 13/07/04

Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-6
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:

BACKFILL TYPE  BENTONITE  FEA GRAVEL  SLOUGH  GROUT  DRILL CUTTINGS  SAND

Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
36.0	▲				115.0
37.0	▲				120.0
38.0	▲				125.0
39.6	▲				130.0
40.0		END OF HOLE @ 39.6 m BELOW SURFACE			135.0
41.0		NOTE: SOILS LOGGED BY DRILLWELL STAFF.			140.0
42.0					145.0
43.0					150.0
44.0					155.0
45.0					160.0
46.0					165.0
47.0					170.0
48.0					175.0
49.0					180.0
50.0					185.0
51.0					190.0
52.0					195.0
53.0					200.0
54.0					205.0
55.0					210.0
56.0					215.0
57.0					220.0
58.0					225.0
59.0					
60.0					
61.0					
62.0					
63.0					
64.0					
65.0					
66.0					
67.0					
68.0					
69.0					
70.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 39.6 m
	REVIEWED BY: SB	COMPLETE: 13/07/04

04/12/16 12:30PM (SMELLY)

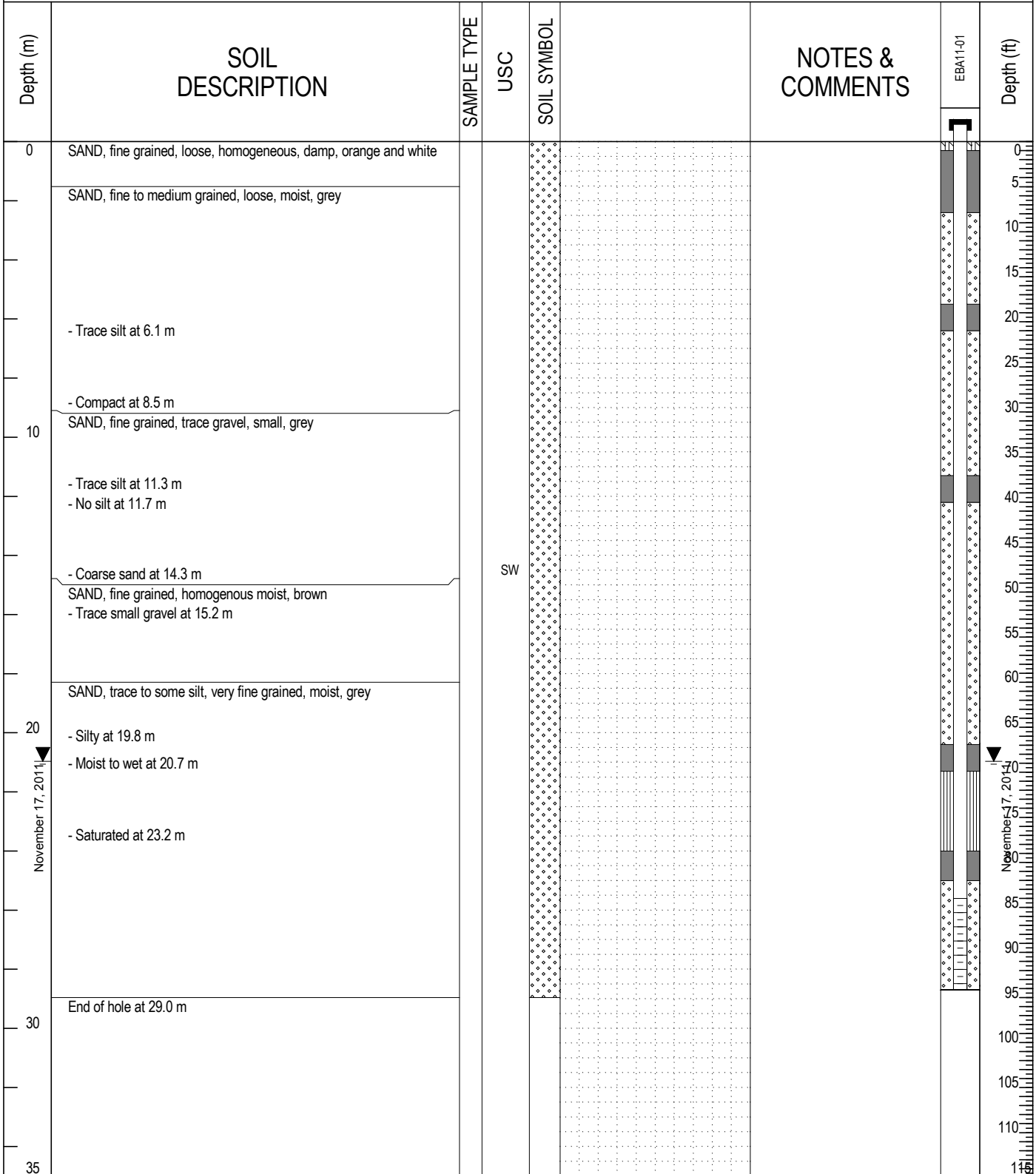
Monitoring Wells Campbell River Landfill	Drillwell Enterprises Ltd.	BOREHOLE NO: EBA04-7
Regional District of Comox-Strathcona	Drilling Method: Air Rotary	PROJECT NO: 2840017.010
		ELEVATION:


BACKFILL TYPE	<input checked="" type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND
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Depth(m)	SOIL SYMBOL	Soil Description	Field Notes	SLOTTED PIEZOMETER	Depth(ft)
0.0		SAND	CASING LEFT IN GROUND TO DEPTH OF 11.2m		0.0
1.0					5.0
2.0					10.0
3.0					15.0
4.0					20.0
5.0		SAND, some gravel			25.0
6.0		COARSE GRAVEL			30.0
7.0		SAND & GRAVEL			35.0
8.0					40.0
9.0					45.0
10.0					50.0
11.0			55.0		
12.0			60.0		
13.0			65.0		
14.0			70.0		
15.0			75.0		
16.0		SILTY SAND	80.0		
17.0		SAND	85.0		
18.0			90.0		
19.0			95.0		
20.0			100.0		
21.0			105.0		
22.0			110.0		
23.0		SAND & GRAVEL, some silt			
24.0					
25.0					
26.0		SILTY SAND, brown			
27.0					
28.0					
29.0		SAND & GRAVEL			
30.0					
31.0					
32.0		END OF HOLE @ 32.0 m BELOW SURFACE NOTE: SOILS LOGGED BY DRILLWELL STAFF.			
33.0					
34.0					
35.0					

EBA Engineering Consultants Ltd.	LOGGED BY: MC	COMPLETION DEPTH: 32 m
	REVIEWED BY: SB	COMPLETE: 17/07/04
		Page 1 of 1

Project: Stage 2 PSI	Client: Comox Valley Regional District	PROJECT NO. - BOREHOLE NO.
Location: Block J, CRWMC	Drilling Contractor: Drillwell Enterprises	N23101802 - EBA11-01
Client: Campbell River, BC	Drilling Method: Air Rotary	
SAMPLE TYPE	<input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND

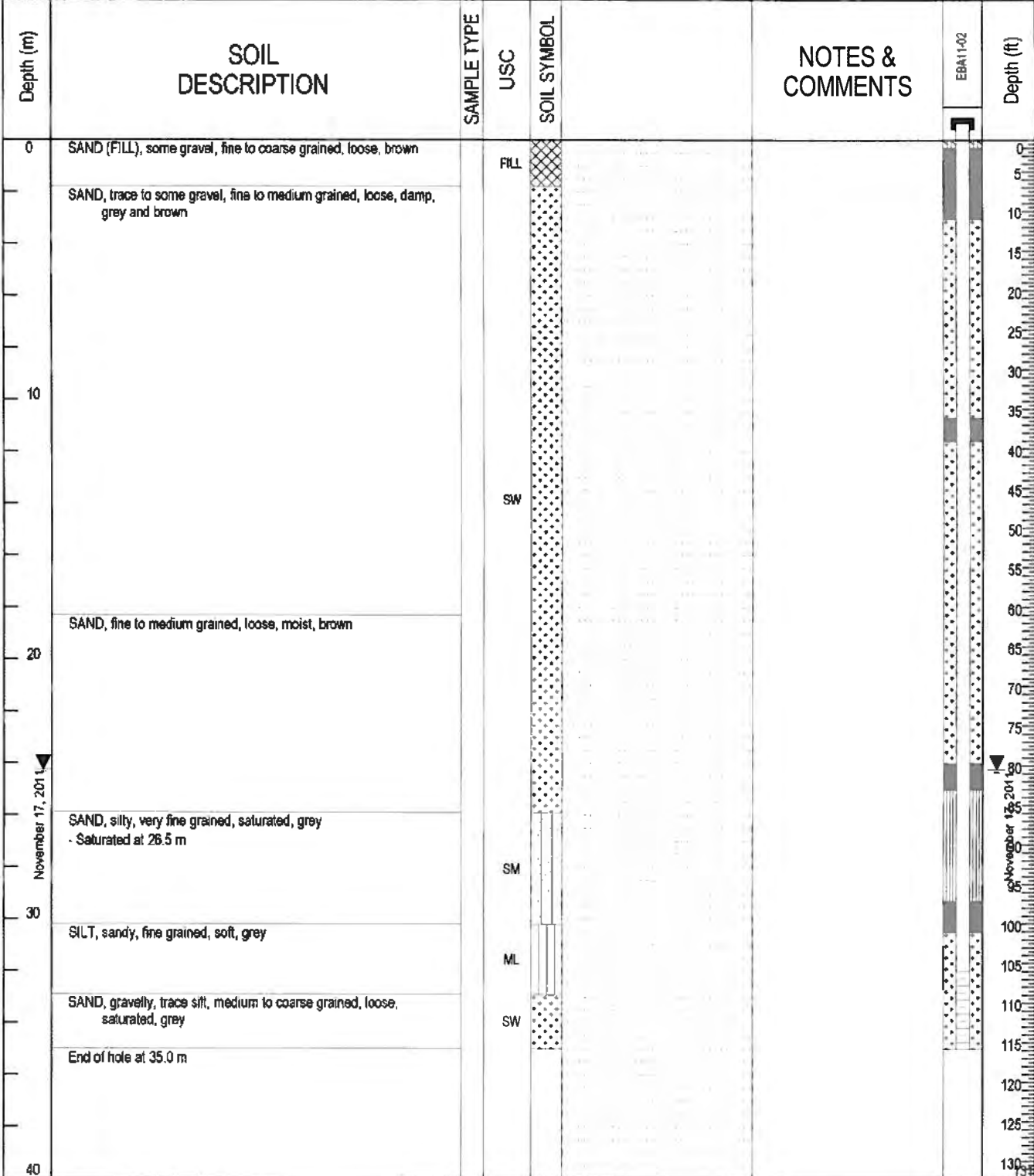


	LOGGED BY: MG	COMPLETION DEPTH: 28.96 m
	REVIEWED BY:	COMPLETE: 11/15/2011
	DRAWING NO: 1	Page 1 of 1



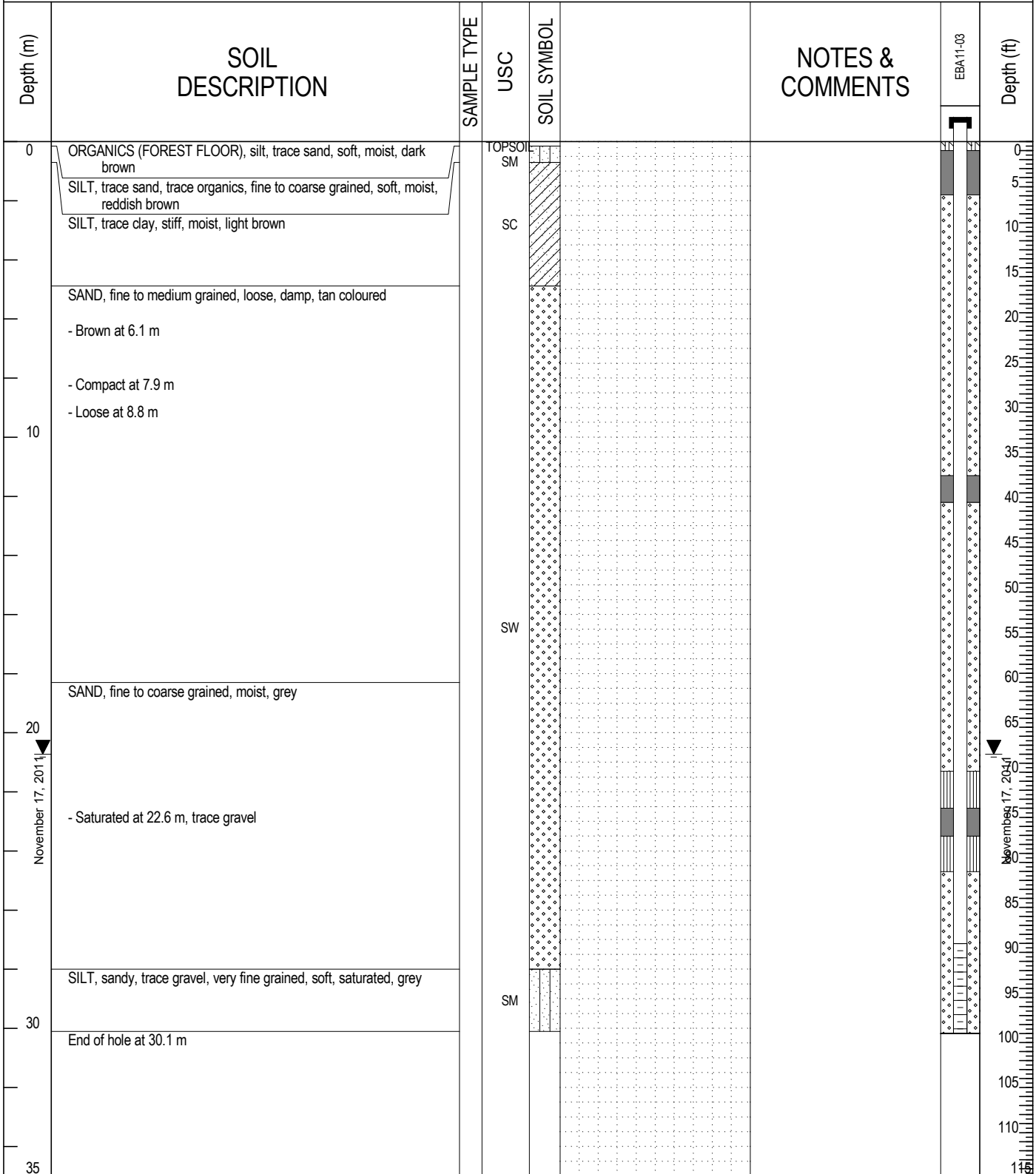
Project: Subsurface Investigation	Client: Comox Valley Regional District	PROJECT NO. - BOREHOLE NO.
Location: Block J, CRWMC	Drilling Contractor: Drillwell Enterprises	N23101803 - EBA11-02
City: Campbell River, BC	Drilling Method: Air Rotary	


SAMPLE TYPE	<input checked="" type="checkbox"/> DISTURBED	<input type="checkbox"/> NO RECOVERY	<input checked="" type="checkbox"/> SPT	<input type="checkbox"/> A-CASING	<input type="checkbox"/> SHELBY TUBE	<input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE	<input type="checkbox"/> PEA GRAVEL	<input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT	<input type="checkbox"/> DRILL CUTTINGS	<input type="checkbox"/> SAND



 <small>EBA</small> <small>A PETRA TECH COMPANY</small>	LOGGED BY: MG	COMPLETION DEPTH: 35 m
	REVIEWED BY:	COMPLETE: 11/16/2011
	DRAWING NO: 6	Page 1 of 1

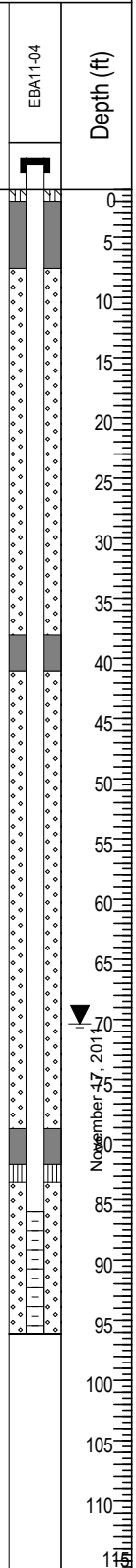
Project: Stage 2 PSI	Client: Comox Valley Regional District	PROJECT NO. - BOREHOLE NO.
Location: Block J, CRWMC	Drilling Contractor: Drillwell Enterprises	N23101802 - EBA11-03
Client: Campbell River, BC	Drilling Method: Air Rotary	
SAMPLE TYPE	<input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND



 A TETRA TECH COMPANY	LOGGED BY: MG	COMPLETION DEPTH: 30.175 m
	REVIEWED BY:	COMPLETE: 11/17/2011
	DRAWING NO: 2	Page 1 of 1

Project: Stage 2 PSI	Client: Comox Valley Regional District	PROJECT NO. - BOREHOLE NO.
Location: Block J, CRWMC	Drilling Contractor: Drillwell Enterprises	N23101802 - EBA11-04
Client: Campbell River, BC	Drilling Method: Air Rotary	
SAMPLE TYPE	<input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> SPT	<input type="checkbox"/> A-CASING <input type="checkbox"/> SHELBY TUBE <input type="checkbox"/> CORE
BACKFILL TYPE	<input type="checkbox"/> BENTONITE <input type="checkbox"/> PEA GRAVEL <input type="checkbox"/> SLOUGH	<input type="checkbox"/> GROUT <input type="checkbox"/> DRILL CUTTINGS <input type="checkbox"/> SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	USC	SOIL SYMBOL	NOTES & COMMENTS	Depth (ft)
0	SILT, sandy, trace organics, soft, moist, reddish brown SAND, fine grained, loose, homogenous, moist, tan coloured		ML			0
	- Grey at 3.1 m					5
10			SW			10
20	SAND, trace gravel, fine to medium grained, compact					20
	November 17, 2011					25
	SILT, sandy, fine grained, trace gravel, moist to wet, grey		ML			30
	SAND, trace gravel, trace silt, saturated, tan coloured		SW			35
	SILT, sandy, soft, saturated, grey		ML			40
	SAND, very fine grained, some silt, saturated, grey		SM			45
30	End of hole at 29.6 m					50
35						55



	LOGGED BY: MG	COMPLETION DEPTH: 29.57 m
	REVIEWED BY:	COMPLETE: 11/17/2011
	DRAWING NO: 3	Page 1 of 1



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Campbell River Waste Management Centre  
 PROJECT NUMBER: 056484  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, BC  
 DRILLING CONTRACTOR: Mud Bay Drilling

HOLE DESIGNATION: MW01-16  
 DATE COMPLETED: 21 June 2016  
 DRILLING METHOD: Rotasonic (153 mm)  
 FIELD PERSONNEL: S. Foster

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	
	NORTHING: 5542091 EASTING: 331111	186.68 185.94	STICKUP 0.80 M					
	TOP OF RISER GROUND SURFACE	185.64						
1	OL-SILT, with gravel (organic topsoil), loose, silt to fine gravel, dark brown, dry	185.64		RS-1	185.64	100		
2	GW-GRAVEL with cobbles, with silt/fine sand, loose, brown, dry - silt and sand with cobbles layer (0.3 m) at 1.83m BGS	183.50		BENTONITE CHIP AND SOIL CUTTINGS	RS-2	183.50	100	
3	SP-gravelly SAND, medium sand, minor coarse sand, fine to coarse gravel, light grey, dry	182.90		51 mm Ø PVC RISER PIPE	RS-3	182.90	100	
4	SW/GW-SAND and GRAVEL, with cobbles, fine sand, fine to coarse gravel, cobbles, tight, grey, moist	180.46			RS-4	180.46	100	
6	SW-gravelly SAND, trace cobble, fine sand (less medium, less coarse), fine gravel (less coarse), light grey dry	180.46		152 mm Ø BOREHOLE	RS-4	180.46	100	
10	SP-SAND, fine sand, light brown, slightly moist	175.88			RS-5	175.88	100	
11	GM-SILTY SAND and GRAVEL, silt with fine to coarse sand, with fine to coarse gravel, light grey, dry	174.97			RS-5	174.97	100	
12	SW/GW-SAND and GRAVEL, trace silt, well graded, fine to coarse sand, fine to coarse gravel, grey, moist	174.06			RS-6	174.06	100	
15	SP-SAND, trace silt, trace gravel, medium to coarse grain sand, fine gravel, brown, moist	171.01			RS-6	171.01	100	
16	- trace cobble at 16.46m BGS				RS-7	16.46	100	
18	SW/GW-SAND and GRAVEL, fine to coarse sand, fine to coarse gravel, trace silt, brown, moist	167.96		BENTONITE/SOIL CUTTINGS	RS-8	167.96	100	

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ June 29, 2016

OVERBURDEN LOG 056484-MW01-16.GPJ CRA\_CORP.GDT 22/7/16



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Campbell River Waste Management Centre  
 PROJECT NUMBER: 056484  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, BC  
 DRILLING CONTRACTOR: Mud Bay Drilling

HOLE DESIGNATION: MW01-16  
 DATE COMPLETED: 21 June 2016  
 DRILLING METHOD: Rotasonic (153 mm)  
 FIELD PERSONNEL: S. Foster

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	BOREHOLE	SAMPLE			
				NUMBER	INTERVAL	REC (%)	N' VALUE
21	GM-GRAVEL (TILL), with silt/fine sand, fine to coarse gravel, fine sand (less medium/coarse), very dense, clumpy, gravel rounded to subrounded, grey to brown, moist - core through boulder at 21.03m BGS	165.52		RS-9	100	100	
22							
23							
24							
25							
26	SP-SAND with gravel, fine to coarse sand, fine gravel, subrounded, brown, grey, moist	157.90		RS-10	100	100	
27							
28	SW/GW-SAND and GRAVEL trace silt, trace cobbles, fine to coarse sand, fine to coarse gravel, subrounded, brown, moist - trace cobbles at 29.26m BGS - becoming wet at 29.87m BGS  - trace cobbles at 31.39m BGS  - increase in silt, return on water, cloudy at 33.22m BGS  - orange brown, sandy silt layer, 5 cm thickness at 34.75m BGS - slow drilling, hard at 35.05m BGS	156.99		RS-11	100	100	
29							
30							
31							
32							
33							
34							
35							
36							
37							
38	- sandy till with gravel at 39.01m BGS			RS-12	100	100	
39							

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ June 29, 2016


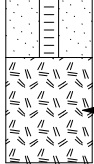

OVERBURDEN LOG 056484-MW01-16.GPJ CRA\_CORP.GDT 22/7/16



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Campbell River Waste Management Centre  
 PROJECT NUMBER: 056484  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, BC  
 DRILLING CONTRACTOR: Mud Bay Drilling

HOLE DESIGNATION: MW01-16  
 DATE COMPLETED: 21 June 2016  
 DRILLING METHOD: Rotosonic (153 mm)  
 FIELD PERSONNEL: S. Foster

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m	BOREHOLE	SAMPLE				
				NUMBER	INTERVAL	REC (%)	N' VALUE	
41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59	 <p>END OF BOREHOLE @ 42.37m BGS</p> <p>Monitoring well completed in saturated conditions.</p> <p>Initial static water level elevated above normal due to addition of water during drilling.</p> <p>Borehole backfilled with bentonite gravel, and a mixture of soil cuttings and bentonite chip.</p>	143.58	 <p><b>WELL DETAILS</b>            Screened interval:            145.10 to 148.15m            40.84 to 37.80m BGS            Length: -3.05m            Diameter: 51mm            Slot Size: 20            Material: SCH. 40 PVC            Seal:            149.67 to 151.50m            36.27 to 34.44m BGS            Material: BENTONITE GRAVEL            Sand Pack:            145.10 to 149.67m            40.84 to 36.27m BGS            Material: TARGET FILTER SAND 10/20            -----            Seal:            151.50 to 185.94m            34.44 to 0.00m BGS            Material: BENTONITE CHIP AND DRILL CUTTINGS</p>	RS-16		100		

**NOTES:** MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE  
 STATIC WATER LEVEL ▼ June 29, 2016

OVERBURDEN LOG 056484-MW01-16.GPJ CRA\_CORP.GDT 22/7/16



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD  
 PROJECT NUMBER: 056484-02  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW02-18  
 DATE COMPLETED: 25 July 2018  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: M. Dyck/N. Turl  
 DRILLER: Scott Burrows

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	
	TOP OF CASING TOP OF RISER GROUND SURFACE	TBD TBD TBD						
1	SP - SAND, trace gravel, medium grained sand, fine gravel, poorly graded, subangular gravel, brown/grey							
2	SP - SAND, medium grain, poorly graded, grey/brown	1.52						
3	SP - SAND, trace silt, fine grained sand, poorly graded, grey/brown	3.05						
4								
5								
6								
7								
8	SW - SAND with gravel, fine to medium grain sand, well graded, subangular gravel, grey/brown	7.62						
9								
10								
11	GW - GRAVEL with sand, fine gravel, medium grain sand, subangular gravel, well graded, grey/brown	10.67						
12								
13	SW - SAND, trace gravel, fine to medium grain sand, fine gravel, well graded, subangular gravel, grey/brown	12.19						
14								
15	GW - GRAVEL with sand, medium to coarse grain sand, fine gravel, well graded, subangular gravel, grey/brown	13.72						
16	SP - SAND, trace gravel, medium grain sand, fine gravel, poorly graded, subangular gravel, grey/brown	15.24						
17	- Some gravel content at 16.76m BGS							
18								
19	SP - SAND, fine grain sand, poorly graded, brown	18.29						
		19.81						

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

OVERBURDEN LOG 056484-BH LOGS.GPJ GHD\_Corp 30/7/18



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD  
 PROJECT NUMBER: 056484-02  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW02-18  
 DATE COMPLETED: 25 July 2018  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: M. Dyck/N. Turl  
 DRILLER: Scott Burrows

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' VALUE	
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39	<p>SW - SAND with gravel, fine to medium grain sand, well graded, subangular gravel, grey/brown</p> <p>- No gravel at 22.86m BGS</p> <hr/> <p>SP - SAND, medium to coarse grain sand, poorly graded, grey/brown</p> <hr/> <p>END OF BOREHOLE @ 32.61m BGS</p>	<p>28.96</p> <p>32.61</p>						
			<p><b>WELL DETAILS</b>            Screened interval:            30.18 to 31.70m BGS            Length: 1.52m            Diameter: 51mm            Material: PVC Schedule 40            Seal:            0.30 to 29.87m BGS            Material: Bentonite chips + 1 bag of bentonite pellets at ~ 22.86 m bgs.            Sand Pack:            29.87 to 32.61m BGS            Material: 10-20 Sand</p>					

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

OVERBURDEN LOG 056484-BH LOGS.GPJ GHD\_Corp 30/7/18





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD  
 PROJECT NUMBER: 056484-02  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW03-18  
 DATE COMPLETED: 24 July 2018  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: M. Dyck/N. Turl  
 DRILLER: Scott Burrows

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' VALUE
	TOP OF CASING TOP OF RISER GROUND SURFACE	TBD TBD TBD					
1	CL - SILTY CLAY with gravel, few sand, fine grained sand, fine gravel, sub-angular gravel, poorly graded, brown		CONCRETE				
2							
3							
4				BENTONITE CHIPS			
5							
6							
7							
8							
9							
10	SP - SAND, trace gravel, fine to medium grained sand, fine gravel, subangular gravel, poorly graded, well sorted, brown	9.14					
11	CL - SILTY CLAY, trace sand, trace fine gravel, fine grained sand, poorly graded, brown	10.67					
12	SC - SAND with clay, fine grained sand, poorly graded, low plasticity, brown	12.19					
13		13.72	BENTONITE CHIPS + 1 BAG OF BENTONITE PELLETS AT ~22.86 M BGS				
14		15.24					
15	CL - CLAY with sand, fine grained sand, poorly graded, brown	15.24					
16							
17							
18							
19		19.81					

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

OVERBURDEN LOG 056484-BH LOGS.GPJ GHD\_Corp 30/7/18

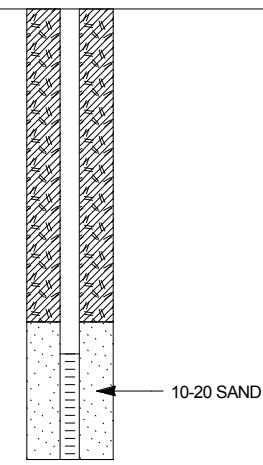


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD  
 PROJECT NUMBER: 056484-02  
 CLIENT: Comox Valley Regional District  
 LOCATION: Campbell River, British Columbia  
 DRILLING CONTRACTOR: Drillwell

HOLE DESIGNATION: MW03-18  
 DATE COMPLETED: 24 July 2018  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: M. Dyck/N. Turl  
 DRILLER: Scott Burrows

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH m BGS	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (%)	'N' VALUE		
21	GW - GRAVEL with sand, medium to coarse grain sand, fine subangular gravel, well graded, grey								
22	SW - SAND, trace gravel, medium to coarse grained sand, fine to medium gravel, subangular gravel, brown/grey	21.34							
23	SW/GW - SAND and GRAVEL, medium to coarse grained sand, fine to medium gravel, subangular gravel, brown/grey	22.86							
24									
25	- Dominated by gravel, sand primarily coarse. Gravel with sand. at 24.38m BGS								
26	- Dominated by sand, trace gravel. at 25.91m BGS								
27	END OF BOREHOLE @ 26.52m BGS	26.52							
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									



**WELL DETAILS**  
 Screened interval:  
 24.99 to 26.52m BGS  
 Length: 1.53m  
 Diameter: 51mm  
 Material: PVC Schedule 40  
 Seal:  
 0.30 to 24.69m BGS  
 Material: Bentonite chips + 1 bag of bentonite pellets at ~ 22.86 m bgs.  
 Sand Pack:  
 24.53 to 26.52m BGS  
 Material: 10-20 Sand

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

OVERBURDEN LOG 056484-BH LOGS.GPJ GHD\_Corp 30/7/18





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CRWMC 2019 DRILLING PROGRAM  
 PROJECT NUMBER: 056484-19  
 CLIENT: COMOX VALLEY REGIONAL DISTRICT  
 LOCATION: CAMPBELL RIVER, BC

HOLE DESIGNATION: MW04-19  
 DATE COMPLETED: 22 October 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N.Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE						
				NUMBER	INTERVAL	REC (%)				
10.5										
11.0	SAND, trace gravel, fine to medium grained sand, fine and coarse grained gravel, light brown, little to no moisture	10.67								
11.5										
12.0										
12.5	SAND, fine to medium grained, light brown and grey, little to no moisture	12.19								
13.0										
13.5										
14.0	SAND, fine to medium grained, trace coarse grained sand, grey/brown, little to no moisture	13.72								
14.5										
15.0										
15.5	SAND, few gravel, fine to coarse grained sand, fine grained gravel, dark brown, little to no moisture	15.24								
16.0										
16.5										
17.0	SAND, fine grained, trace medium grained sand, light brown, slightly moist	16.76								
17.5										
18.0										
18.5	SILTY SAND, fine grained sand, brown	18.29								
19.0	Began using water to drill, could not determine moisture									
19.5										

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

STATIC WATER LEVEL ▼ 24.850m BTOR October 23, 2019

OVERBURDEN LOG 056484-19-VN.GPJ\_GHD\_Corp 12/3/20



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CRWMC 2019 DRILLING PROGRAM  
 PROJECT NUMBER: 056484-19  
 CLIENT: COMOX VALLEY REGIONAL DISTRICT  
 LOCATION: CAMPBELL RIVER, BC

HOLE DESIGNATION: MW04-19  
 DATE COMPLETED: 22 October 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N.Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)		
20.5 21.0 21.5 22.0 22.5 23.0 23.5 24.0 24.5 25.0 25.5 26.0 26.5 27.0 27.5 28.0 28.5 29.0 29.5	SAND, fine to medium grained, trace coarse grained sand, grey/brown  SAND, fine to medium grained, brown  - trace coarse sand at 25.91m bgs for 1.52m  SILTY SAND, fine grained sand, grey/brown, increase in silt content with depth	21.34  22.86  25.91  28.96						

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

STATIC WATER LEVEL ▼ 24.85m BTOR October 23, 2019

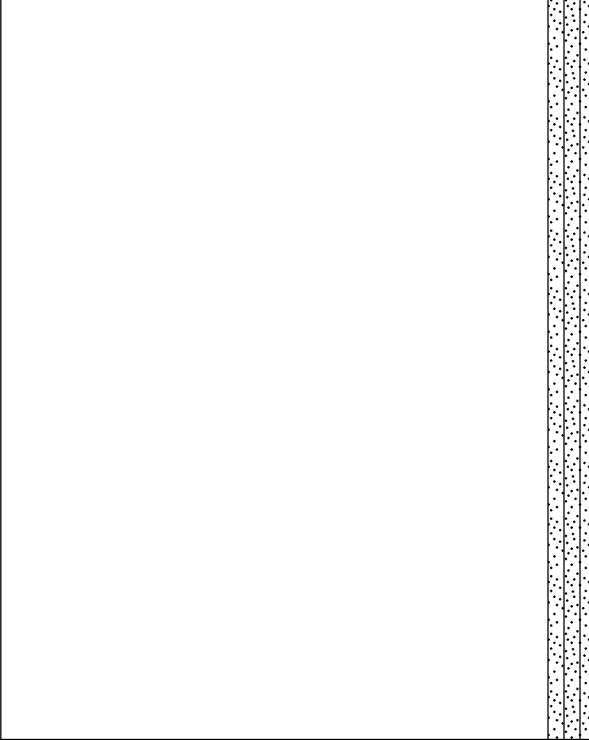
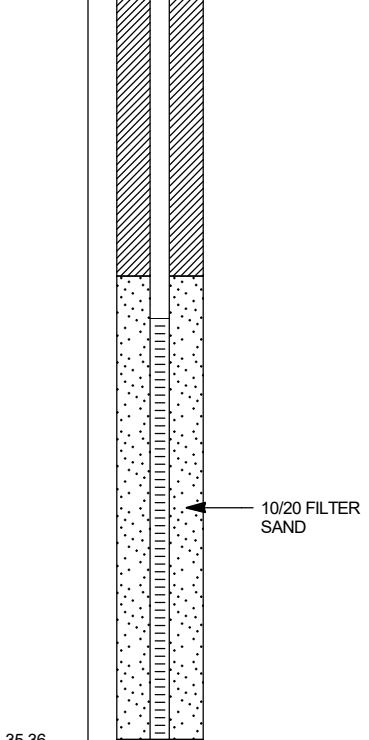
OVERBURDEN LOG 056484-19-VN.GPJ\_GHD\_Corp 12/3/20



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CRWMC 2019 DRILLING PROGRAM  
 PROJECT NUMBER: 056484-19  
 CLIENT: COMOX VALLEY REGIONAL DISTRICT  
 LOCATION: CAMPBELL RIVER, BC

HOLE DESIGNATION: MW04-19  
 DATE COMPLETED: 22 October 2019  
 DRILLING METHOD: Air Rotary  
 FIELD PERSONNEL: N.Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)		
30.5 31.0 31.5 32.0 32.5 33.0 33.5 34.0 34.5 35.0 35.5 36.0 36.5 37.0 37.5 38.0 38.5 39.0 39.5		35.36	 <p style="text-align: right; margin-right: 50px;">10/20 FILTER SAND</p>					
	END OF BOREHOLE @ 35.36m BGS		<b>WELL DETAILS</b> Screened interval: 32.31 to 35.36m BGS Length: 3.05m Diameter: 51mm Slot Size: 0.010 Material: SCH. 40 PVC Seal: 0.61 to 32.00m BGS Material: BENTONITE CHIPS Sand Pack: 32.00 to 35.36m BGS Material: 10/20 FILTER SAND					

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

STATIC WATER LEVEL ▼ 24.850m BTOR October 23, 2019

OVERBURDEN LOG 056484-19-VN.GPJ\_GHD\_Corp 12/3/20

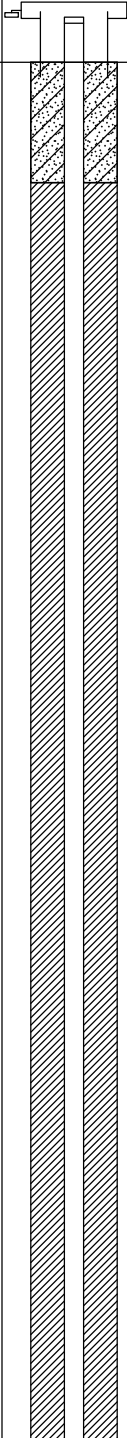


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW06-21  
 DATE COMPLETED: 21 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CANVANCOURVER\PROJECTS\663\11229478\FIELD\11229478-FIELD FILES\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; align-items: center;"> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"> <p style="font-size: small; margin: 0;">SAND, poorly graded, fine, medium to dark brown, dry, no odour</p> </div> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"> <p style="font-size: small; margin: 0;">- fine to medium, trace coarse sand</p> </div> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"> <p style="font-size: small; margin: 0;">GRAVELLY SAND, well graded, fine to coarse sand, fine to coarse gravel, angular to subangular, medium brown, dry, no odour</p> </div> </div>	<div style="display: flex; align-items: center;"> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"> <p style="font-size: small; margin: 0;">0.5</p> <p style="font-size: small; margin: 0;">1.0</p> <p style="font-size: small; margin: 0;">1.5</p> <p style="font-size: small; margin: 0;">2.0</p> <p style="font-size: small; margin: 0;">2.5</p> <p style="font-size: small; margin: 0;">3.0</p> <p style="font-size: small; margin: 0;">3.5</p> <p style="font-size: small; margin: 0;">4.0</p> <p style="font-size: small; margin: 0;">4.5</p> <p style="font-size: small; margin: 0;">5.0</p> <p style="font-size: small; margin: 0;">5.5</p> <p style="font-size: small; margin: 0;">6.0</p> <p style="font-size: small; margin: 0;">6.5</p> </div> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; margin: 0 5px;"> <p style="font-size: small; margin: 0;">6.10</p> </div> </div>							

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







# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW06-21  
 DATE COMPLETED: 21 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE					
				NUMBER	INTERVAL	REC (%)	'N' Value		
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-bottom: 5px;">File: N:\CANVANCOURVERIPROJECTS\663\11229478\FIELD\11229478-VA-GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">14.5</div> <div style="margin-bottom: 5px;">15.0</div> <div style="margin-bottom: 5px;">15.5</div> <div style="margin-bottom: 5px;">16.0</div> <div style="margin-bottom: 5px;">16.5</div> <div style="margin-bottom: 5px;">17.0</div> <div style="margin-bottom: 5px;">17.5</div> <div style="margin-bottom: 5px;">18.0</div> <div style="margin-bottom: 5px;">18.5</div> <div style="margin-bottom: 5px;">19.0</div> <div style="margin-bottom: 5px;">19.5</div> <div style="margin-bottom: 5px;">20.0</div> <div style="margin-bottom: 5px;">20.5</div> </div> </div>	<p>- trace gravel, fine to coarse</p>								

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW06-21  
 DATE COMPLETED: 21 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="font-size: small; transform: rotate(-90deg); position: absolute; left: -100px; top: 50%; transform: translateY(-50%);">           File: N:\CANVANCOURVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21         </div> <div style="position: absolute; left: -100px; top: 50%; transform: translateY(-50%);">           21.5 22.0 22.5 23.0 23.5 24.0 24.5 25.0 25.5 26.0 26.5 27.0 27.5         </div>	<p style="margin: 0;">SILT with SAND, fine, non to low plasticity, light to medium brown, moist, no odour</p> <p style="margin: 0;">- low to medium plasticity, wet</p>	<p style="margin: 0;">21.34</p> <p style="margin: 0;">24.38</p>						

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW06-21  
 DATE COMPLETED: 21 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CA\VANCOUVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; align-items: center;"> <div style="width: 100%; border-right: 1px solid black; margin-right: 5px;"> <p style="margin: 0;">28.5</p> <p style="margin: 0;">29.0</p> <p style="margin: 0;">29.5</p> <p style="margin: 0;">30.0</p> <p style="margin: 0;">30.5</p> <p style="margin: 0;">31.0</p> <p style="margin: 0;">31.5</p> <p style="margin: 0;">32.0</p> <p style="margin: 0;">32.5</p> <p style="margin: 0;">33.0</p> <p style="margin: 0;">33.5</p> <p style="margin: 0;">34.0</p> <p style="margin: 0;">34.5</p> </div> <div style="width: 100%; border-right: 1px solid black; margin-right: 5px;"> <p style="margin: 0;">28.5</p> <p style="margin: 0;">29.0</p> <p style="margin: 0;">29.5</p> <p style="margin: 0;">30.0</p> <p style="margin: 0;">30.5</p> <p style="margin: 0;">31.0</p> <p style="margin: 0;">31.5</p> <p style="margin: 0;">32.0</p> <p style="margin: 0;">32.5</p> <p style="margin: 0;">33.0</p> <p style="margin: 0;">33.5</p> <p style="margin: 0;">34.0</p> <p style="margin: 0;">34.5</p> </div> </div>	<p style="margin: 0;">SILTY SAND, fine, slow to rapid dilatency, light to medium brown, wet, no odour</p> <p style="margin: 0; font-weight: bold;">END OF BOREHOLE @ 32.92m BGS</p>	<p style="margin: 0;">30.48</p> <p style="margin: 0;">32.92</p>	<p style="margin: 0; font-weight: bold;">WELL DETAILS</p> <p style="margin: 0;">Screened interval: 29.87 to 32.92m BGS</p> <p style="margin: 0;">Length: 3.05m</p> <p style="margin: 0;">Diameter: 51mm</p> <p style="margin: 0;">Slot Size: 0.010</p> <p style="margin: 0;">Material: SCH. 40 PVC</p> <p style="margin: 0;">Seal: 0.61 to 28.65m BGS Material: BENTONITE CHIPS</p> <p style="margin: 0;">Sand Pack: 28.65 to 32.92m BGS Material: 10/20 FILTER SAND</p>					

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW07-21  
 DATE COMPLETED: 22 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turf

File: N:\CANVANCOURVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
0.5	GRAVELLY SAND, medium to coarse grained, fine to coarse gravel, subangular to sub rounded, medium to dark brown, dry to moist, no odour						
1.0							
1.5							
2.0							
2.5							
3.0	- fine grained, subangular to rounded, increase in gravel content						
3.5							
4.0							
4.5							
5.0							
5.5							
6.0	SANDY GRAVEL, fine to coarse gravel, fine to coarse grained, sub angular to well rounded, medium gray, dry to moist, no odour	6.10					
6.5							

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW07-21  
 DATE COMPLETED: 22 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turf

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-bottom: 5px;">File: N:\CA\VANCOUVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">7.5</div> <div style="margin-bottom: 5px;">8.0</div> <div style="margin-bottom: 5px;">8.5</div> <div style="margin-bottom: 5px;">9.0</div> <div style="margin-bottom: 5px;">9.5</div> <div style="margin-bottom: 5px;">10.0</div> <div style="margin-bottom: 5px;">10.5</div> <div style="margin-bottom: 5px;">11.0</div> <div style="margin-bottom: 5px;">11.5</div> <div style="margin-bottom: 5px;">12.0</div> <div style="margin-bottom: 5px;">12.5</div> <div style="margin-bottom: 5px;">13.0</div> <div style="margin-bottom: 5px;">13.5</div> </div> </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> <div style="position: absolute; top: 0; left: 0; right: 0; bottom: 0; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, black 2px, black 4px);"></div> </div> <p style="text-align: center; margin-top: 10px;">- medium to coarse grained, slate gray, moist</p> <p style="text-align: center; margin-top: 100px;">- sub angular to rounded, dark gray</p>							

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW07-21  
 DATE COMPLETED: 22 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CANVANCOURVER\PROJECTS\663\11229478\FIELD\11229478-FIELD\11229478-VA-GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
14.5  15.0  15.5  16.0  16.5  17.0  17.5  18.0  18.5  19.0  19.5  20.0  20.5	<p style="margin-top: 150px;">GRAVELLY SAND, medium to coarse grained, fine to coarse gravel, medium gray, sub angular to rounded, moist, no odour, more sandy (medium grained)</p> <p style="margin-top: 100px;">- fine to coarse grained, sub angular to well rounded, medium to light gray, more sandy (fine grained)</p>	15.24						

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
PROJECT NUMBER: 11229478  
CLIENT: CVRD  
LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW07-21  
DATE COMPLETED: 22 June 2021  
DRILLING METHOD: Odex  
FIELD PERSONNEL: N. Turl

File: N:\CANVANCOURPROJETS\663\11229478\FIELD\11229478-FIELD FILES\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
21.5	SANDY GRAVEL, fine to coarse gravel, trace fine gravel, medium to coarse grained, sub angular to well rounded, medium gray, moist, no odour, more medium grained	21.34						
24.5	- trace fine grained, sub angular to rounded, blueish gray, wet, more gravel (greater than 15%)							
27.5	GRAVELLY SAND, coarse grained, trace medium grained, sub angular to rounded, blueish gray, wet, no odour, more coarse grained sand	27.43						

10/20 FILTER

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

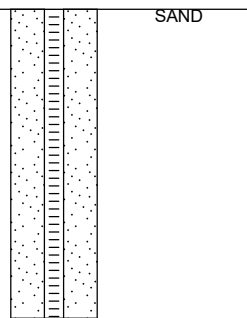


# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW07-21  
 DATE COMPLETED: 22 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CA\VANCOUVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">28.5</div> <div style="margin-bottom: 5px;">29.0</div> <div style="margin-bottom: 5px;">29.5</div> <div style="margin-bottom: 5px;">30.0</div> <div style="margin-bottom: 5px;">30.5</div> <div style="margin-bottom: 5px;">31.0</div> <div style="margin-bottom: 5px;">31.5</div> <div style="margin-bottom: 5px;">32.0</div> <div style="margin-bottom: 5px;">32.5</div> <div style="margin-bottom: 5px;">33.0</div> <div style="margin-bottom: 5px;">33.5</div> <div style="margin-bottom: 5px;">34.0</div> <div style="margin-bottom: 5px;">34.5</div> </div>	<p style="text-align: center;">END OF BOREHOLE @ 30.48m BGS</p>	30.48	<p style="text-align: center;">SAND</p>  <p><b>WELL DETAILS</b>        Screened interval:        26.52 to 29.57m BGS        Length: 3.05m        Diameter: 51mm        Slot Size: 0.010        Material: SCH. 40 PVC        Seal:        0.61 to 26.21m BGS        Material: BENTONITE CHIPS        Sand Pack:        26.21 to 29.57m BGS        Material: 10/20 FILTER SAND</p>					

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





# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turf

File: N:\CANVANCOURVER\PROJECTS\663\11229478\FIELD\11229478-FIELD FILES\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
0.5	FILL in ditch						
1.52	SAND with GRAVEL and FILL, poorly graded, fine grained, trace medium to coarse grained, fine to coarse gravel, brown, dry, likely fill	1.52					
3.05	SAND, well graded, fine to medium, light gray and brown, no odour	3.05					
6.5							

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; flex-direction: column; align-items: center;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: 8px; margin-bottom: 5px;">File: N:\CANVANCOUVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21</div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;">7.5</div> <div style="margin-bottom: 5px;">8.0</div> <div style="margin-bottom: 5px;">8.5</div> <div style="margin-bottom: 5px;">9.0</div> <div style="margin-bottom: 5px;">9.5</div> <div style="margin-bottom: 5px;">10.0</div> <div style="margin-bottom: 5px;">10.5</div> <div style="margin-bottom: 5px;">11.0</div> <div style="margin-bottom: 5px;">11.5</div> <div style="margin-bottom: 5px;">12.0</div> <div style="margin-bottom: 5px;">12.5</div> <div style="margin-bottom: 5px;">13.0</div> <div style="margin-bottom: 5px;">13.5</div> </div> </div>	<p>- trace gravel, fine grained gravel</p>	<p>12.19</p>						

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



## STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="font-size: 8px; transform: rotate(-90deg); position: absolute; left: -40px; top: 50%; transform: translateY(-50%);">           File: N:\CA\VANCOUVER\PROJECTS\66311229478\FIELD\11229478-FIELD\11229478-VA-GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21         </div> <div style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; border-left: 1px solid black; border-right: 1px solid black;"> <div style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); opacity: 0.5;"></div> <div style="position: absolute; left: 0; top: 0; width: 100%; height: 100%; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, black 2px, black 4px); opacity: 0.5;"></div> </div>	<p>SAND with GRAVEL, well graded, fine to medium grained, trace coarse grained, fine to coarse gravel, light brown, no odour</p> <p>SAND, poorly graded, fine, brown, no odour</p>	<p>15.24</p> <p>18.29</p>						

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
<div style="font-size: small; transform: rotate(-90deg); position: absolute; left: -40px; top: 50%; transform: translateY(-50%);">           File: N:\CA\VANCOUVER\PROJECTS\663\11229478\FIELD\11229478-FIELD FILES\11229478-VA.GPJ Library File: GHD_ENVIRO_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21         </div> <div style="margin-top: 20px;"> <p>21.5</p> <p>22.0</p> <p>22.5</p> <p>23.0</p> <p>23.5</p> <p>24.0</p> <p>24.5</p> <p>25.0</p> <p>25.5</p> <p>26.0</p> <p>26.5</p> <p>27.0</p> <p>27.5</p> </div>	<div style="border-left: 1px solid black; border-right: 1px solid black; height: 100%; position: relative;"> <div style="position: absolute; top: 0; left: 0; right: 0; height: 100%; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></div> <div style="position: absolute; top: 0; left: 0; right: 0; height: 100%; background: repeating-linear-gradient(-45deg, transparent, transparent 2px, black 2px, black 4px);"></div> <div style="position: absolute; top: 0; left: 0; right: 0; height: 100%; background: radial-gradient(circle, black 1px, transparent 1px); background-size: 10px 10px;"></div> </div>	<p>24.38</p> <p>27.43</p>					
	<p>SILTY SAND, poorly graded, fine, grey and brown, wet, no odour</p>						
	<p>SAND, poorly graded, fine, grey and brown, wet, no odour</p>						

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



## STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CANVANCOURVER\PROJECTS\66311229478\FIELD\11229478-VA-GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE				
				NUMBER	INTERVAL	REC (%)	'N' Value	
<div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">28.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">29.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">29.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">30.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">30.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">31.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">31.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">32.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">32.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">33.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">33.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;">34.0</div> </div> <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="margin-right: 5px;">34.5</div> <div style="flex-grow: 1; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> <div style="margin-left: 5px;"></div> </div>	<p style="margin-top: 100px;">SAND with GRAVEL, well graded, fine to medium grained, trace coarse grained, fine to coarse gravel, light brown, no odour</p>	<p style="margin-top: 100px;">30.48</p> <p style="margin-top: 150px;">33.53</p>	<div style="display: flex; align-items: center;"> <div style="width: 100%; border-left: 1px solid black; border-right: 1px solid black; border-bottom: 1px solid black;"></div> </div>					

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



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
PROJECT NUMBER: 11229478  
CLIENT: CVRD  
LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
DATE COMPLETED: 23 June 2021  
DRILLING METHOD: Odex  
FIELD PERSONNEL: N. Turf

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
35.5							
36.0							
36.5							
37.0	SAND, well graded, fine, few medium, trace coarse, grey and brown, wet and saturated, no odour	36.58					
37.5							
38.0							
38.5							
39.0							
39.5	- medium, few fine						
40.0							
40.5							
41.0							
41.5							

**WELL DETAILS**  
 Screened interval:  
 37.49 to 40.54m BGS  
 Length: 3.05m  
 Diameter: 51mm  
 Slot Size: 0.010  
 Material: SCH. 40 PVC  
 Seal:  
 0.61 to 37.19m BGS  
 Material: BENTONITE CHIPS  
 Sand Pack:  
 37.19 to 40.54m BGS

10/20 FILTER SAND

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

File: N:\CANVANCOUVER\PROJECTS\663\11229478\FIELD\11229478-VA.GPJ Library File: GHD\_ENVIRO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21



# STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: CVRD 2021 Drilling Program  
 PROJECT NUMBER: 11229478  
 CLIENT: CVRD  
 LOCATION: Campbell River Landfill

HOLE DESIGNATION: MW08-21  
 DATE COMPLETED: 23 June 2021  
 DRILLING METHOD: Odex  
 FIELD PERSONNEL: N. Turl

File: N:\CA\VANCOUVER\PROJECTS\663\11229478\FIELD\11229478-FIELD FILES\11229478-VA.GPJ Library File: GHD\_ENV\RO\_V04.GLB Report: OVERBURDEN LOG Date: 5-7-21

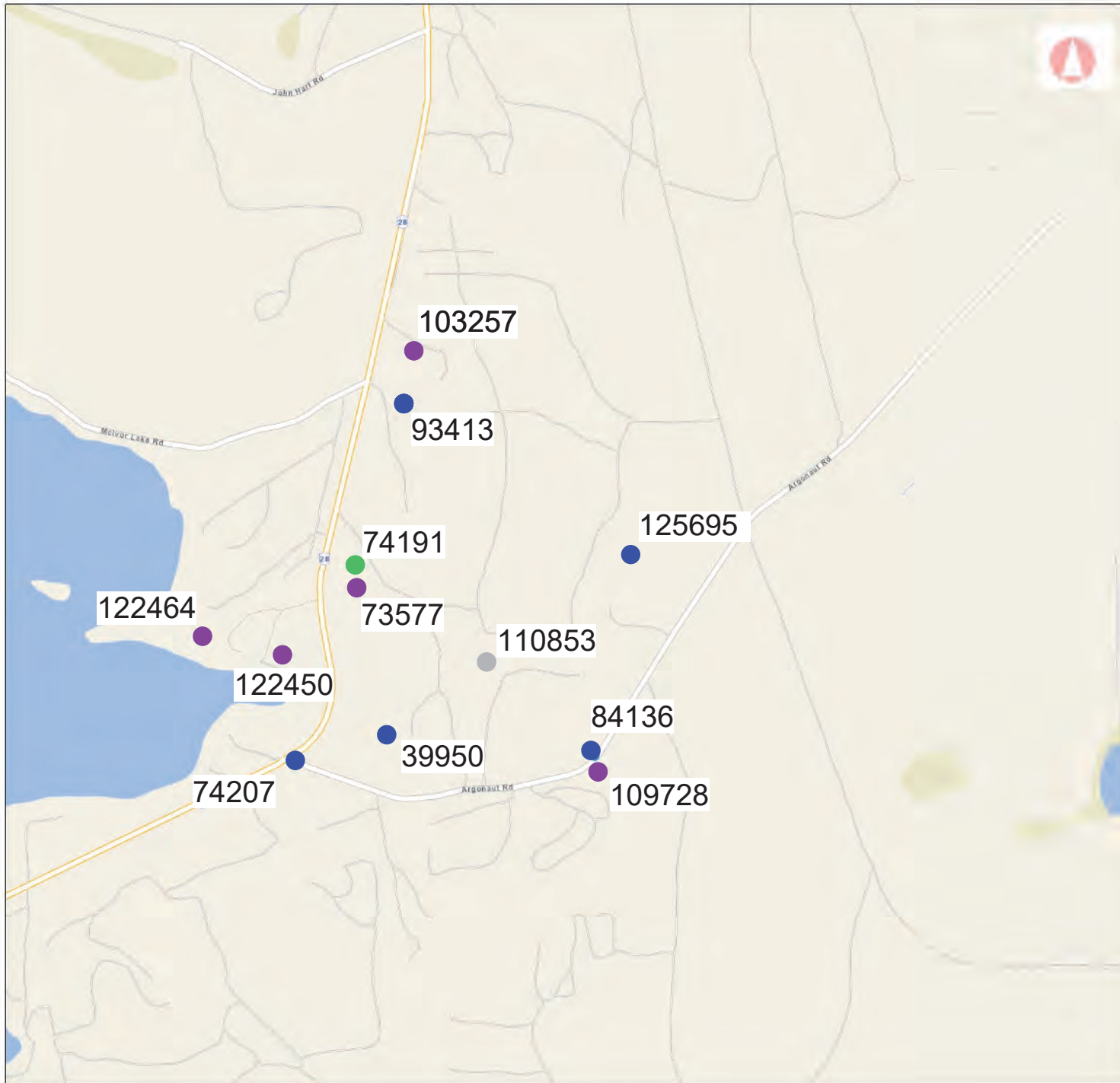
DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH	MONITORING WELL	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' Value
<div style="display: flex; align-items: center;"> <div style="width: 100%; border-right: 1px solid black; margin-right: 5px;"> <p style="text-align: center;">END OF BOREHOLE @ 42.67m BGS</p> </div> <div style="width: 20px; height: 20px; border: 1px solid black; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); margin-right: 5px;"></div> <div style="width: 100%; border-right: 1px solid black; margin-right: 5px;"> <p style="text-align: center;">42.67</p> </div> <div style="width: 100%;"> <p style="text-align: center;">Material: 10/20 FILTER SAND</p> </div> </div>							

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

# **Appendix C**

**Well Licenses and Surface Water Points of  
Diversion**





**Legend**

Groundwater Wells - All

- Private Domestic Use Well
- Non-domestic/Commercial Well Use
- Decommissioned Well
- Other Use Well

0 0.41 0.81 km



1: 20,000

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Datum: NAD83  
 Projection: WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere

**Key Map of British Columbia**



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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 39950  
**Well Identification Plate Number:**  
**Owner Name:** ISLAND READY MIX  
**Intended Water Use:** Commercial and Industrial

**Well Status:** New  
**Well Class:**  
**Well Subclass:**  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

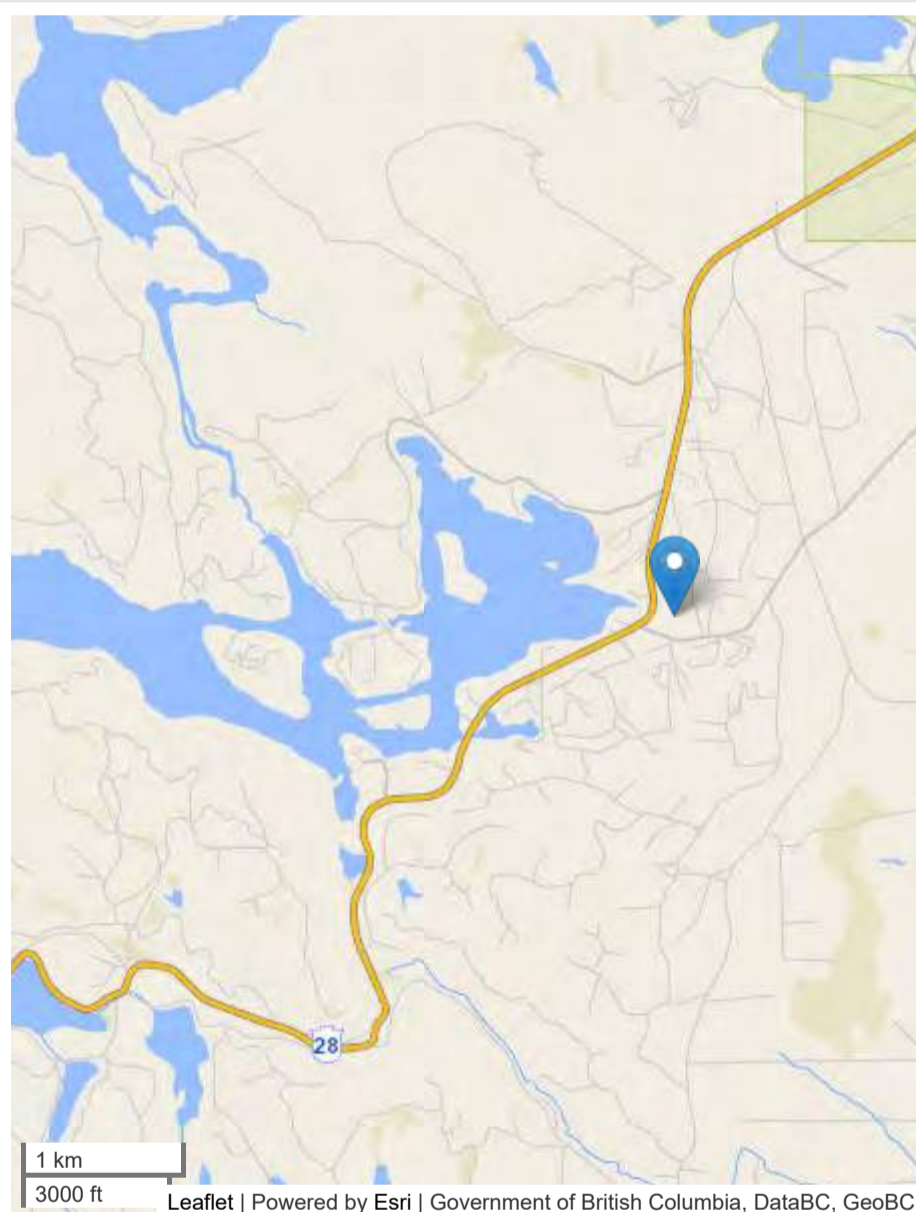
## Location Information

**Street Address:** GOLD RIVER HIGHWAY NEAR DUMP  
**Town/City:** CAMPBELL RIVER

### Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	85
Township	
Range	
Land District	51
Property Identification Description (PID)	

### Description of Well Location:



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

**Latitude:** 50.007591      **Longitude:** -125.354453  
**UTM Easting:** 331298      **UTM Northing:** 5542131  
**Zone:** 10      **Coordinate Acquisition Code:** (50 m accuracy) Digitized from 1:20,000 mapping

## Well Activity

Activity	↕ Work Start Date	↕ Work End Date	↕ Drilling Company	↕ Date Entered	↕
There has been no activity related to this well.					

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
1978-06-26	1978-06-26				

### Well Completion Data

<b>Total Depth Drilled:</b>	<b>Static Water Level (BTOC):</b> 7.00 feet	<b>Well Cap:</b>
<b>Finished Well Depth:</b> 55.00 feet	<b>Estimated Well Yield:</b> 0.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Other
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	10.00	silty gravel						
10.00	55.00	sand & gravel						
55.00	55.00	sand						

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	There are no records to show				
From	To	Diameter	Assembly Type	Slot Size							
There are no records to show											
<b>Material:</b>											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
----------------------	------------------------------------

### Well Yield

No well yield data available.

### Well Decommission Information

<b>Reason for Decommission:</b>	<b>Method of Decommission:</b>
<b>Sealant Material:</b>	<b>Backfill Material:</b>
<b>Decommission Details:</b>	

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Alternative Specs Submitted: No

## Documents

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- [WTN 39950\\_Well Record.pdf](#)

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 73577  
**Well Identification Plate Number:**  
**Owner Name:** FR FRANZEN CONSTUCTI  
**Intended Water Use:** Private Domestic

**Well Status:** New  
**Well Class:** Unknown  
**Well Subclass:**  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

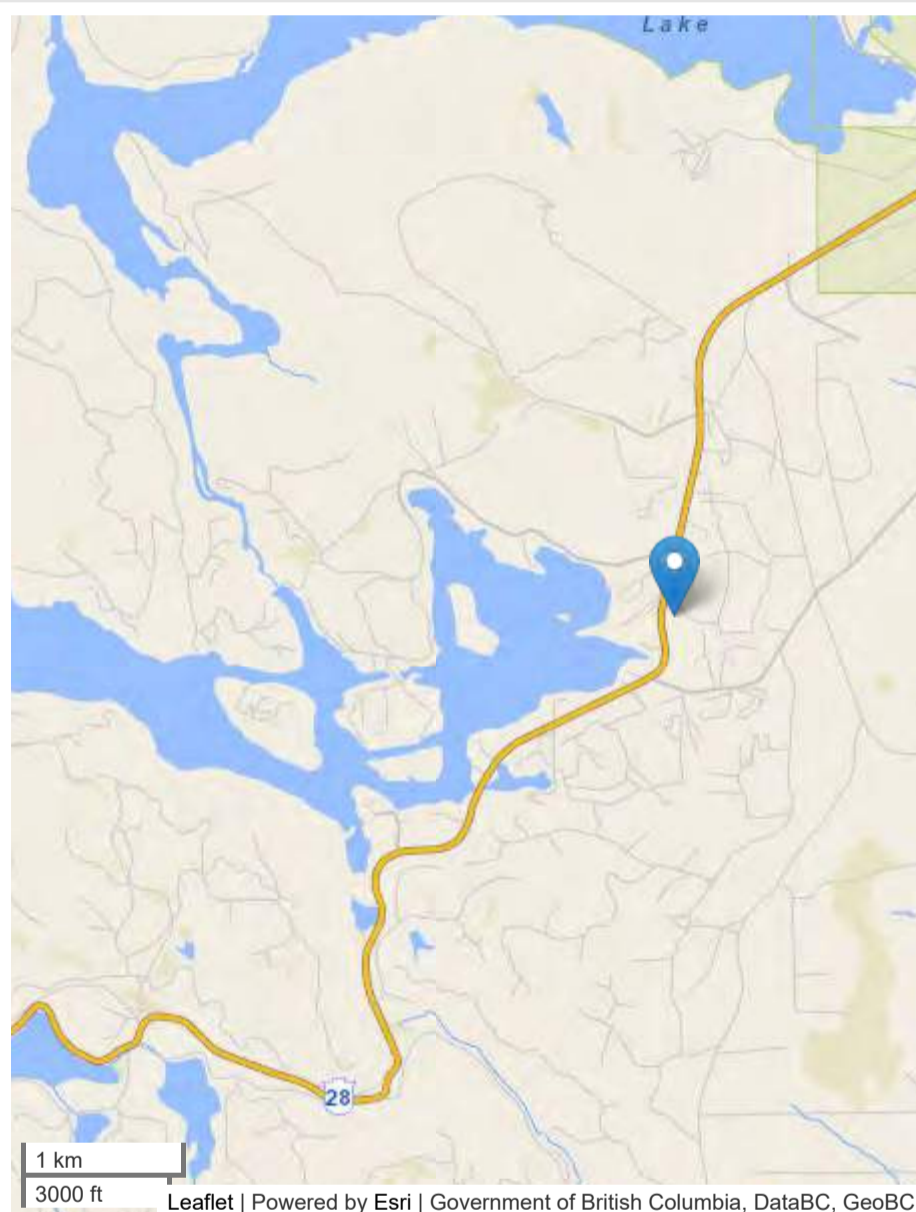
**Street Address:**

**Town/City:**

**Legal Description:**

Lot	7
Plan	31913
District Lot	
Block	
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	001125745

**Description of Well Location:** 4 MILES N OF C R ON GOLD R RD



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

**Latitude:** 50.010547      **Longitude:** -125.355519  
**UTM Easting:** 331232      **UTM Northing:** 5542462  
**Zone:** 10  
**Coordinate Acquisition Code:**  
 unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
1981-03-09					

### Well Completion Data

<b>Total Depth Drilled:</b>	<b>Static Water Level (BTOC):</b> 120.00 feet	<b>Well Cap:</b>
<b>Finished Well Depth:</b> 149.00 feet	<b>Estimated Well Yield:</b> 0.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Other
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
142.00	149.00	WATER BEARING SAND & GRAVEL						
138.00	142.00	WHITE WATER BEARING SAND						
132.00	138.00	BLUE WATER BEARING GRAVEL						
117.00	132.00	BLUE WATER BEARING SAND						
0.00	117.00	BLUE GRAVEL						

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	There are no records to show				
From	To	Diameter	Assembly Type	Slot Size							
There are no records to show											
<b>Material:</b>											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
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### Well Yield

No well yield data available.

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#### Decommission Details:

### Comments

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STEEL CASING, CONTINUOUS, METHOD OF DRILLING = DRILLED

**Alternative Specs Submitted:** No

### Documents

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- WTN 73577\_Well Record.pdf

### Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 74191  
**Well Identification Plate Number:**  
**Owner Name:** AL & SONS BACKHOE &  
**Intended Water Use:** Other

**Well Status:** New  
**Well Class:** Unknown  
**Well Subclass:**  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

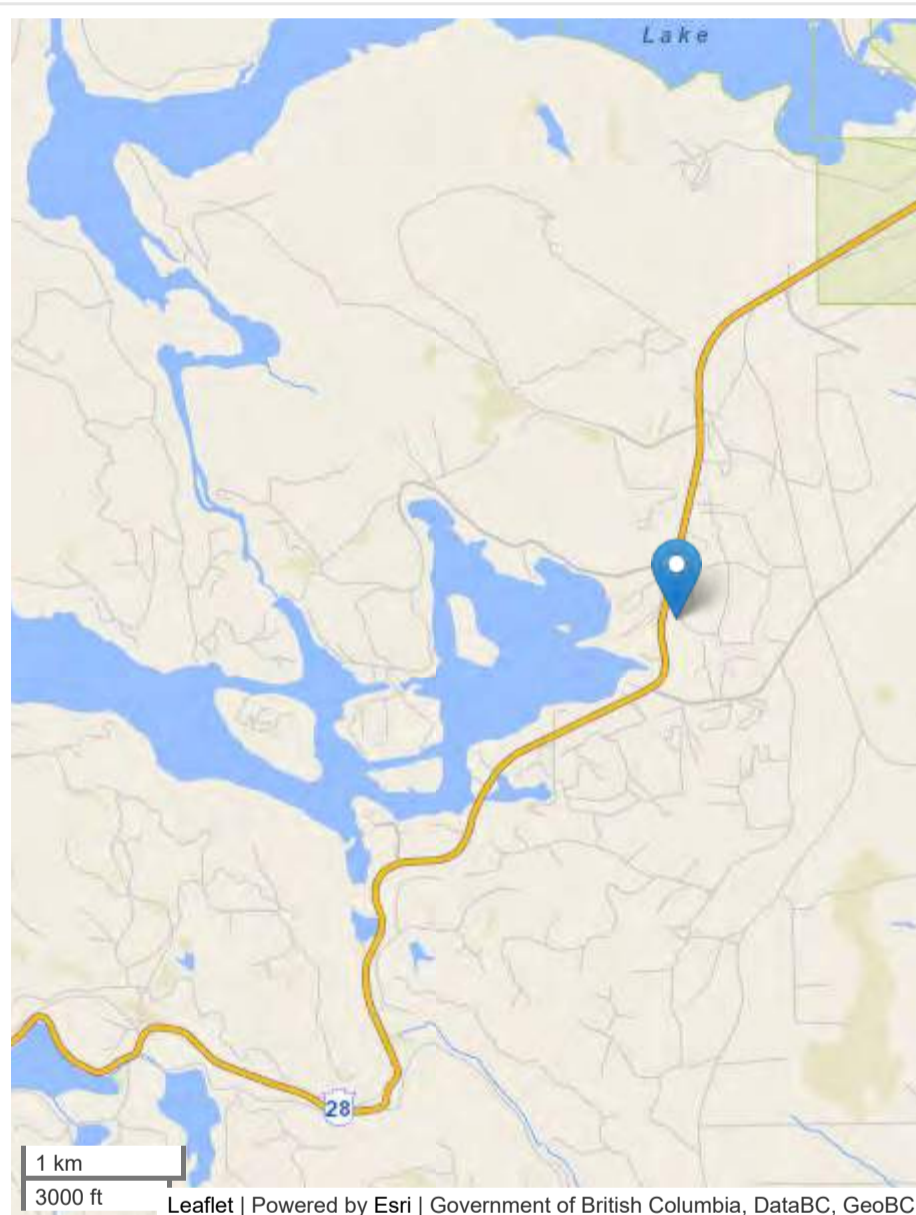
**Street Address:** GOLD RIVER HIGHWAY

**Town/City:**

**Legal Description:**

Lot	2
Plan	47695
District Lot	85
Block	
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	012474266

**Description of Well Location:**



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

**Latitude:** 50.010962      **Longitude:** -125.355456  
**UTM Easting:** 331238      **UTM Northing:** 5542508  
**Zone:** 10      **Coordinate Acquisition Code:**  
 unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				



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Construction	Construction	Alteration	Alteration	Decommission	Decommission
1991-10-23	1991-10-23				

### Well Completion Data

<b>Total Depth Drilled:</b>	<b>Static Water Level (BTOC):</b> 80.00 feet	<b>Well Cap:</b>
<b>Finished Well Depth:</b> 123.00 feet	<b>Estimated Well Yield:</b> 100.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Other
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
122.00	124.00	WATER BEARING SAND & GRAVEL						
115.00	122.00	ROCKS & SAND						
100.00	125.00	WATERBEARING SAND & GRAVEL						
85.00	100.00	WATER BEARING SAND & GRAVEL						
75.00	85.00	BROWN SAND & GRAVEL						
50.00	75.00	BROWN SAND & GRAVEL						
20.00	50.00	GREY SAND & GRAVEL						
0.00	20.00	GREY SAND & GRAVEL						

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	There are no records to show				
From	To	Diameter	Assembly Type	Slot Size							
There are no records to show											
<b>Material:</b>											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
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## Well Decommission Information

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**Reason for Decommission:**

**Method of Decommission:**

**Sealant Material:**

**Backfill Material:**

**Decommission Details:**

## Comments

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STEEL CASING,0.0 TO 123.2,,250 THICK,A53 LBS, CONTINUOUS,STAINLESS STEEL,PUMP TEST RATE 100 USGM,80 FT AFTER 24 HRS METHOD OF DRILLING = DRILLED

**Alternative Specs Submitted:** No

## Documents

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- [WTN 74191\\_Well Record.pdf](#)

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 74207  
**Well Identification Plate Number:**  
**Owner Name:** M & S FOREST PRODUCT  
**Intended Water Use:** Commercial and Industrial

**Well Status:** New  
**Well Class:** Unknown  
**Well Subclass:**  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

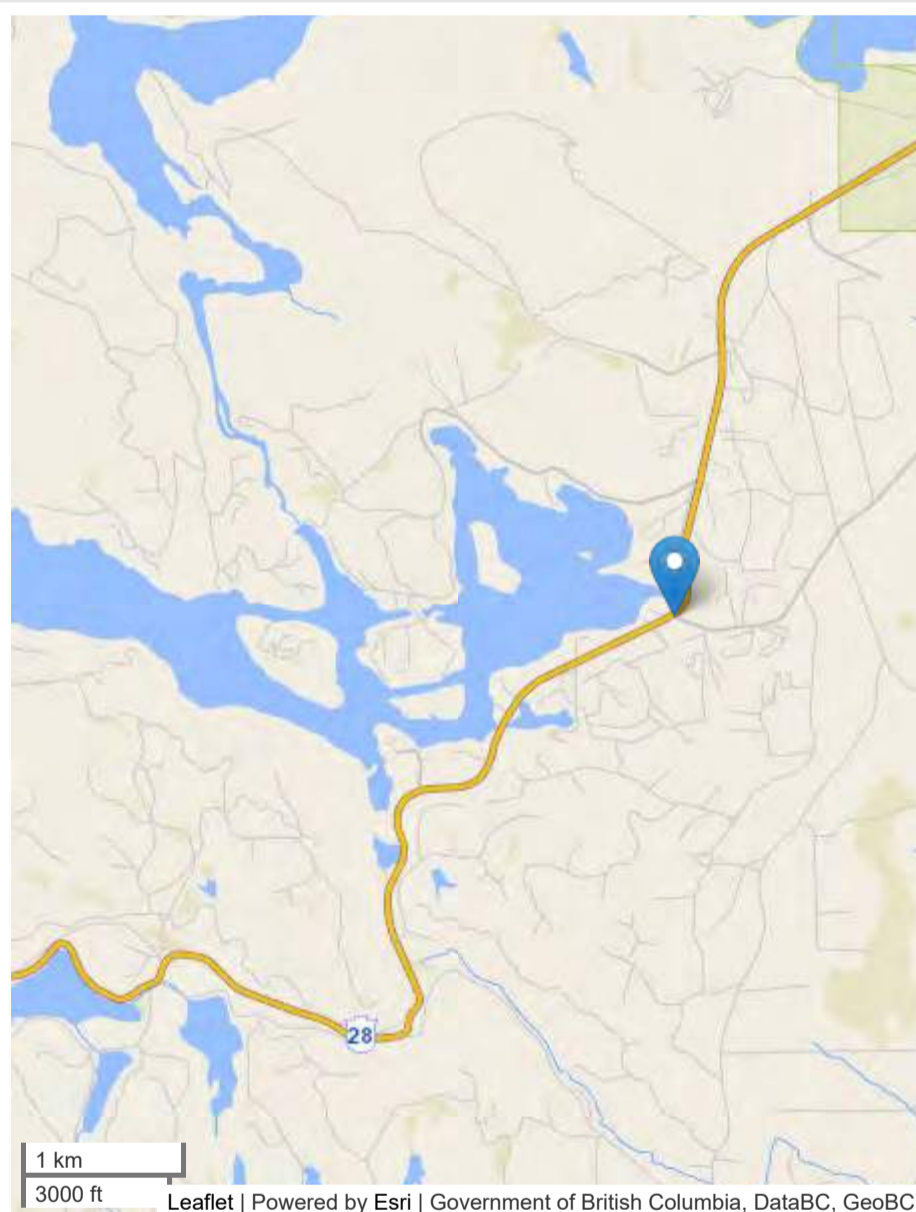
**Street Address:** GOLD RIVER HIGHWAY

**Town/City:**

**Legal Description:**

Lot	
Plan	
District Lot	85
Block	
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	

**Description of Well Location:** NEAR UPLAND EXCAVATING



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

**Latitude:** 50.007081      **Longitude:** -125.357429  
**UTM Easting:** 331083      **UTM Northing:** 5542081  
**Zone:** 10  
**Coordinate Acquisition Code:**  
 (unknown, accuracy based on parcel size) No ICF cadastre, poor or no location sketch; site located in center of primary parcel

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
1987-05-01	1987-05-01				

### Well Completion Data

<b>Total Depth Drilled:</b>	<b>Static Water Level (BTOC):</b> 85.00 feet	<b>Well Cap:</b>
<b>Finished Well Depth:</b> 138.00 feet	<b>Estimated Well Yield:</b> 20.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Other
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
100.00	138.00	WB SAND						
93.00	100.00	BROWN WB SAND & GRAVEL						
0.00	93.00	BROWN SAND & GRAVEL						

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	There are no records to show				
From	To	Diameter	Assembly Type	Slot Size							
There are no records to show											
<b>Material:</b>											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
----------------------	------------------------------------

### Well Yield

No well yield data available.

### Well Decommission Information

<b>Reason for Decommission:</b>	<b>Method of Decommission:</b>
<b>Sealant Material:</b>	<b>Backfill Material:</b>
<b>Decommission Details:</b>	

Chrome 74 is not supported by the Groundwater Wells and Aquifers application. We recommend using: Chrome, Firefox or Safari.

[Read more](#) or [ignore](#)

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Alternative Specs Submitted: No

## Documents

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- [WTN 74207\\_Well Record.pdf](#)

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 84136  
**Well Identification Plate Number:**  
**Owner Name:** CAMPBELL RIVER LANDFILL  
**Intended Water Use:** Commercial and Industrial

**Well Status:** New  
**Well Class:** Unknown  
**Well Subclass:**  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

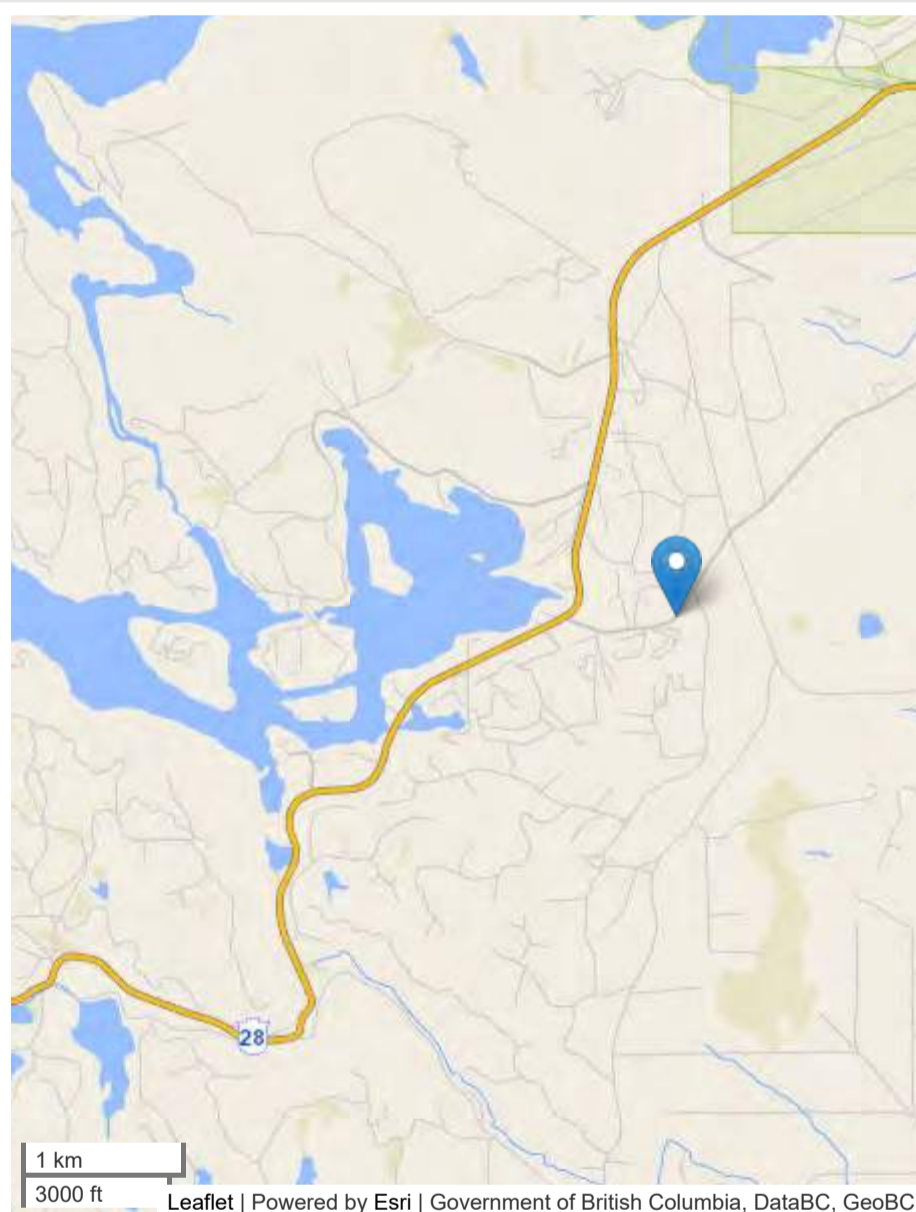
**Street Address:** 6700 ARGONAUT RD

**Town/City:**

**Legal Description:**

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	

**Description of Well Location:**



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

**Latitude:** 50.007172      **Longitude:** -125.348054  
**UTM Easting:** 331755      **UTM Northing:** 5542070  
**Zone:** 10  
**Coordinate Acquisition Code:**  
 unknown, accuracy based on parcel size) ICF cadastre, poor or no location sketch, arbitrarily located in center of parcel

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
2004-07-05	2004-07-05				

### Well Completion Data

<b>Total Depth Drilled:</b> 224.00 feet	<b>Static Water Level (BTOC):</b>	<b>Well Cap:</b> WELDED LID
<b>Finished Well Depth:</b> 215.00 feet	<b>Estimated Well Yield:</b> 75.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Air Rotary
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	13.00	COARSE GRAVEL						
13.00	36.00	COARSE SAND & GRAVEL						
36.00	42.00	COARSE GRAVEL						
42.00	87.00	BROWN SAND						
87.00	130.00	BROWN SILTY SAND & SOME GRAVEL						
130.00	142.00	CLEAN BROWN COARSE SAND						
142.00	150.00	SLIGHTLY SILTY SAND & GRAVEL						
150.00	220.00	COARSE SAND & GRAVEL (WB)						
220.00	224.00	MORE SAND & SILTYER BROWN WATER						

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b> Telescope	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td>206.30 ft</td> <td>215.00 ft</td> <td>5.50</td> <td></td> <td>200.00</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	206.30 ft	215.00 ft	5.50		200.00
From	To	Diameter	Assembly Type	Slot Size							
206.30 ft	215.00 ft	5.50		200.00							
<b>Material:</b> Stainless Steel											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
----------------------	------------------------------------

Chrome 74 is not supported by the Groundwater Wells and Aquifers application. We recommend using: Chrome, Firefox or Safari.

[Read more](#) or [ignore](#)

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## Well Decommission Information

**Reason for Decommission:**

**Method of Decommission:**

**Sealant Material:**

**Backfill Material:**

**Decommission Details:**

## Comments

CHLORINE MEASUREMENTS TAKEN AT GROUND LEVEL

**Alternative Specs Submitted:** No

## Documents

- WTN 84136\_Well Construction.pdf

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 93413  
**Well Identification Plate Number:** 12472  
**Owner Name:** EMCON (MINISTRY OF HIGHWAYS)  
**Intended Water Use:** Commercial and Industrial

**Well Status:** Alteration  
**Well Class:** Water Supply  
**Well Subclass:** Non Domestic  
**Aquifer Number:** 975

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

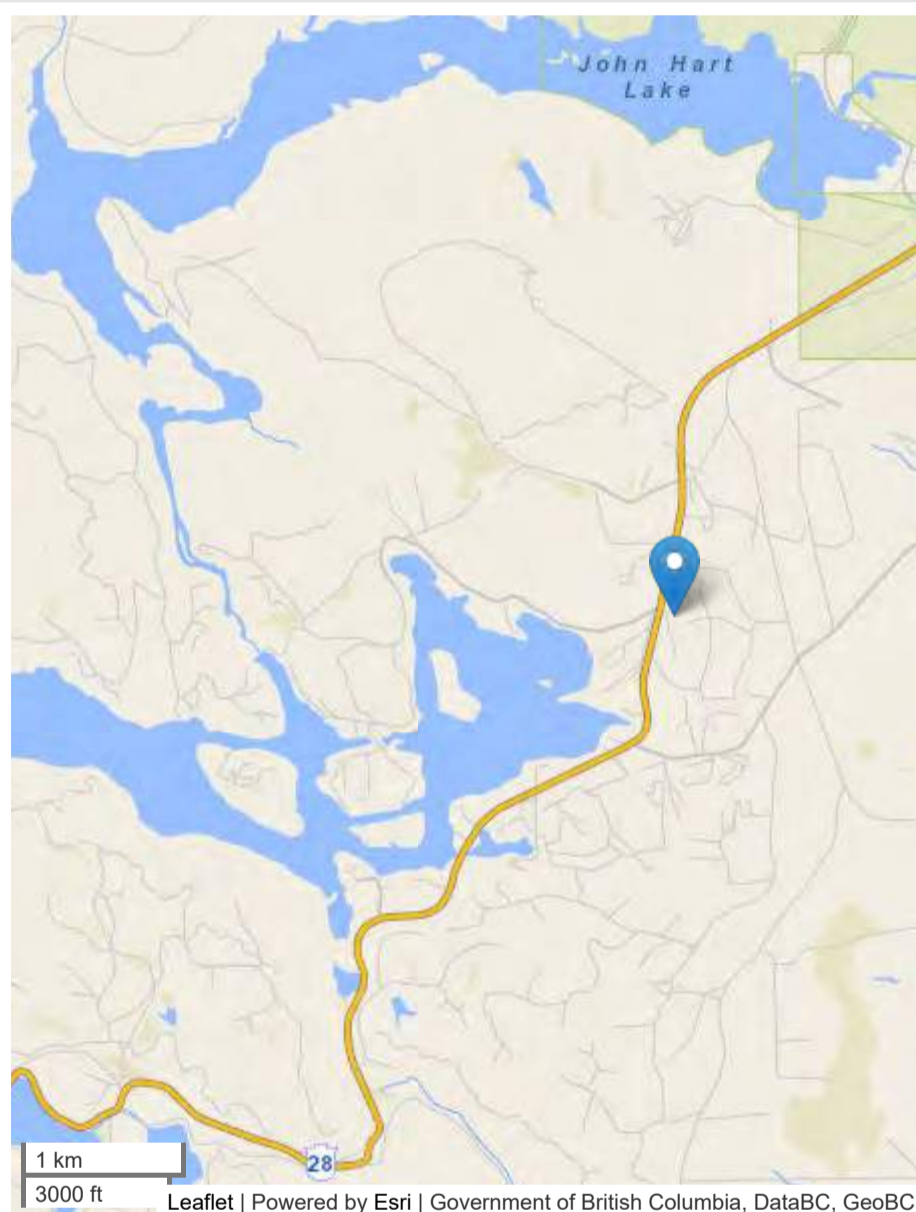
**Street Address:** 7025 GOLD RIVER HIGHWAY

**Town/City:**

**Legal Description:**

Lot	
Plan	
District Lot	85
Block	
Section	
Township	
Range	
Land District	47
Property Identification Description (PID)	

**Description of Well Location:** BETWEEN BRINE TANK @ SHOP, SE PORTION OF PROPERTY



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

**Latitude:** 50.014176      **Longitude:** -125.35398  
**UTM Easting:** 331355      **UTM Northing:** 5542862  
**Zone:** 10      **Coordinate Acquisition Code:** (10 m accuracy) ICF cadastre and good location sketch

## Well Activity

Activity	↕ Work Start Date	↕ Work End Date	↕ Drilling Company	↕ Date Entered	↕
There has been no activity related to this well.					

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
		2005-12-15	2005-12-15		

### Well Completion Data

<b>Total Depth Drilled:</b> 26.00 feet	<b>Static Water Level (BTOC):</b> 159.00 feet	<b>Well Cap:</b> PITLESS UNIT & CAP
<b>Finished Well Depth:</b> 180.00 feet	<b>Estimated Well Yield:</b> 10.000 USGPM	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b> 24.000 inches	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Cable Tool
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
160.00	178.00	GRAVEL	medium					
178.00	184.00						FINER & SANDIER AS GOING DEEPER	
184.00	187.00		silty		brown			
187.00	188.00		silty		brown		VERY SILTY	

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>															
<b>Type:</b> Telescope	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td>180.00 ft</td> <td>182.00 ft</td> <td>5.00</td> <td>RISER_PIPE</td> <td></td> </tr> <tr> <td>182.00 ft</td> <td>186.00 ft</td> <td>5.00</td> <td>K_PACKER</td> <td>12.00</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	180.00 ft	182.00 ft	5.00	RISER_PIPE		182.00 ft	186.00 ft	5.00	K_PACKER	12.00
From	To	Diameter	Assembly Type	Slot Size												
180.00 ft	182.00 ft	5.00	RISER_PIPE													
182.00 ft	186.00 ft	5.00	K_PACKER	12.00												
<b>Material:</b> Stainless Steel																
<b>Opening:</b> Continuous Slot																
<b>Bottom:</b> Other																

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
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### Well Yield

No well yield data available.

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#### Decommission Details:

### Comments

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MEASUREMENTS FROM GROUND LEVEL. RECOMMENDED PUMPING RATE: 10 USGPM.

**Alternative Specs Submitted:** No

### Documents

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- WTN 93413\_Well Record.pdf

### Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

<b>Well Tag Number:</b> 103257	<b>Well Status:</b> New	<b>Observation Well Number:</b>
<b>Well Identification Plate Number:</b> 34915	<b>Well Class:</b> Water Supply	<b>Observation Well Status:</b>
<b>Owner Name:</b> TIM FLUTER (CONTACT) CAMPBELL RIVER MOTOCROSS ASSOCIATION	<b>Well Subclass:</b> Domestic	<b>Environmental Monitoring System (EMS) ID:</b>
<b>Intended Water Use:</b> Private Domestic	<b>Aquifer Number:</b> 975	<b>Alternative specs submitted:</b> No

## Licensing Information

<b>Licensed Status:</b> Unlicensed	<b>Licence Number:</b>
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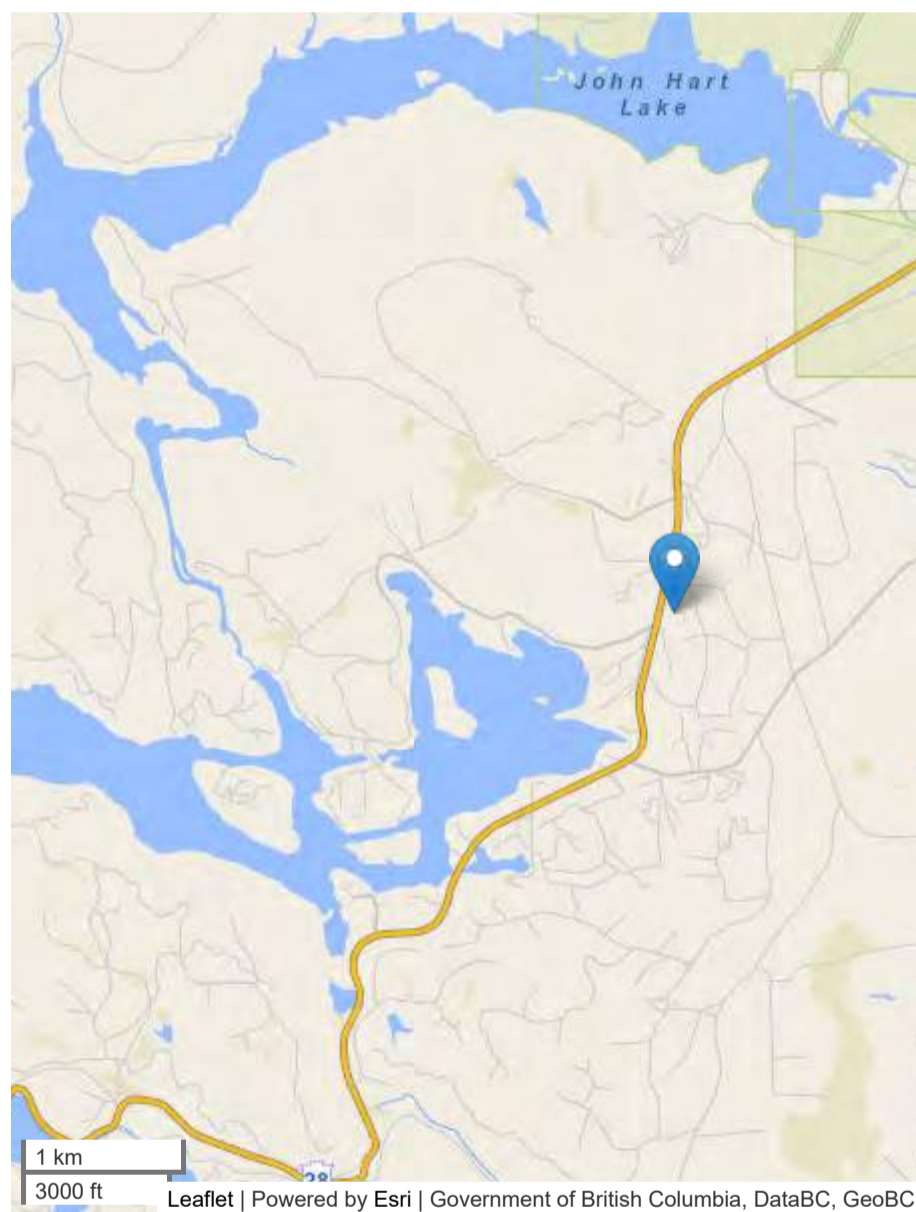
## Location Information

**Street Address:** GOLD RIVER HIGHWAY  
**Town/City:** CAMPBELL RIVER

### Legal Description:

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	

**Description of Well Location:** NOT PROVIDED



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

<b>Latitude:</b> 50.015273	<b>Longitude:</b> -125.3536
<b>UTM Easting:</b> 331386	<b>UTM Northing:</b> 5542983
<b>Zone:</b> 10	<b>Coordinate Acquisition Code:</b> (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	↕	Work Start Date	↕	Work End Date	↕	Drilling Company	↕	Date Entered	↕
There has been no activity related to this well.									

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
2010-08-18	2010-08-20				

## Well Completion Data

**Total Depth Drilled:** 240.00 feet  
**Finished Well Depth:** 239.00 feet  
**Final Casing Stick Up:** 30.000 inches  
**Depth to Bedrock:**  
**Ground elevation:** 599.00

**Static Water Level (BTOC):** 158.00 feet  
**Estimated Well Yield:** 50.000 USGPM  
**Artesian Flow:**  
**Artesian Pressure:**  
**Method of determining elevation:** GPS

**Well Cap:** SIMPLE  
**Well Disinfected Status:** Disinfected  
**Drilling Method:** Air Rotary  
**Orientation of Well:** VERTICAL

## Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	170.00	SAND & GRAVEL			brown			
170.00	185.00				brown			
185.00	240.00	WATER-BEARING MEDIUM GRAINED SAND			brown			

## Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	231.17		Steel	6.000	0.219	Installed

## Surface Seal and Backfill Details

**Surface Seal Material:** Bentonite clay and cement mixture  
**Surface Seal Installation Method:** Poured  
**Surface Seal Thickness:** 1.00  
**Surface Seal Depth:**

**Backfill Material Above Surface Seal:**  
**Backfill Depth:**

## Liner Details

**Liner Material:**  
**Liner Diameter:**  
**Liner from:**

**Liner Thickness:**  
**Liner to:**

### Liner perforations

From	To
There are no records to show	

## Screen Details

**Intake Method:** Screen  
**Type:** Telescope  
**Material:** Stainless Steel  
**Opening:** Continuous Slot  
**Bottom:** Other

### Installed Screens

From	To	Diameter	Assembly Type	Slot Size
230.17 ft	234.58 ft	5.00	SCREEN	20.00
230.17 ft	ft	5.00	K_PACKER	
234.58 ft	239.00 ft	5.00	SCREEN	15.00

## Well Development

**Developed by:**

**Development Total Duration:** 5.00 hours

## Well Yield

No well yield data available.

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#### Decommission Details:

### Comments

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SCREEN BOTTOM: BLANK. BAILED 10 GPM DREW 1' - DRAWDOWN AVAILABLE 90'.

**Alternative Specs Submitted:** No

### Documents

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- WTN 103257\_Well Construction.pdf

### Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 109728  
**Well Identification Plate Number:** 42401  
**Owner Name:** AL+SONS EXCAVATING  
**Intended Water Use:** Private Domestic

**Well Status:** New  
**Well Class:** Water Supply  
**Well Subclass:** Domestic  
**Aquifer Number:**

**Observation Well Number:**  
**Observation Well Status:**  
**Environmental Monitoring System (EMS) ID:**  
**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

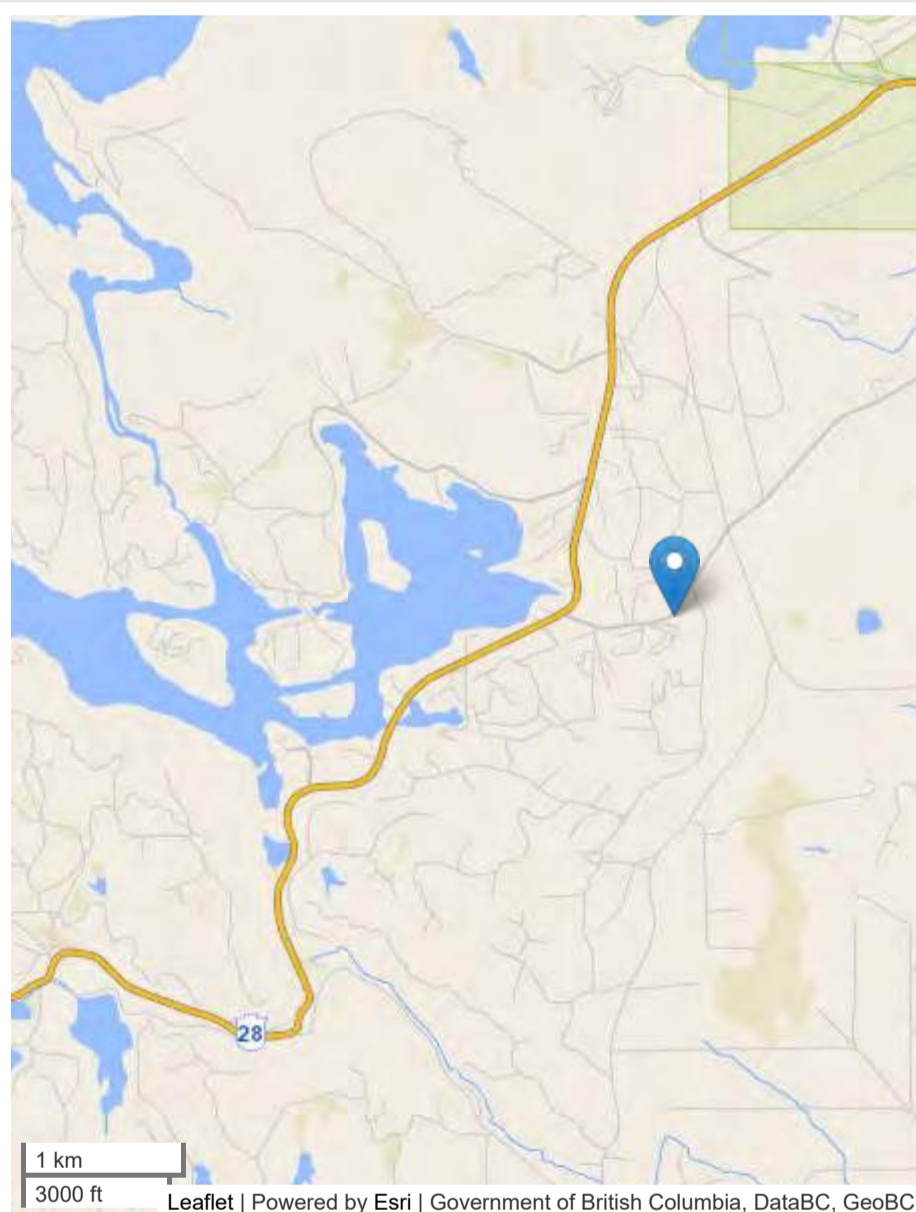
## Location Information

**Street Address:** 6700 ARGONAUT ROAD  
**Town/City:** CAMPBELL RIVER

**Legal Description:**

Lot	85
Plan	
District Lot	
Block	B
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	

**Description of Well Location:** NOTHING RECORDED



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

**Latitude:** 50.006913      **Longitude:** -125.347972  
**UTM Easting:** 331760      **UTM Northing:** 5542041  
**Zone:** 10      **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	↕	Work Start Date	↕	Work End Date	↕	Drilling Company	↕	Date Entered	↕
There has been no activity related to this well.									

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
2015-01-14	2015-01-15				

### Well Completion Data

<b>Total Depth Drilled:</b> 216.00 feet	<b>Static Water Level (BTOC):</b> 110.00 feet	<b>Well Cap:</b> WELDED LID
<b>Finished Well Depth:</b> 208.00 feet	<b>Estimated Well Yield:</b> 50.000 USGPM	<b>Well Disinfected Status:</b> Disinfected
<b>Final Casing Stick Up:</b> 20.000 inches	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Air Rotary
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b> 520.00	<b>Method of determining elevation:</b> GPS	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	8.00	GRAVEL AND SILTY SANDY			brown	Medium		
8.00	14.00	GRAVEL			brown	Medium	ZONE WOOD	
14.00	72.00	GRAVEL, SANDY			brown	Medium	LOOSE	
72.00	110.00	SAND,SILTY.			brown	Medium	SILT LAYERS AND GRAVEL LAYERS	
110.00	144.00	SAND			brown	Medium	CLEAN, LOOSE	
144.00	156.00	GRAVEL			brown	Medium	WB,COARSE CLEAN	
156.00	209.00	SAND MED FINE			brown	Medium	WB,CLEAN	
209.00	216.00	SAND,SILTY			brown	Medium	WB,FINE	

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	16.00	Steel Removed		10.000		Not Installed
0.00	216.00		Steel	6.000	0.219	Installed

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b> Bentonite clay	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b> Poured	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b> 2.00	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						



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[Read more](#) or [ignore](#)

<b>Material:</b> Stainless Steel <b>Opening:</b> Continuous Slot <b>Bottom:</b> Plug	197.00 ft	199.00 ft	5.00	K_RISER	
	199.00 ft	203.60 ft	5.00	SCREEN	15.00
	203.60 ft	208.00 ft	5.00	SCREEN	12.00

## Well Development

**Developed by:** **Development Total Duration:** 3.00 hours

## Well Yield

No well yield data available.

## Well Decommission Information

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

## Comments

EWELLS SUBMISSION

**Alternative Specs Submitted:** No

## Documents

No additional documentation available for this well.

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# Groundwater Wells and Aquifers

## Well Summary

**Well Tag Number:** 110853

**Well Identification Plate Number:**

**Owner Name:** COMOX VALLEY REGIONAL DISTRICT

**Intended Water Use:**

**Well Status:** Closure

**Well Class:** Monitoring

**Well Subclass:** Permanent

**Aquifer Number:**

**Observation Well Number:**

**Observation Well Status:**

**Environmental Monitoring System (EMS) ID:**

**Alternative specs submitted:** No

## Licensing Information

**Licensed Status:** Unlicensed

**Licence Number:**

## Location Information

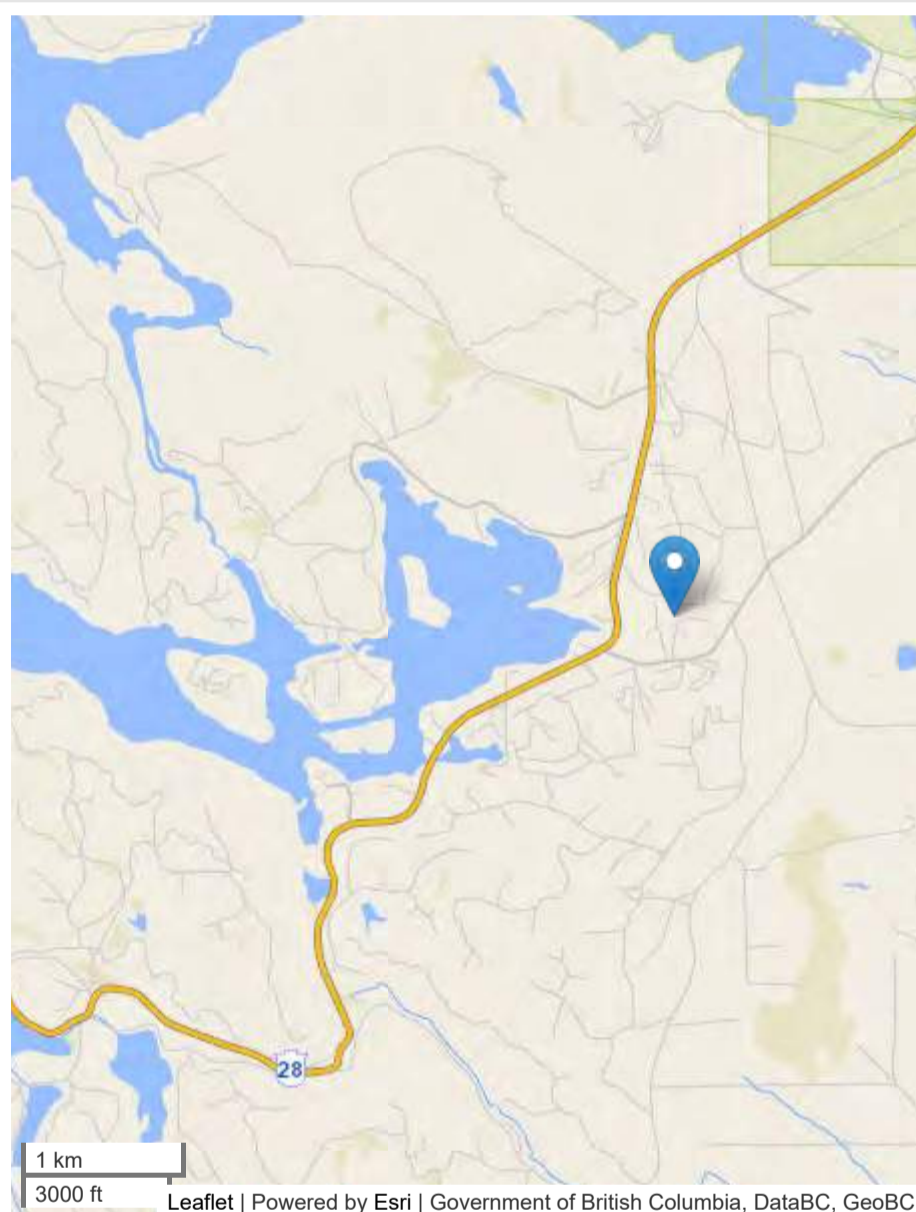
**Street Address:** ARGONAUT ROAD

**Town/City:** CAMPBELL RIVER

**Legal Description:**

Lot	
Plan	
District Lot	
Block	
Section	
Township	
Range	
Land District	
Property Identification Description (PID)	

**Description of Well Location:** CLOSURE OF 2" MONITORING WELL



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

**Latitude:** 50.008985

**Longitude:** -125.351395

**UTM Easting:** 331522

**UTM Northing:** 5542279

**Zone:** 10

**Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	↕ Work Start Date	↕ Work End Date	↕ Drilling Company	↕ Date Entered	↕
There has been no activity related to this well.					

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Construction	Construction	Alteration	Alteration	Decommission	Decommission
				2013-06-21	2013-06-21

### Well Completion Data

<b>Total Depth Drilled:</b>	<b>Static Water Level (BTOC):</b>	<b>Well Cap:</b>
<b>Finished Well Depth:</b>	<b>Estimated Well Yield:</b>	<b>Well Disinfected Status:</b> Not Disinfected
<b>Final Casing Stick Up:</b>	<b>Artesian Flow:</b>	<b>Drilling Method:</b> Air Rotary
<b>Depth to Bedrock:</b>	<b>Artesian Pressure:</b>	<b>Orientation of Well:</b> VERTICAL
<b>Ground elevation:</b>	<b>Method of determining elevation:</b> Unknown	

### Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
							FILLED 2" WELL BORE WITH BENTONITE-CEMENT GROUT	

### Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
There are no records to show						

### Surface Seal and Backfill Details

<b>Surface Seal Material:</b>	<b>Backfill Material Above Surface Seal:</b>
<b>Surface Seal Installation Method:</b>	<b>Backfill Depth:</b>
<b>Surface Seal Thickness:</b>	
<b>Surface Seal Depth:</b>	

### Liner Details

<b>Liner Material:</b>	<b>Liner Thickness:</b>	<b>Liner perforations</b>				
<b>Liner Diameter:</b>	<b>Liner to:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	There are no records to show	
From	To					
There are no records to show						
<b>Liner from:</b>						

### Screen Details

<b>Intake Method:</b>	<b>Installed Screens</b>										
<b>Type:</b>	<table border="1"> <thead> <tr> <th>From</th> <th>To</th> <th>Diameter</th> <th>Assembly Type</th> <th>Slot Size</th> </tr> </thead> <tbody> <tr> <td colspan="5" style="text-align: center;">There are no records to show</td> </tr> </tbody> </table>	From	To	Diameter	Assembly Type	Slot Size	There are no records to show				
From	To	Diameter	Assembly Type	Slot Size							
There are no records to show											
<b>Material:</b>											
<b>Opening:</b>											
<b>Bottom:</b>											

### Well Development

<b>Developed by:</b>	<b>Development Total Duration:</b>
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### Well Yield

No well yield data available.

### Well Decommission Information

<b>Reason for Decommission:</b> NOT REQUIRED - AREA TO BE FILLED	<b>Method of Decommission:</b> PUMPED
<b>Sealant Material:</b>	<b>Backfill Material:</b>
<b>Decommission Details:</b> TREMIE CEMENT/BENTONITE GROUT FROM BOTTOM TO TOP	

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**Alternative Specs Submitted:** No

## Documents

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No additional documentation available for this well.

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

Well Tag Number: 122450  
 Well Identification Plate Number: 62929  
 Owner Name: GEORGINA McCUBBING  
 Intended Water Use: Private Domestic

Well Status: New  
 Well Class: Water Supply  
 Well Subclass: Not Applicable  
 Aquifer Number:

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

## Licensing Information

Licensed Status: Unlicensed

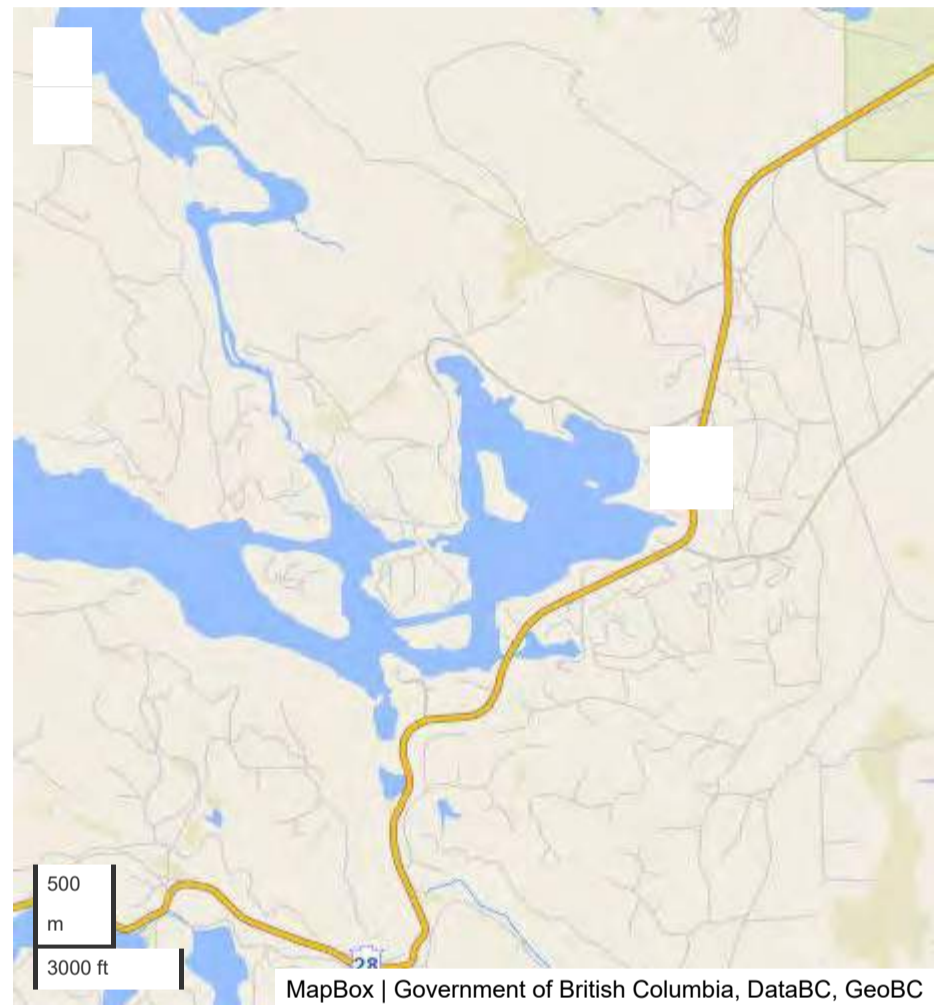
Licence Number:

## Location Information

Street Address: 7170 GOLD RIVER HWY  
 Town/City: CAMPBELL RIVER

### Legal Description:

Lot	2
Plan	EPS4410
District Lot	85
Block	
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	030264227



### Description of Well Location:

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

Latitude: 50.00919      Longitude: -125.35774  
 UTM Easting: 331068      UTM Northing: 5542316  
 Zone: 10      Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2020-10-15	2020-10-16	Drillwell Enterprises Ltd.	February 11th 2021 at 3:58 PM

## Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2020-10-15	2020-10-16				

## Well Completion Data

**Total Depth Drilled:** 155 feet  
**Finished Well Depth:** 155 ft bgl  
**Final Casing Stick Up:** 24 inches  
**Depth to Bedrock:**  
**Ground elevation:** 701 feet

**Static Water Level:** 110 feet btoc  
**Estimated Well Yield:** 15 USgpm  
**Artesian Flow:**  
**Artesian Pressure:**  
**Method of determining elevation:** GPS

**Well Cap:** Welded lid  
**Well Disinfected Status:** Disinfected  
**Drilling Method:** Dual Rotary  
**Orientation of Well:** VERTICAL

## Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	42	Compact gravel		Dry	brown	Dense		
42	112	Gravel, sand			brown	Loose		
112	155	Coarse gravel		Wet	brown	Loose		

## Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
0	17		Steel Pulled Out	10		
0	155		Steel	6	0.219	Installed

## Surface Seal and Backfill Details

**Surface Seal Material:** Bentonite clay  
**Surface Seal Installation Method:** Poured  
**Surface Seal Thickness:** 2 inches  
**Surface Seal Depth:** 17 feet

**Backfill Material Above Surface Seal:**  
**Backfill Depth:**

## Liner Details

**Liner Material:**  
**Liner Diameter:**  
**Liner from:**

**Liner Thickness:**  
**Liner to:**

### Liner perforations

From (ft bgl)	To (ft bgl)
There are no records to show	

## Screen Details

**Intake Method:** Open  
 Bottom  
**Type:**  
**Material:**  
**Opening:**  
 Bottom:

### Installed Screens

From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size
There are no records to show				

## Well Development

**Developed by:** Air lifting, Surging

**Development Total Duration:** 1 hours

## Well Yield

**Estimation Method:** Air Lifting  
**Static Water Level Before Test:** 110 ft (btoc)  
**Hydrofracturing Performed:** No

**Estimation Rate:** 15 USgpm  
**Drawdown:**  
**Increase in Yield Due to Hydrofracturing:**

**Estimation Duration:** 1 hours

## Well Decommission Information

**Reason for Decommission:**  
**Sealant Material:**  
**Decommission Details:**

**Method of Decommission:**  
**Backfill Material:**

## Comments

No comments submitted

**Alternative Specs Submitted:** No

## Documents

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- [WTN 122450 #62929 Georgina McCubbing, 7170 Gold River Hwy, Campbell River.pdf](#)

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

<b>Well Tag Number:</b> 122464	<b>Well Status:</b> New	<b>Observation Well Number:</b>
<b>Well Identification Plate Number:</b> 62928	<b>Well Class:</b> Water Supply	<b>Observation Well Status:</b>
<b>Owner Name:</b> CROWNE PACIFIC DEVELOPMENT CORP	<b>Well Subclass:</b> Not Applicable	<b>Environmental Monitoring System (EMS) ID:</b>
<b>Intended Water Use:</b> Private Domestic	<b>Aquifer Number:</b>	<b>Alternative specs submitted:</b> No

## Licensing Information

<b>Licensed Status:</b> Unlicensed	<b>Licence Number:</b>
------------------------------------	------------------------

## Location Information

**Street Address:** 7120 GOLD RIVER HWY  
**Town/City:** CAMPBELL RIVER

### Legal Description:

Lot	2
Plan	VIS3140
District Lot	85
Block	
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	018675867



### Description of Well Location:

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

**Latitude:** 50.00953      **Longitude:** -125.36034  
**UTM Easting:** 330883      **UTM Northing:** 5542360  
**Zone:** 10      **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2020-10-19	2020-10-20	Drillwell Enterprises Ltd.	February 12th 2021 at 1:34 PM

## Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2020-10-19	2020-10-20				



## Well Completion Data

**Total Depth Drilled:** 135 feet  
**Finished Well Depth:** 123 ft bgl  
**Final Casing Stick Up:** 16 inches  
**Depth to Bedrock:**  
**Ground elevation:** 658 feet

**Static Water Level:** 73 feet btoc  
**Estimated Well Yield:** 30 USgpm  
**Artesian Flow:**  
**Artesian Pressure:**  
**Method of determining elevation:** GPS

**Well Cap:** Welded lid  
**Well Disinfected Status:** Disinfected  
**Drilling Method:** Dual Rotary  
**Orientation of Well:** VERTICAL

## Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	95	Clean gravel, sand			brown	Loose		
95	125	Coarse gravel		Wet	brown	Loose		
125	135	Sand		Wet	brown	Loose		

## Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
0	17		Steel Pulled Out	10		
0	119		Steel	6	0.219	Installed

## Surface Seal and Backfill Details

**Surface Seal Material:** Bentonite clay  
**Surface Seal Installation Method:** Poured  
**Surface Seal Thickness:** 2 inches  
**Surface Seal Depth:** 17 feet

**Backfill Material Above Surface Seal:**  
**Backfill Depth:**

## Liner Details

**Liner Material:**  
**Liner Diameter:**  
**Liner from:**

**Liner Thickness:**  
**Liner to:**

### Liner perforations

From (ft bgl)	To (ft bgl)
There are no records to show	

## Screen Details

**Intake Method:** Screen  
**Type:** Telescope  
**Material:** Stainless  
 Steel  
**Opening:** Continuous  
 Slot  
**Bottom:** Other

### Installed Screens

From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size
117.00	119.00	6.00	K_RISER	
119.00	123.00	6.00	SCREEN	100.00

## Well Development

**Developed by:** Air lifting, Bailing

**Development Total Duration:** 1 hours

## Well Yield

**Estimation Method:** Air Lifting  
**Static Water Level Before Test:** 73 ft (btoc)  
**Hydrofracturing Performed:** No

**Estimation Rate:** 30 USgpm  
**Drawdown:**  
**Increase in Yield Due to Hydrofracturing:**

**Estimation Duration:** 1 hours

## Well Decommission Information

**Reason for Decommission:**  
**Sealant Material:**  
**Decommission Details:**

**Method of Decommission:**  
**Backfill Material:**

## Comments

No comments submitted

**Alternative Specs Submitted:** No

## Documents

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- [WTN 122464 #62928 Crowne Pacific, 7120 Gold River Hwy, Campbell River.pdf](#)

## Disclaimer

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# Groundwater Wells and Aquifers

## Well Summary

<b>Well Tag Number:</b> 125695	<b>Well Status:</b> New	<b>Observation Well Number:</b>
<b>Well Identification Plate Number:</b> 66650	<b>Well Class:</b> Water Supply	<b>Observation Well Status:</b>
<b>Owner Name:</b> Comox Valley Regional District	<b>Well Subclass:</b> Not Applicable	<b>Environmental Monitoring System (EMS) ID:</b>
<b>Intended Water Use:</b> Commercial and Industrial	<b>Aquifer Number:</b> 975	<b>Alternative specs submitted:</b> No
<b>Artesian Condition:</b> No	<b>Technical Report:</b> N/A	

## Licensing Information

**Licensed Status:** Licensed      **Licence Number:**

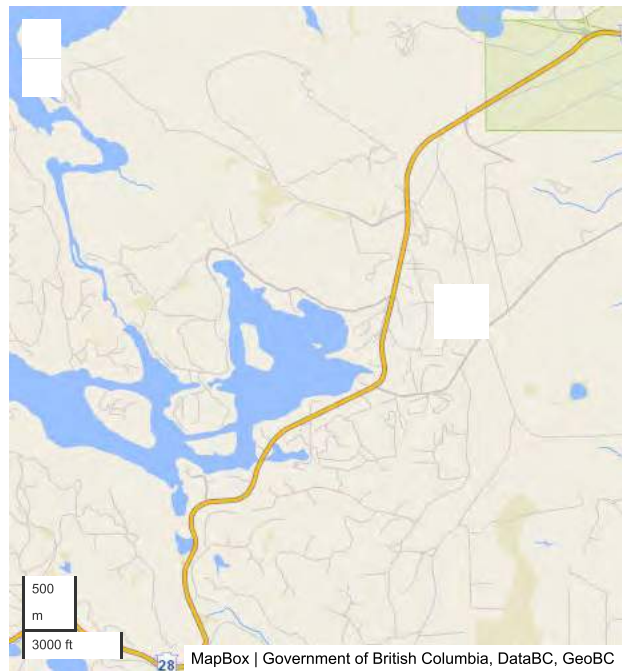
## Location Information

**Street Address:** 6300 Argonaut Road  
**Town/City:** Campbell River

### Legal Description:

Lot	
Plan	
District Lot	85
Block	J
Section	
Township	
Range	
Land District	51
Property Identification Description (PID)	

**Description of Well location:** PIN 12445651; Campbell River Compost Facility.



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

**Latitude:** 50.01105      **Longitude:** -125.34773  
**UTM Easting:** 331792      **UTM Northing:** 5542500  
**Zone:** 10      **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

## Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
Construction report	2022-03-10	2022-03-11	Drillwell Enterprises Ltd.	May 3rd 2022 at 9:13 AM

## Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2022-03-10	2022-03-11				

## Well Completion Data

**Total Depth Drilled:** 135 ft bgl  
**Finished Well Depth:** 135 ft bgl  
**Final Casing Stick Up:** 24 inches  
**Depth to Bedrock:**  
**Ground elevation:** 489 feet

**Estimated Well Yield:** 15 USgpm  
**Well Cap:** Welded steel  
**Well Disinfected Status:** Disinfected  
**Drilling Method:** Dual Rotary  
**Method of determining elevation:** GPS

**Static Water Level (BTCC):** 72 feet btoc  
**Artesian Flow:**  
**Artesian Pressure (head):**  
**Artesian Pressure (PSI):**  
**Orientation of Well:** VERTICAL

## Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0	78	sand gravel		Dry	brown	Loose		
78	93	sand with clay		Dry	brown	Loose		
93	135	sand		Wet	brown	Loose		

## Casing Details

From (ft bgl)	To (ft bgl)	Casing Type	Casing Material	Diameter (in)	Wall Thickness (in)	Drive Shoe
0	17	Steel Removed	Steel Pulled Out	10		
0	130	Production casing	Steel	6	0.219	Installed

## Surface Seal and Backfill Details

**Surface Seal Material:** Bentonite clay  
**Surface Seal Installation Method:** Poured  
**Surface Seal Thickness:** 2 inches  
**Surface Seal Depth:** 17 feet

**Backfill Material Above Surface Seal:**  
**Backfill Depth:**

## Liner Details

**Liner Material:**  
**Liner Diameter:**  
**Liner from:**

**Liner Thickness:**  
**Liner to:**

### Liner perforations

From (ft bgl)	To (ft bgl)
There are no records to show	

## Screen Details

**Intake Method:** Screen  
**Type:** Telescope  
**Material:** Stainless Steel  
**Opening:** Continuous Slot  
**Bottom:** Other

### Installed Screens

From (ft bgl)	To (ft bgl)	Diameter (in)	Assembly Type	Slot Size
128.00	131.00	6.00	K_RISER	
131.00	135.00	6.00	SCREEN	10.00

## Well Development

**Developed by:** Bailing

**Development Total Duration:** 1 hours

## Well Yield

**Estimation Method:** Bailing  
**Static Water Level Before Test:** 72 ft (btoc)  
**Hydrofracturing Performed:** No

**Estimation Rate:** 15 USgpm  
**Drawdown:**  
**Increase In Yield Due to Hydrofracturing:**

**Estimation Duration:** 1 hours

## Well Decommission Information

**Reason for Decommission:**  
**Sealant Material:**  
**Decommission Details:**

**Method of Decommission:**  
**Backfill Material:**

## Comments

Specific well use = Waste Management; Well xref'd and associated with GW licence application.

## Documents

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- [WTN 125695\\_Map.pdf](#)
- [WTN 125695\\_Well\\_Construction.pdf](#)

## Disclaimer

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# **Appendix D**

**2022 Closure Fund Memorandum**

# Technical Memorandum

March 5, 2024

<b>To</b>	Sarah Willie, Comox Valley Regional District	<b>Contact No.</b>	604 248-3971
<b>Copy to</b>	Crystal Stuart, Tina He	<b>Email</b>	Jeremy.scott@ghd.com
<b>From</b>	Jeremy Scott, Alex Rorke	<b>Project No.</b>	11209296
<b>Project Name</b>	CVRD EMP		
<b>Subject</b>	2023 Closure and Post-Closure Estimates Comox Strathcona Waste Management Campbell River, Comox Valley, Gold River, Tahsis, and Zeballos, British Columbia		

## 1. Introduction

This memorandum has been prepared by GHD Limited (GHD) for the Comox Valley Regional District (CVRD) to present the 2023 closure and post-closure (CPC) estimates for the following Comox Strathcona Solid Waste Management Centres (CSWM) landfills.

- Campbell River
- Comox Valley Waste Management Centre – Pidgeon Lake
- Comox Valley Waste Management Centre – Bevan Landfill
- Gold River
- Tahsis
- Zeballos
- Sawmill
- Cortes Island – no associated costs

Table 1 presents a summary of the CPC cost estimates for each landfill.

## 2. Calculation Methodology

Landfill CPC estimates have been calculated based on the methodology for calculating landfill liability described in PS 3280 – Asset Retirement Obligations Guide, formerly PS 3270 – Solid Waste Landfill Closure & Post-closure Liability. The following presents a summary of the methodology:

Asset retirement costs are necessary and integral to owning and operating the related tangible capital asset. These costs increase the carrying amount. As asset retirement costs on their initial recording are capitalized and amortized over the period of benefit, changes in their estimate would be accounted for similarly. An accretion expense, which is a change in measurement resulting from the passage of time, results from events of the accounting period. It would be expensed in the period and reported in the statement of operations. An entity will measure and incorporate changes due to the passage of time into

This Technical Memorandum is provided as an interim output under our agreement with CVRD. It is provided to foster discussion in relation to technical matters associated with the project and should not be relied upon in any way.

the carrying amount of the liability before measuring changes resulting from a revision to either the timing, the amount of the original estimate of undiscounted cash flows or the discount rate.

The following components that need to be assessed for asset retirement obligations (ARO) landfill liability are:

1. Present value (PV) of the ARO liability related to the closure costs, final cover and vegetation, and completing facilities for post-closure activities. PV is calculated using inflated cash flows.
2. Determining of the ARO liability related to the post closure maintenance for the years after closure occurred. Inflated cash flows are calculated for each year after closure.
3. Total present value based on the inflated cash flows for post closure maintenance. This is determined through the calculation of PVs for each year and summing them.
4. Calculation of accretion expenses. This is calculated from the difference of the present value sums of 2022 and 2023. This accounts for Jan 1, 2023, to Dec 31, 2023.
5. Book Value at initial obligation date. To properly adapt to PS3280 the book value of the landfill is calculated from the year it started to receive waste. This is calculated using the same tables but adjusting the present value year so that year 0 is the year the landfill opened. The Book value is the sum of the present value costs.
6. Amortization of the ARO liability in year 1. This is the Book value of the landfill divided by the total years of useful life (landfill open date to closure date)
7. Accumulated Amortization. This is the amortization in year 1 multiplied by the number of years from when the landfill was opened to when PS3280 came into effect (2022)

To allow organizations to more easily adopt to this new methodology, 3 separate transitional provisions are provided for application of PS 3280. These are the retroactive approach, the prospective approach, and the modified retroactive approach. The CVRD has chosen to use the modified retroactive approach. In this provision, the December 31, 2022 balance represents the 2023 opening amount for the liability. ARO is calculated for 2022 and 2023 as if this new methodology was in place during that time.

## 2.1 Inflation and Discount Rates

All calculations of the present value of CPC costs were completed using the same rates for O&M inflation, construction cost inflation, and discount. The following list presents values and sources for inflation and discount rates applied:

- Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD
- Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
- Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD

Further details on values used for forecasts are presented below for each landfill in turn.

## 3. Campbell River

Details of the present value calculations for the Campbell River Landfill are presented in Table 2. The CVRD has closed the Campbell River Landfill and stopped accepting waste in May 2022. The following list summarizes the key inputs to the CPC Update:

- Annual cost of post closure operations and monitoring of \$30,311



- This was calculated from CVRD cost estimates of 2023 groundwater monitoring and the 2022 ALS lab costs collected by GHD inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
- Cost of post closure landfill maintenance of \$20,000 every five years.
- Annual cost of post-closure landfill gas collection system operations and maintenance of \$45,000.
  - Provided by CVRD
- 30-year post closure period beginning in 2023.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$2,379,337
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$3,288,474
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$1,630,060
Accretion expense (December 31, 2023)	\$76,124
Book Value at Initial Obligation Date (1999)	\$570,548
Amortization expense (year 1)	\$0
Accumulated Amortization	\$570,548

## 4. Comox Valley

Details of the present value calculations for the Comox Valley Waste Management Centre landfills are presented in Tables 3, 4 and 8. Separate calculations were developed for the Pidgeon Lake Landfill, Cell 1 of the Engineered Landfill, and the Former Sawmill Landfill.

The following list summarizes the key inputs to the CPC Update for each of the landfills on the CVWMC site:

### ***Pidgeon Lake Landfill (Table 3)***

- The Pidgeon Lake Landfill was closed in 2019.
- Annual cost of post closure monitoring of \$15,989.
- Cost of post closure landfill maintenance of \$10,000 every five years.
- Annual cost of post-closure landfill gas collection system operations and maintenance of \$30,000.
- 30-year post closure period began in 2020.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$1,301,692
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$1,739,049
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$924,662
Accretion expense (December 31, 2023)	\$43,182
Book Value at Initial Obligation Date (1977)	\$118,572

Amortization expense (year 1)	\$0
Accumulated Amortization	\$118,572

**Bevan Landfill Cell 1 and Cell 2 (Table 4)**

- Closure of Cell 1 of the Engineered Landfill is planned to consist of the following works:
  - Cell 1 design for partial closure and gas collection construction at \$430,000 for 2025
  - Cell 1 partial closure construction \$875,000 for 2025
  - Construction of LFG infrastructure (horizontal collection trenches and connections to the headers)
    - \$121,000 in 2026 and \$150,000 in each year from 2027-2032
      - *Note: these costs will be extended from 2027 to 2040 in next years reporting.*
  - Cell 1 & 2 complete closure construction \$4,942,952 for 2041
    - Final Cover construction for the remainder of Cell 1 and Cell 2 was estimated by GHD using the 3D surface area (81032m<sup>2</sup>) of the design contours at \$61/m<sup>2</sup> as estimated from similar landfill closure projects completed by GHD.
- Annual cost of post closure monitoring of \$30,024.
  - This was calculated from CVRD cost estimates of 2023 groundwater monitoring and the 2022 ALS lab costs collected by GHD inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
- Cost of post closure landfill maintenance of \$10,000 every five years.
  - This cost is split between the Bevan and the Pidgeon Lake Landfills
- Annual cost of post-closure LFG collection system operations and maintenance of \$97,800.
  - Obtained from CVRD
- Leachate Plant Operation once Cell 2 has been closed
  - Calculated from the 2023 yearly estimate of \$600,000, with \$250,000 of fixed costs and \$350,000 variable depending on the amount of leachate generated. After closure of Cell 2 the amount of leachate generated will gradually decrease down to a rate of approximately 4% compared to full operations.
- Estimated Landfill expected useful life of 18 years. This was calculated based off actual airspace consumed in Cell 1 and Cell 2 from surveys provided by McElhanney prorated to December 31 2023. This yearly average was then forecasted to calculate Cell 1 and Cell 2 reaching capacity at the end of 2040.
- 30-year post closure period beginning in 2042.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$19,797,666
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$34,587,267
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$10,465,709
Accretion expense (December 31, 2023)	\$488,749
Book Value at Initial Obligation Date (2017)	\$8,330,240
Amortization expense (year 1)	\$347,093
Accumulated Amortization	\$1,735,467

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**Former Sawmill Landfill (Table 8)**

- The closure date for the Former Sawmill Landfill is uncertain but occurred somewhere between 1992 and 1998.
- For the purposes of the CPC Liability calculations a closure date of 1998 was assumed, the 30-year monitoring period will end in 2028.
- Annual cost of post closure monitoring of \$8,129
- Cost of post closure landfill maintenance of \$5,000 every five years.
- The closure works for this site is complete and the site’s permit has been abandoned. The CVRD is implementing annual post-closure inspections and continuing bi-annual monitoring of four groundwater wells and one surface water location.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$58,773
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$63,034
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$53,753
Accretion expense (December 31, 2023)	\$2,510
Book Value at Initial Obligation Date (1997)	\$17,173
Amortization expense (year 1)	\$0
Accumulated Amortization	\$17,173

**5. Gold River**

Details of the present value calculations for the Gold River Landfill are presented in Table 5. The following list summarizes the key inputs to the CPC Update:

- Closure of the existing landfill footprint beginning in 2030 at \$426,456 and 2030 at \$1,387,367.
- Annual cost of post closure operations and monitoring of \$20,133.
- Cost of post closure landfill maintenance of \$20,000 every five years.
- 30-year post closure period beginning in 2031.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$2,537,801
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$3,302,950
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$1,876,075
Accretion expense (December 31, 2023)	\$87,613
Book Value at Initial Obligation Date (1992)	\$477,072
Amortization expense (year 1)	\$12,555
Accumulated Amortization	\$376,635

## 6. Tahsis

Details of the present value calculations for the Tahsis Landfill are presented in Table 6. The following list summarizes the key inputs to the CPC Update:

- Closure of the existing landfill footprint in 2031 at \$470,860 and 2031 at \$1,425,580.
- Annual cost of post closure operations and monitoring of \$7,023
- Cost of post closure landfill maintenance of \$20,000 every five years.
- 30-year post closure period beginning in 2032.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$2,227,142
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$2,819,464
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$1,679,618
Accretion expense (December 31, 2023)	\$78,438
Book Value at Initial Obligation Date (1988)	\$355,840
Amortization expense (year 1)	\$8,275
Accumulated Amortization	\$281,362

## 7. Zeballos

Details of the present value calculations for the Zeballos Landfill are presented in Table 7. The following list summarizes the key inputs to the CPC Update:

- Closure of the existing landfill footprint in 2029 at \$330,083 and 2029 at \$957,749.
- Annual cost of post closure operations and monitoring of \$11,819.
- Cost of post closure landfill maintenance of \$20,000 every five years.
- 30-year post closure period beginning in 2030.

Item	Amount
Total Closure/Post Closure Costs for Construction and O&M	\$1,762,390
Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	\$2,238,807
PV of Inflated Closure/ Post Closure Costs (MFA 30-year rate 4.67%)	\$1,343,256
Accretion expense (December 31, 2023)	\$62,730
Book Value at Initial Obligation Date (1987)	\$271,882
Amortization expense (year 1)	\$6,473
Accumulated Amortization	\$226,569

## **8. Cortes**

- The Cortes landfill site was abandoned in 1995 with 100 percent of capacity used.
- Closure of the former landfill footprint occurred in 2019 (final cover improvements).
- Actual total airspace and waste in place unknown.
- The site currently houses a solid waste transfer station.
- There are no annual post closure operations and monitoring costs.
- The CVRD is working with the MOE to abandon the permit for this site. No further closure costs are to be incurred. Therefore, no CPC liability estimate was completed.

Table 1

Cost Estimate Summary  
2022

Closure and Post-Closure Fund Estimates  
Comox Strathcona Solid Waste Management Centres

Landfill	Estimated Closure Year	Years to Closure	Total Closure/Post Closure Costs for Construction and O&M	Inflated Closure/Post Closure Costs to year of Expenditure (2% for construction, 2% for O&M)	PV of Inflated Closure/ Post Closure Costs (MFA 30 year rate 4.67%)	% of Capacity used to December 31, 2023	Accretion expense (December 31, 2023)	Book Value at Initial Obligation Date	Amortization expense (year 1)	Accumulated Amortization	Airspace consumed Dec 2022-2023 (m3)
Campbell River	2022	N/A	\$ 2,379,337	\$ 3,288,474	\$ 1,630,060	100.00%	\$ 76,124	\$ 570,548	\$ -	\$ 570,548	-
Comox Valley Pidgeon Lake	2019	N/A	\$ 1,301,692	\$ 1,739,049	\$ 924,662	100.00%	\$ 43,182	\$ 118,572	\$ -	\$ 118,572	-
Comox Valley Bevan Landfill (Cell 1 & Gold River	2041	18	\$ 19,797,666	\$ 34,587,267	\$ 10,465,709	21.80%	\$ 488,749	\$ 8,330,240	\$ 347,093	\$ 1,735,467	86,957
Tahsis	2030	7	\$ 2,537,801	\$ 3,302,950	\$ 1,876,075		\$ 87,613	\$ 477,072	\$ 12,555	\$ 376,635	768
Zeballos	2031	8	\$ 2,227,142	\$ 2,819,464	\$ 1,679,618		\$ 78,438	\$ 355,840	\$ 8,275	\$ 281,362	2,039
Sawmill	2029	6	\$ 1,762,390	\$ 2,238,807	\$ 1,343,256		\$ 62,730	\$ 271,882	\$ 6,473	\$ 226,569	1,809
	1998	N/A	\$ 58,773	\$ 63,034	\$ 53,753	100.00%	\$ 2,510	\$ 17,173	\$ -	\$ 17,173	-
		<b>Subtotal</b>	<b>\$ 30,064,801</b>	<b>\$ 48,039,045</b>	<b>\$ 17,973,134</b>		<b>\$ 839,345</b>	<b>\$ 10,141,328</b>	<b>\$ 374,397</b>	<b>\$ 3,326,327</b>	

Current year 2023

**Table 2: Landfill Liability - Campbell River Waste Management Centre - Retrospective to year of opening**

Data:	11/31/2023	
Landfill Cover Option	LLDPE	
Landfill Open Date	1999	
Landfill Closure Date	2022	
Closure Construction Costs (2021\$)	\$ -	
Annual post closure O&M (2023\$)	\$ 30,311	Note 1
5th year post closure O&M costs (2023\$)	\$ 50,311	Note 2
Annual post closure LFG O&M (2023\$)	\$ 45,000	Note 3
Construction cost escalation rate	2.0000%	Note 4
Discount rate	4.67%	Note 5
Inflation rate	2.0000%	Note 6
		Note 7
		Note 7

	<b>Present Value Sum Post Closure</b>	
\$		<b>570,548</b>
	<b>Ammortization</b>	
\$		<b>24,806.45</b>
	<b>Accumulated Ammortization</b>	
\$		<b>570,548.46</b>

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Cash Flow	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2019								
2020								
2022	0	0	23					
2023	1	1	24	\$ -	\$ 75,311	\$ 76,817	\$ 25,688	Annual O&M
2024	2	2	25		\$ 75,311	\$ 78,354	\$ 25,033	Annual O&M
2025	3	3	26		\$ 75,311	\$ 79,921	\$ 24,394	Annual O&M
2026	4	4	27		\$ 75,311	\$ 81,519	\$ 23,772	Annual O&M
2027	5	5	28		\$ 95,311	\$ 105,231	\$ 29,317	Annual O&M plus allowance for 5 year maintenance
2028	6	6	29		\$ 75,311	\$ 84,813	\$ 22,574	Annual O&M
2029	7	7	30		\$ 75,311	\$ 86,509	\$ 21,999	Annual O&M
2030	8	8	31		\$ 75,311	\$ 88,239	\$ 21,437	Annual O&M
2031	9	9	32		\$ 75,311	\$ 90,004	\$ 20,891	Annual O&M
2032	10	10	33		\$ 95,311	\$ 116,184	\$ 25,764	Annual O&M plus allowance for 5 year maintenance
2033	11	11	34		\$ 75,311	\$ 93,640	\$ 19,838	Annual O&M
2034	12	12	35		\$ 75,311	\$ 95,513	\$ 19,332	Annual O&M
2035	13	13	36		\$ 75,311	\$ 97,423	\$ 18,839	Annual O&M
2036	14	14	37		\$ 75,311	\$ 99,372	\$ 18,359	Annual O&M
2037	15	15	38		\$ 95,311	\$ 128,276	\$ 22,641	Annual O&M plus allowance for 5 year maintenance
2038	16	16	39		\$ 75,311	\$ 103,386	\$ 17,434	Annual O&M
2039	17	17	40		\$ 75,311	\$ 105,454	\$ 16,989	Annual O&M
2040	18	18	41		\$ 75,311	\$ 107,563	\$ 16,556	Annual O&M
2041	19	19	42		\$ 75,311	\$ 109,714	\$ 16,134	Annual O&M
2042	20	20	43		\$ 95,311	\$ 141,627	\$ 19,897	Annual O&M plus allowance for 5 year maintenance
2043	21	21	44		\$ 75,311	\$ 114,147	\$ 15,321	Annual O&M
2044	22	22	45		\$ 75,311	\$ 116,430	\$ 14,930	Annual O&M
2045	23	23	46		\$ 75,311	\$ 118,758	\$ 14,549	Annual O&M
2046	24	24	47		\$ 75,311	\$ 121,133	\$ 14,178	Annual O&M
2047	25	25	48		\$ 95,311	\$ 156,368	\$ 17,486	Annual O&M plus allowance for 5 year maintenance
2048	26	26	49		\$ 75,311	\$ 126,027	\$ 13,464	Annual O&M
2049	27	27	50		\$ 75,311	\$ 128,548	\$ 13,121	Annual O&M
2050	28	28	51		\$ 75,311	\$ 131,119	\$ 12,786	Annual O&M
2051	29	29	52		\$ 75,311	\$ 133,741	\$ 12,460	Annual O&M
2052	30	30	53		\$ 95,311	\$ 172,643	\$ 15,366	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				\$ -	\$ 2,379,337	\$ 3,288,474	\$ 570,548	

**Table 2: Landfill Liability - Campbell River Waste Management Centre**

Data:	11/31/2023
Landfill Cover Option	LLDPE
Landfill Closure Date	2022
Closure Construction Costs (2021\$)	\$ -
Annual post closure O&M (2023\$)	\$ 30,311
5th year post closure O&M costs (2023\$)	\$ 50,311
Annual post closure LFG O&M (2023\$)	\$ 45,000
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%
Post Closure Accretion Expense	\$ 76,123.82
Total Accretion Expense	\$ 76,123.82

Note 1 Present Value Sum Post Closure  
 Note 2 \$ 1,630,060  
 Note 3  
 Note 4  
 Note 5  
 Note 6  
 Note 7  
 Note 7

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Cash Flow	Monitoring/ Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2019								
2020								
2022	0	0	0					
2023	1	1	1	\$ -	\$ 75,311	\$ 76,817	\$ 73,390	Annual O&M
2024	2	2	2		\$ 75,311	\$ 78,354	\$ 71,518	Annual O&M
2025	3	3	3		\$ 75,311	\$ 79,921	\$ 69,694	Annual O&M
2026	4	4	4		\$ 75,311	\$ 81,519	\$ 67,916	Annual O&M
2027	5	5	5		\$ 95,311	\$ 105,231	\$ 83,759	Annual O&M plus allowance for 5 year maintenance
2028	6	6	6		\$ 75,311	\$ 84,813	\$ 64,495	Annual O&M
2029	7	7	7		\$ 75,311	\$ 86,509	\$ 62,850	Annual O&M
2030	8	8	8		\$ 75,311	\$ 88,239	\$ 61,247	Annual O&M
2031	9	9	9		\$ 75,311	\$ 90,004	\$ 59,684	Annual O&M
2032	10	10	10		\$ 95,311	\$ 116,184	\$ 73,608	Annual O&M plus allowance for 5 year maintenance
2033	11	11	11		\$ 75,311	\$ 93,640	\$ 56,678	Annual O&M
2034	12	12	12		\$ 75,311	\$ 95,513	\$ 55,233	Annual O&M
2035	13	13	13		\$ 75,311	\$ 97,423	\$ 53,824	Annual O&M
2036	14	14	14		\$ 75,311	\$ 99,372	\$ 52,451	Annual O&M
2037	15	15	15		\$ 95,311	\$ 128,276	\$ 64,686	Annual O&M plus allowance for 5 year maintenance
2038	16	16	16		\$ 75,311	\$ 103,386	\$ 49,809	Annual O&M
2039	17	17	17		\$ 75,311	\$ 105,454	\$ 48,538	Annual O&M
2040	18	18	18		\$ 75,311	\$ 107,563	\$ 47,300	Annual O&M
2041	19	19	19		\$ 75,311	\$ 109,714	\$ 46,094	Annual O&M
2042	20	20	20		\$ 95,311	\$ 141,627	\$ 56,846	Annual O&M plus allowance for 5 year maintenance
2043	21	21	21		\$ 75,311	\$ 114,147	\$ 43,772	Annual O&M
2044	22	22	22		\$ 75,311	\$ 116,430	\$ 42,655	Annual O&M
2045	23	23	23		\$ 75,311	\$ 118,758	\$ 41,567	Annual O&M
2046	24	24	24		\$ 75,311	\$ 121,133	\$ 40,507	Annual O&M
2047	25	25	25		\$ 95,311	\$ 156,368	\$ 49,957	Annual O&M plus allowance for 5 year maintenance
2048	26	26	26		\$ 75,311	\$ 126,027	\$ 38,467	Annual O&M
2049	27	27	27		\$ 75,311	\$ 128,548	\$ 37,486	Annual O&M
2050	28	28	28		\$ 75,311	\$ 131,119	\$ 36,529	Annual O&M
2051	29	29	29		\$ 75,311	\$ 133,741	\$ 35,598	Annual O&M
2052	30	30	30		\$ 95,311	\$ 172,643	\$ 43,902	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				\$ -	\$ 2,379,337	\$ 3,288,474	\$ 1,630,060	

**Notes:**

(1) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.

(2) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.

(3) Annual Post Closure Landfill Gas System costs provided by CVRD

(4)

(5) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD

(6) Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.

(7) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD

(8) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.



**Table 2: Landfill Liability - Campbell River Waste Management Centre - Accretion**

<b>Data:</b>	<b>11/31/2023</b>
Landfill Cover Option	LLDPE
Landfill Closure Date	2022
Post Closure Period (years)	30
Airspace Consumed from Dec 31 2021- May 2022 (m3)	0
Current (May 2022) Cumulative Waste Volume (m3)	2,700,000
Remaining unused airspace volume (m3) - capacity vs actual	0
Landfill Capacity at Closure (m3)	2,700,000
Closure Construction Costs (2021\$)	\$ -
Annual post closure O&M (2022\$)	\$ 30,311
5th year post closure O&M costs (2022\$)	\$ 50,311
Annual post closure LFG O&M (2022\$)	\$ 45,000
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

Present Value Sum Post Closure  
\$ 1,706,184

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Cash Flow 2020\$	Monitoring/ Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Decription of Cost
2023	1	1	0		\$ 75,311	\$ 76,817	\$ 76,817	
2024	2	2	1		\$ 75,311	\$ 78,354	\$ 74,858	Annual O&M
2025	3	3	2		\$ 75,311	\$ 79,921	\$ 72,948	Annual O&M
2026	4	4	3		\$ 75,311	\$ 81,519	\$ 71,088	Annual O&M
2027	5	5	4		\$ 95,311	\$ 105,231	\$ 87,671	Annual O&M plus allowance for 5 year maintenance
2028	6	6	5		\$ 75,311	\$ 84,813	\$ 67,507	Annual O&M
2029	7	7	6		\$ 75,311	\$ 86,509	\$ 65,785	Annual O&M
2030	8	8	7		\$ 75,311	\$ 88,239	\$ 64,107	Annual O&M
2031	9	9	8		\$ 75,311	\$ 90,004	\$ 62,472	Annual O&M
2032	10	10	9		\$ 95,311	\$ 116,184	\$ 77,045	Annual O&M plus allowance for 5 year maintenance
2033	11	11	10		\$ 75,311	\$ 93,640	\$ 59,325	Annual O&M
2034	12	12	11		\$ 75,311	\$ 95,513	\$ 57,812	Annual O&M
2035	13	13	12		\$ 75,311	\$ 97,423	\$ 56,337	Annual O&M
2036	14	14	13		\$ 75,311	\$ 99,372	\$ 54,900	Annual O&M
2037	15	15	14		\$ 95,311	\$ 128,276	\$ 67,707	Annual O&M plus allowance for 5 year maintenance
2038	16	16	15		\$ 75,311	\$ 103,386	\$ 52,135	Annual O&M
2039	17	17	16		\$ 75,311	\$ 105,454	\$ 50,805	Annual O&M
2040	18	18	17		\$ 75,311	\$ 107,563	\$ 49,509	Annual O&M
2041	19	19	18		\$ 75,311	\$ 109,714	\$ 48,246	Annual O&M
2042	20	20	19		\$ 95,311	\$ 141,627	\$ 59,501	Annual O&M plus allowance for 5 year maintenance
2043	21	21	20		\$ 75,311	\$ 114,147	\$ 45,816	Annual O&M
2044	22	22	21		\$ 75,311	\$ 116,430	\$ 44,647	Annual O&M
2045	23	23	22		\$ 75,311	\$ 118,758	\$ 43,509	Annual O&M
2046	24	24	23		\$ 75,311	\$ 121,133	\$ 42,399	Annual O&M
2047	25	25	24		\$ 95,311	\$ 156,368	\$ 52,290	Annual O&M plus allowance for 5 year maintenance
2048	26	26	25		\$ 75,311	\$ 126,027	\$ 40,263	Annual O&M
2049	27	27	26		\$ 75,311	\$ 128,548	\$ 39,236	Annual O&M
2050	28	28	27		\$ 75,311	\$ 131,119	\$ 38,235	Annual O&M
2051	29	29	28		\$ 75,311	\$ 133,741	\$ 37,260	Annual O&M
2052	30	30	29		\$ 95,311	\$ 172,643	\$ 45,952	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				\$ -	\$ 2,379,337	\$ 3,288,474	\$ 1,706,184	

**Table 3: Landfill Liability - Comox Valley Waste Management Centre - Pidgeon Lake Landfill - Retrospective to year of opening**

<b>Data:</b>	<b>11/31/2023</b>
Landfill Cover Option	LLDPE
Landfill Open Date	1977
Landfill Closure Date	2019
Post Closure Period (years)	30
Closure construction costs	\$ -
Annual post closure O&M (2023\$)	\$ 15,989
5th year post closure O&M costs (2023\$)	\$ 25,989
Annual post closure LFG O&M (2023\$)	\$ 30,000
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

Note 1  
 Note 2  
 Note 3  
 Note 4  
 Note 5  
 Note 6  
 Note 7  
 Note 7

<b>Present Value Sum Post Closure</b>	<b>118,572</b>
<b>\$ Ammortization</b>	
<b>\$ Accumulated Ammortization</b>	<b>2,823.15</b>
<b>\$</b>	<b>118,572.25</b>

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Costs Cash Flow	Monitoring / Maintenance Cash Flow (2023 \$)	Cash Flow plus Inflation	Present Value	Description of Cost
2019			42					
2020			43					
2021			44					
2022	3	0	45					
2023	4	1	46		\$ 45,989	\$ 46,908	\$ 5,747	Annual O&M plus annual LFG O&M
2024	5	2	47		\$ 55,989	\$ 58,251	\$ 6,818	Annual O&M plus annual LFG O&M plus 5 year maintenance
2025	6	3	48		\$ 45,989	\$ 48,803	\$ 5,457	Annual O&M plus annual LFG O&M
2026	7	4	49		\$ 45,989	\$ 49,780	\$ 5,318	Annual O&M plus annual LFG O&M
2027	8	5	50		\$ 45,989	\$ 50,775	\$ 5,183	Annual O&M plus annual LFG O&M
2028	9	6	51		\$ 45,989	\$ 51,791	\$ 5,050	Annual O&M plus annual LFG O&M
2029	10	7	52		\$ 55,989	\$ 64,313	\$ 5,992	Annual O&M plus annual LFG O&M plus 5 year maintenance
2030	11	8	53		\$ 45,989	\$ 53,883	\$ 4,796	Annual O&M plus annual LFG O&M
2031	12	9	54		\$ 45,989	\$ 54,961	\$ 4,674	Annual O&M plus annual LFG O&M
2032	13	10	55		\$ 45,989	\$ 56,060	\$ 4,554	Annual O&M plus annual LFG O&M
2033	14	11	56		\$ 45,989	\$ 57,181	\$ 4,438	Annual O&M plus annual LFG O&M
2034	15	12	57		\$ 55,989	\$ 71,007	\$ 5,265	Annual O&M plus annual LFG O&M plus 5 year maintenance
2035	16	13	58		\$ 45,989	\$ 59,491	\$ 4,215	Annual O&M plus annual LFG O&M
2036	17	14	59		\$ 45,989	\$ 60,681	\$ 4,107	Annual O&M plus annual LFG O&M
2037	18	15	60		\$ 45,989	\$ 61,895	\$ 4,002	Annual O&M plus annual LFG O&M
2038	19	16	61		\$ 45,989	\$ 63,132	\$ 3,900	Annual O&M plus annual LFG O&M
2039	20	17	62		\$ 55,989	\$ 78,398	\$ 4,627	Annual O&M plus annual LFG O&M plus 5 year maintenance
2040	21	18	63		\$ 45,989	\$ 65,683	\$ 3,704	Annual O&M plus annual LFG O&M
2041	22	19	64		\$ 45,989	\$ 66,997	\$ 3,609	Annual O&M plus annual LFG O&M
2042	23	20	65		\$ 45,989	\$ 68,337	\$ 3,517	Annual O&M plus annual LFG O&M
2043	24	21	66		\$ 45,989	\$ 69,703	\$ 3,428	Annual O&M plus annual LFG O&M
2044	25	22	67		\$ 55,989	\$ 86,557	\$ 4,066	Annual O&M plus annual LFG O&M plus 5 year maintenance
2045	26	23	68		\$ 45,989	\$ 72,519	\$ 3,255	Annual O&M plus annual LFG O&M
2046	27	24	69		\$ 45,989	\$ 73,970	\$ 3,172	Annual O&M plus annual LFG O&M
2047	28	25	70		\$ 45,989	\$ 75,449	\$ 3,091	Annual O&M plus annual LFG O&M
2048	29	26	71		\$ 45,989	\$ 76,958	\$ 3,012	Annual O&M plus annual LFG O&M
2049	30	27	72		\$ 55,989	\$ 95,566	\$ 3,574	Annual O&M plus annual LFG O&M plus 5 year maintenance
<b>TOTAL COST</b>				<b>\$ -</b>	<b>\$ 1,301,692</b>	<b>\$ 1,739,049</b>	<b>\$ 118,572</b>	

**Table 3: Landfill Liability - Comox Valley Waste Management Centre - Pidgeon Lake Landfill**

Data:	11/31/2023
Landfill Cover Option	LLDPE
Landfill Closure Date	2019
Post Closure Period (years)	30
Closure construction costs	\$
Annual post closure O&M (2023\$)	\$ 15,989
5th year post closure O&M costs (2023\$)	\$ 25,989
Annual post closure LFG O&M (2023\$)	\$ 30,000
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%
Post Closure Accretion Expenses	\$ 43,181.73
Total Accretion Expenses	\$ 43,181.73

Note 1  
 Note 2 Present Value Sum Post Closure  
 Note 3 \$ 924,662  
 Note 4  
 Note 5  
 Note 6  
 Note 7  
 Note 7

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Costs Cash Flow	Monitoring / Maintenance Cash Flow (2023 \$)	Cash Flow plus Inflation	Present Value	Description of Cost
2019			0					
2020			0					
2021			0					
2022	3	0	0					
2023	4	1	1		\$ 45,989	\$ 46,908	\$ 44,815	Annual O&M plus annual LFG O&M
2024	5	2	2		\$ 55,989	\$ 58,251	\$ 53,169	Annual O&M plus annual LFG O&M plus 5 year maintenance
2025	6	3	3		\$ 45,989	\$ 48,803	\$ 42,558	Annual O&M plus annual LFG O&M
2026	7	4	4		\$ 45,989	\$ 49,780	\$ 41,473	Annual O&M plus annual LFG O&M
2027	8	5	5		\$ 45,989	\$ 50,773	\$ 40,415	Annual O&M plus annual LFG O&M
2028	9	6	6		\$ 45,989	\$ 51,791	\$ 39,384	Annual O&M plus annual LFG O&M
2029	10	7	7		\$ 55,989	\$ 64,313	\$ 46,725	Annual O&M plus annual LFG O&M plus 5 year maintenance
2030	11	8	8		\$ 45,989	\$ 53,883	\$ 37,400	Annual O&M plus annual LFG O&M
2031	12	9	9		\$ 45,989	\$ 54,961	\$ 36,446	Annual O&M plus annual LFG O&M
2032	13	10	10		\$ 45,989	\$ 56,060	\$ 35,516	Annual O&M plus annual LFG O&M
2033	14	11	11		\$ 45,989	\$ 57,181	\$ 34,610	Annual O&M plus annual LFG O&M
2034	15	12	12		\$ 55,989	\$ 71,007	\$ 41,062	Annual O&M plus annual LFG O&M plus 5 year maintenance
2035	16	13	13		\$ 45,989	\$ 59,491	\$ 32,867	Annual O&M plus annual LFG O&M
2036	17	14	14		\$ 45,989	\$ 60,681	\$ 32,029	Annual O&M plus annual LFG O&M
2037	18	15	15		\$ 45,989	\$ 61,895	\$ 31,212	Annual O&M plus annual LFG O&M
2038	19	16	16		\$ 45,989	\$ 63,132	\$ 30,416	Annual O&M plus annual LFG O&M
2039	20	17	17		\$ 55,989	\$ 78,398	\$ 36,085	Annual O&M plus annual LFG O&M plus 5 year maintenance
2040	21	18	18		\$ 45,989	\$ 65,683	\$ 28,884	Annual O&M plus annual LFG O&M
2041	22	19	19		\$ 45,989	\$ 66,997	\$ 28,147	Annual O&M plus annual LFG O&M
2042	23	20	20		\$ 45,989	\$ 68,337	\$ 27,429	Annual O&M plus annual LFG O&M
2043	24	21	21		\$ 45,989	\$ 69,703	\$ 26,729	Annual O&M plus annual LFG O&M
2044	25	22	22		\$ 55,989	\$ 86,557	\$ 31,711	Annual O&M plus annual LFG O&M plus 5 year maintenance
2045	26	23	23		\$ 45,989	\$ 72,519	\$ 25,383	Annual O&M plus annual LFG O&M
2046	27	24	24		\$ 45,989	\$ 73,970	\$ 24,736	Annual O&M plus annual LFG O&M
2047	28	25	25		\$ 45,989	\$ 75,449	\$ 24,105	Annual O&M plus annual LFG O&M
2048	29	26	26		\$ 45,989	\$ 76,956	\$ 23,490	Annual O&M plus annual LFG O&M
2049	30	27	27		\$ 55,989	\$ 95,566	\$ 27,868	Annual O&M plus annual LFG O&M plus 5 year maintenance
<b>TOTAL COST</b>				\$	- \$ 1,301,692	\$ 1,739,049	\$ 924,662	

**Notes:**

(1) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.

(2) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.

(3) Annual Post Closure Landfill Gas System costs provided by CVRD

(4)

(5) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD  
 Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.

(6) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD

(7) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

**Table 3: Landfill Liability - Comox Valley Waste Management Centre - Pidgeon Lake Landfill - Accretion**

Data:	11/31/2023	
Landfill Cover Option	LLDPE	
Landfill Closure Date	2019	
Post Closure Period (years)	30	
Closure construction costs	\$	
Annual post closure O&M (2022\$)	\$ 15,989	
5th year post closure O&M costs (2022\$)	\$ 25,989	
Annual post closure LFG O&M (2022\$)	\$ 30,000	Present Value Sum Post Closure
Construction cost escalation rate	2.0000%	\$ 967,844
Discount rate	4.67%	
Inflation rate	2.0000%	

Year	Years Since Closure	Years for FV calcs	Years for NPV	Construction Costs Cash Flow	Monitoring / Maintenance Cash Flow (2023 \$)	Cash Flow plus Inflation	Present Value	Description of Cost
2023	4	1	0		\$ 45,989	\$ 46,908	\$ 46,908	
2024	5	2	1		\$ 55,989	\$ 58,251	\$ 55,652	Annual O&M plus annual LFG O&M plus 5 year maintenance
2025	6	3	2		\$ 45,989	\$ 48,803	\$ 44,546	Annual O&M plus annual LFG O&M
2026	7	4	3		\$ 45,989	\$ 49,780	\$ 43,409	Annual O&M plus annual LFG O&M
2027	8	5	4		\$ 45,989	\$ 50,775	\$ 42,302	Annual O&M plus annual LFG O&M
2028	9	6	5		\$ 45,989	\$ 51,791	\$ 41,223	Annual O&M plus annual LFG O&M
2029	10	7	6		\$ 55,989	\$ 64,313	\$ 48,907	Annual O&M plus annual LFG O&M plus 5 year maintenance
2030	11	8	7		\$ 45,989	\$ 53,883	\$ 39,147	Annual O&M plus annual LFG O&M
2031	12	9	8		\$ 45,989	\$ 54,961	\$ 38,148	Annual O&M plus annual LFG O&M
2032	13	10	9		\$ 45,989	\$ 56,060	\$ 37,175	Annual O&M plus annual LFG O&M
2033	14	11	10		\$ 45,989	\$ 57,181	\$ 36,227	Annual O&M plus annual LFG O&M
2034	15	12	11		\$ 55,989	\$ 71,007	\$ 42,979	Annual O&M plus annual LFG O&M plus 5 year maintenance
2035	16	13	12		\$ 45,989	\$ 59,491	\$ 34,402	Annual O&M plus annual LFG O&M
2036	17	14	13		\$ 45,989	\$ 60,681	\$ 33,525	Annual O&M plus annual LFG O&M
2037	18	15	14		\$ 45,989	\$ 61,895	\$ 32,669	Annual O&M plus annual LFG O&M
2038	19	16	15		\$ 45,989	\$ 63,132	\$ 31,836	Annual O&M plus annual LFG O&M
2039	20	17	16		\$ 55,989	\$ 78,398	\$ 37,770	Annual O&M plus annual LFG O&M plus 5 year maintenance
2040	21	18	17		\$ 45,989	\$ 65,683	\$ 30,233	Annual O&M plus annual LFG O&M
2041	22	19	18		\$ 45,989	\$ 66,997	\$ 29,461	Annual O&M plus annual LFG O&M
2042	23	20	19		\$ 45,989	\$ 68,337	\$ 28,710	Annual O&M plus annual LFG O&M
2043	24	21	20		\$ 45,989	\$ 69,703	\$ 27,978	Annual O&M plus annual LFG O&M
2044	25	22	21		\$ 55,989	\$ 86,557	\$ 33,192	Annual O&M plus annual LFG O&M plus 5 year maintenance
2045	26	23	22		\$ 45,989	\$ 72,519	\$ 26,568	Annual O&M plus annual LFG O&M
2046	27	24	23		\$ 45,989	\$ 73,970	\$ 25,891	Annual O&M plus annual LFG O&M
2047	28	25	24		\$ 45,989	\$ 75,449	\$ 25,230	Annual O&M plus annual LFG O&M
2048	29	26	25		\$ 45,989	\$ 76,956	\$ 24,587	Annual O&M plus annual LFG O&M
2049	30	27	26		\$ 55,989	\$ 95,566	\$ 29,169	Annual O&M plus annual LFG O&M plus 5 year maintenance
<b>TOTAL COST</b>				<b>\$</b>	<b>- \$ 1,301,692</b>	<b>\$ 1,739,049</b>	<b>\$ 967,844</b>	

Table 4: Landfill Liability - CVWMC - Engineered Landfill Cell 1 (Progressive Closure) - retrospective to year of opening

Data:	11/31/2023	
Landfill Cover Option	LLDPE	
Landfill Open Date	2017	
Landfill Closure Date (approximate)	2041	
Post Closure Period (years)	30	
Closure construction costs (2023\$)	\$ 7,268,952	Note 1
Annual post closure O&M (2023\$)	\$ 30,024	Note 2
5th year post closure O&M costs (2023\$)	\$ 40,024	Note 3
Annual post closure LFG O&M (2023\$)	\$ 97,800	Note 4
Construction cost escalation rate	2.0000%	Note 5
Discount rate	4.67%	Note 6
Inflation rate	2.0000%	Note 7
Closure Accretion Expense		Note 8
Post Closure Accretion Expense		Note 8
Total Accretion Expense - Closure & Post Closure		Note 8

Present Value Sum Closure	\$ 4,046,825
Present Value Sum Post Closure	\$ 4,283,416
<b>Total PV Closure + Post Closure</b>	<b>\$ 8,330,240</b>
<b>Ammortization</b>	
\$ 347,093.35	
<b>Accumulated Ammortization</b>	<b>\$ 1,735,466.77</b>

Year	Number of Years	Years Since Closure	Years for FV calcs	Years for NPV	Final Cover	Leachate Plant Operation	Construction Costs Cash Flow (2023 \$)	Post Closure Monitoring / Maintenance Cash Flow (2023 \$)	Cash Flow plus Inflation	Present Value	Description of Cost
2017				0							
2018				1							
2019	3			2							
2020	4			3							
2021				4							
2022	6			5							
2023	7	0	1	6			\$ -	\$ -	\$ -	\$ -	
2024	9		2	7					\$ -	\$ -	
2025	10		3	8	\$ 1,305,000.00		\$ 1,305,000		\$ 1,384,876	\$ 961,243	Cell 1 design for partial closure/gas collection construction + Cell 1 partial closure construction
2026	11		4	9			\$ 121,000		\$ 130,974	\$ 86,853	LFG Infrastructure
2027	12		5	10			\$ 150,000		\$ 165,612	\$ 104,923	LFG Infrastructure
2028	13		6	11			\$ 150,000		\$ 168,924	\$ 102,246	LFG Infrastructure
2029	14		7	12			\$ 150,000		\$ 172,303	\$ 99,638	LFG Infrastructure
2030	15		8	13			\$ 150,000		\$ 175,749	\$ 97,097	LFG Infrastructure
2031	16		9	14			\$ 150,000		\$ 179,264	\$ 94,620	LFG Infrastructure
2032	17		10	15			\$ 150,000		\$ 182,849	\$ 92,206	LFG Infrastructure
2033	18		11	16					\$ -	\$ -	landfill still open. Will account for extended LFG costs to 2040 in 2024 reporting.
2034	19		12	17					\$ -	\$ -	landfill still open
2035	20		13	18					\$ -	\$ -	landfill still open
2036	21		14	19					\$ -	\$ -	landfill still open
2037	22		15	20					\$ -	\$ -	landfill still open
2038	23		16	21					\$ -	\$ -	landfill still open
2039	24		17	22					\$ -	\$ -	landfill still open
2040	25		18	23					\$ -	\$ -	landfill still open
2041	25		19	24	\$ 4,942,952.00		\$ 4,942,952		\$ 7,200,949	\$ 2,407,999	Final Cover Closure of Cell 1 & Cell 2
2042	27	1	20	25		\$ 530,000.00	\$ -	\$ 127,824	\$ 977,492	\$ 312,290	Annual O&M + Leachate Plant Operation
2043	28	2	21	26		\$ 530,000.00	\$ -	\$ 127,824	\$ 997,041	\$ 304,323	Annual O&M + Leachate Plant Operation
2044	29	3	22	27		\$ 425,000.00	\$ -	\$ 127,824	\$ 854,654	\$ 249,224	Annual O&M + Leachate Plant Operation
2045	30	4	23	28		\$ 285,000.00	\$ -	\$ 127,824	\$ 650,982	\$ 181,362	Annual O&M + Leachate Plant Operation
2046	31	5	24	29		\$ 264,000.00	\$ -	\$ 137,824	\$ 646,308	\$ 172,026	Annual O&M and allowance for 5 year maintenance
2047		6	25	30		\$ 264,000.00	\$ -	\$ 127,824	\$ 642,828	\$ 163,466	Annual O&M + Leachate Plant Operation
2048	31	7	26	31		\$ 264,000.00	\$ -	\$ 127,824	\$ 655,685	\$ 159,297	Annual O&M + Leachate Plant Operation
2049		8	27	32		\$ 264,000.00	\$ -	\$ 127,824	\$ 668,799	\$ 155,233	Annual O&M + Leachate Plant Operation
2050	31	9	28	33		\$ 264,000.00	\$ -	\$ 127,824	\$ 682,175	\$ 151,273	Annual O&M + Leachate Plant Operation
2051		10	29	34		\$ 264,000.00	\$ -	\$ 137,824	\$ 713,577	\$ 151,177	Annual O&M and allowance for 5 year maintenance
2052	31	11	30	35		\$ 264,000.00	\$ -	\$ 127,824	\$ 709,735	\$ 143,654	Annual O&M + Leachate Plant Operation
2053		12	31	36		\$ 264,000.00	\$ -	\$ 127,824	\$ 723,929	\$ 139,990	Annual O&M + Leachate Plant Operation
2054		13	32	37		\$ 264,000.00	\$ -	\$ 127,824	\$ 738,408	\$ 136,419	Annual O&M + Leachate Plant Operation
2055		14	33	38		\$ 264,000.00	\$ -	\$ 127,824	\$ 753,176	\$ 132,939	Annual O&M + Leachate Plant Operation
2056		15	34	39		\$ 264,000.00	\$ -	\$ 137,824	\$ 787,846	\$ 132,854	Annual O&M and allowance for 5 year maintenance
2057		16	35	40		\$ 264,000.00	\$ -	\$ 127,824	\$ 783,604	\$ 126,243	Annual O&M + Leachate Plant Operation
2058		17	36	41		\$ 264,000.00	\$ -	\$ 127,824	\$ 799,276	\$ 123,023	Annual O&M + Leachate Plant Operation
2059		18	37	42		\$ 264,000.00	\$ -	\$ 127,824	\$ 815,262	\$ 119,885	Annual O&M + Leachate Plant Operation
2060		19	38	43		\$ 264,000.00	\$ -	\$ 127,824	\$ 831,567	\$ 116,827	Annual O&M + Leachate Plant Operation
2061		20	39	44		\$ 264,000.00	\$ -	\$ 137,824	\$ 869,846	\$ 116,752	Annual O&M and allowance for 5 year maintenance
2062		21	40	45		\$ 264,000.00	\$ -	\$ 127,824	\$ 865,162	\$ 110,942	Annual O&M + Leachate Plant Operation
2063		22	41	46		\$ 264,000.00	\$ -	\$ 127,824	\$ 882,466	\$ 108,112	Annual O&M + Leachate Plant Operation
2064		23	42	47		\$ 264,000.00	\$ -	\$ 127,824	\$ 900,115	\$ 105,355	Annual O&M + Leachate Plant Operation
2065		24	43	48		\$ 264,000.00	\$ -	\$ 127,824	\$ 918,117	\$ 102,667	Annual O&M + Leachate Plant Operation
2066		25	44	49		\$ 264,000.00	\$ -	\$ 137,824	\$ 960,380	\$ 102,602	Annual O&M and allowance for 5 year maintenance
2067		26	45	50		\$ 264,000.00	\$ -	\$ 127,824	\$ 955,209	\$ 97,496	Annual O&M + Leachate Plant Operation
2068		27	46	51		\$ 264,000.00	\$ -	\$ 127,824	\$ 974,313	\$ 95,009	Annual O&M + Leachate Plant Operation
2069		28	47	52		\$ 264,000.00	\$ -	\$ 127,824	\$ 993,800	\$ 92,586	Annual O&M + Leachate Plant Operation
2070		29	48	53		\$ 264,000.00	\$ -	\$ 127,824	\$ 1,013,676	\$ 90,224	Annual O&M + Leachate Plant Operation
2071		30	49	54		\$ 264,000.00	\$ -	\$ 137,824	\$ 1,060,337	\$ 90,166	Annual O&M and allowance for 5 year maintenance
<b>TOTAL COST</b>						<b>\$ 8,634,000.00</b>	<b>\$ 7,268,952</b>	<b>\$ 3,894,714</b>	<b>\$ 34,587,267</b>	<b>\$ 8,330,240</b>	

Table 4: Landfill Liability - CVWMC - Engineered Landfill Cell 1 (Progressive Closure)

Data:	11/31/202	
Landfill Cover: Ontario		11,05E
Landfill Open Date		2017
Landfill Closure Date (approximate)		2041
Post Closure Period (years)		30
Closure construction costs (2023\$)	\$ 7,268.9	Note 1
Annual post closure O&M (2023\$)	\$ 30.2	Note 2
5th year post closure O&M costs (2023\$)	\$ 40.0	Note 3
Annual post closure LFG O&M (2023\$)	\$ 97.8	Note 4
Construction cost escalation rate	2.0000%	Note 5
Discount rate	4.67%	Note 6
Inflation rate	2.0000%	Note 7
Closure Accretion Expense	\$ 237,433	Note 8
Post Closure Accretion Expense	\$ 251,314	Note 8
Total Accretion Expense - Closure & Post Closure	\$ 488,746	Note 8

Present Value Sum Closure 5,084.4  
 Present Value Sum Post Closure 5,381.4  
 Total PV Closure + Post Closure 10,465.7

Year	Years Since Closure	Years for FV calcs	Years for NPV	Final Cover	Leachate Plant Operation	Construction Costs Cash Flow (2023 \$)	Post Closure Monitoring / Maintenance Cash Flow (2023 \$)	Cash Flow plus Inflation	Present Value	Description of Cost
2017			-5							
2018			-4							
2019			-3							
2020			-2							
2021			-1							
2022	0	1	0			\$ -		\$ -		
2023	1	2	1			\$ -		\$ -		landfill still oper
2024	2	3	2			\$ -		\$ -		landfill still oper
2025	3	4	3	\$ 1,305,000		\$ 1,305.00		\$ 1,384.8	\$ 1,207	Cell 1 design for partial closure/gas collection construction + Cell 1 partial closure construction
2026	4	5	4			\$ 121.00		\$ 130.8		landfill still oper
2027	5	6	5			\$ 150.00		\$ 163.6		landfill still oper
2028	6	7	6			\$ 150.00		\$ 168.9		landfill still oper
2029	7	8	7			\$ 150.00		\$ 172.3		landfill still oper
2030	8	9	8			\$ 150.00		\$ 175.7		landfill still oper
2031	9	10	9			\$ 150.00		\$ 179.2		landfill still oper
2032	10	11	10			\$ 150.00		\$ 182.8		landfill still oper
2033	11	12	11					\$ -		landfill still oper. Will account for extended LFG costs to 2040 in 2024 report
2034	12	13	12					\$ -		landfill still oper
2035	13	14	13					\$ -		landfill still oper
2036	14	15	14					\$ -		landfill still oper
2037	15	16	15					\$ -		landfill still oper
2038	16	17	16					\$ -		landfill still oper
2039	17	18	17					\$ -		landfill still oper
2040	18	19	18					\$ -		landfill still oper
2041	19	20	19	\$ 4,942,952		\$ 4,942.95		\$ 7,200.9	\$ 3,025	Final Cover Closure of Cell 1 & Cell 2
2042	20	21	20		\$ 530,000	\$ 530.00	\$ 127.82	\$ 977.4	\$ 392	Annual O&M + Leachate Plant Operati
2043	21	22	21		\$ 530,000	\$ 530.00	\$ 127.82	\$ 977.4	\$ 392	Annual O&M + Leachate Plant Operati
2044	22	23	22		\$ 425,000	\$ 425.00	\$ 127.82	\$ 854.6	\$ 313	Annual O&M + Leachate Plant Operati
2045	23	24	23		\$ 285,000	\$ 285.00	\$ 127.82	\$ 650.9	\$ 227	Annual O&M + Leachate Plant Operati
2046	24	25	24		\$ 264,000	\$ 264.00	\$ 127.82	\$ 646.3	\$ 216	Annual O&M and allowance for 5 year maintena
2047	25	26	25		\$ 264,000	\$ 264.00	\$ 127.82	\$ 642.3	\$ 205	Annual O&M + Leachate Plant Operati
2048	26	27	26		\$ 264,000	\$ 264.00	\$ 127.82	\$ 655.6	\$ 200	Annual O&M + Leachate Plant Operati
2049	27	28	27		\$ 264,000	\$ 264.00	\$ 127.82	\$ 668.7	\$ 195	Annual O&M + Leachate Plant Operati
2050	28	29	28		\$ 264,000	\$ 264.00	\$ 127.82	\$ 692.1	\$ 190	Annual O&M + Leachate Plant Operati
2051	29	30	29		\$ 264,000	\$ 264.00	\$ 127.82	\$ 713.5	\$ 189	Annual O&M and allowance for 5 year maintena
2052	30	31	30		\$ 264,000	\$ 264.00	\$ 127.82	\$ 709.7	\$ 180	Annual O&M + Leachate Plant Operati
2053	31	32	31		\$ 264,000	\$ 264.00	\$ 127.82	\$ 723.3	\$ 175	Annual O&M + Leachate Plant Operati
2054	32	33	32		\$ 264,000	\$ 264.00	\$ 127.82	\$ 738.4	\$ 171	Annual O&M + Leachate Plant Operati
2055	33	34	33		\$ 264,000	\$ 264.00	\$ 127.82	\$ 753.1	\$ 167	Annual O&M + Leachate Plant Operati
2056	34	35	34		\$ 264,000	\$ 264.00	\$ 127.82	\$ 767.8	\$ 166	Annual O&M and allowance for 5 year maintena
2057	35	36	35		\$ 264,000	\$ 264.00	\$ 127.82	\$ 783.6	\$ 159	Annual O&M + Leachate Plant Operati
2058	36	37	36		\$ 264,000	\$ 264.00	\$ 127.82	\$ 799.2	\$ 154	Annual O&M + Leachate Plant Operati
2059	37	38	37		\$ 264,000	\$ 264.00	\$ 127.82	\$ 815.2	\$ 150	Annual O&M + Leachate Plant Operati
2060	38	39	38		\$ 264,000	\$ 264.00	\$ 127.82	\$ 831.5	\$ 146	Annual O&M + Leachate Plant Operati
2061	39	40	39		\$ 264,000	\$ 264.00	\$ 127.82	\$ 869.8	\$ 146	Annual O&M and allowance for 5 year maintena
2062	40	41	40		\$ 264,000	\$ 264.00	\$ 127.82	\$ 865.1	\$ 139	Annual O&M + Leachate Plant Operati
2063	41	42	41		\$ 264,000	\$ 264.00	\$ 127.82	\$ 892.4	\$ 135	Annual O&M + Leachate Plant Operati
2064	42	43	42		\$ 264,000	\$ 264.00	\$ 127.82	\$ 900.1	\$ 132	Annual O&M + Leachate Plant Operati
2065	43	44	43		\$ 264,000	\$ 264.00	\$ 127.82	\$ 918.1	\$ 128	Annual O&M + Leachate Plant Operati
2066	44	45	44		\$ 264,000	\$ 264.00	\$ 127.82	\$ 930.3	\$ 128	Annual O&M and allowance for 5 year maintena
2067	45	46	45		\$ 264,000	\$ 264.00	\$ 127.82	\$ 952.2	\$ 122	Annual O&M + Leachate Plant Operati
2068	46	47	46		\$ 264,000	\$ 264.00	\$ 127.82	\$ 974.3	\$ 119	Annual O&M + Leachate Plant Operati
2069	47	48	47		\$ 264,000	\$ 264.00	\$ 127.82	\$ 993.8	\$ 116	Annual O&M + Leachate Plant Operati
2070	48	49	48		\$ 264,000	\$ 264.00	\$ 127.82	\$ 1,013.6	\$ 113	Annual O&M + Leachate Plant Operati
2071	49	50	49		\$ 264,000	\$ 264.00	\$ 127.82	\$ 1,050.3	\$ 113	Annual O&M and allowance for 5 year maintena
TOTAL COST				\$ 8,634,005		\$ 7,268.95	\$ 3,894.74	\$ 34,587.25	\$ 10,465.70	

- Notes:
- Construction Closure costs in 2023\$ from CVRD financial plan schedules. Final Cover construction for the remainder of Cell 1 and Cell 2 was estimated by GHD using the 3D surface area of the design contours of 81032m2 at \$61/m2 as estimated from similar landfill closure projects completed by GHD.
  - Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
  - 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.
  - Annual Post Closure Landfill Gas System costs calculated assuming landfill gas collection system will be finalized in 2024. E was provided by CVRD
  - Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
  - Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

Internal note:

Instructions on Section PS 3280 - Asset retirement obligations calcs can be found here:

[2020 06 PSAS 3280 Asset Retirement Obligations - FINAL \(mmp.ca\)](#)

Table 4: Landfill Liability - CVWMC - Engineered Landfill Cell 1 (Progressive Closure) - Accretion

Data:	11/31/202
Landfill Cover Opio	LLDPE
Landfill Closure Date (approximat	2024
Post Closure Period (years)	30
Closure construction costs (2022\$) (2021-2030 F	\$ 7,268.9
Annual post closure O&M (2022\$)	\$ 30.0
5th year post closure O&M costs (2022	\$ 40.0
Annual post closure LFG O&M (2022	\$ 97.8
Construction cost escalation rat	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

Present Value Sum Closu  
\$ 5,321.6  
Present Value Sum Post Closu  
\$ 5,632.7

150k is LFG infrastructure from capital plan

Year	Years Since Closure	Years for FV calcs	Years for NPV	Final Cover	Leachate Plant Operation	Construction Costs Cash Flow (2023 \$)	Post Closure Monitoring / Maintenance Cash Flow (2022)	Cash Flow plus Inflation	Present Value	Description of Cost
2023		1	0							
2024		2	1							Cell 1 partial closure constructio
2025		3	2	92		\$ 1,305,000	\$	\$ 1,384,800	1,264,558	Cell 1 partial closure construction
2026		4	3			\$ 121,000	\$	\$ 130,800	114,458	Annual O&M
2027		5	4			\$ 150,000	\$	\$ 165,600	137,458	Annual O&M
2028		6	5			\$ 150,000	\$	\$ 168,900	134,458	Annual O&M
2029		7	6			\$ 150,000	\$	\$ 172,300	131,458	Annual O&M and allowance for 5 year maintena
2030		8	7			\$ 150,000	\$	\$ 175,700	127,458	Annual O&M
2031		9	8			\$ 150,000	\$	\$ 179,200	124,458	Annual O&M
2032		10	9			\$ 150,000	\$	\$ 182,800	121,458	Annual O&M
2033		11	10				\$	\$		
2034		12	11				\$	\$		
2035		13	12				\$	\$		
2036		14	13				\$	\$		
2037		15	14				\$	\$		
2038		16	15				\$	\$		
2039		17	16				\$	\$		
2040		18	17				\$	\$		
2041		19	18	\$ 4,942,952		\$ 4,942,952	\$	\$ 7,200,900	3,166,458	Final Cover Closure of Cell 1 & Cell
2042	1	20	19		\$ 530,000.0	\$	\$ 127,825	\$ 977,400	410,458	Annual O&M + Leachate Plant Operati
2043	2	21	20		\$ 530,000.0	\$	\$ 127,825	\$ 997,000	400,458	Annual O&M + Leachate Plant Operati
2044	3	22	21		\$ 425,000.0	\$	\$ 127,825	\$ 854,600	327,458	Annual O&M + Leachate Plant Operati
2045	4	23	22		\$ 285,000.0	\$	\$ 127,825	\$ 650,300	238,458	Annual O&M + Leachate Plant Operati
2046	5	24	23		\$ 264,000.0	\$	\$ 137,825	\$ 646,300	228,458	Annual O&M and allowance for 5 year maintenance
2047	6	25	24		\$ 264,000.0	\$	\$ 127,825	\$ 642,800	214,458	Annual O&M + Leachate Plant Operati
2048	7	26	25		\$ 264,000.0	\$	\$ 127,825	\$ 656,600	209,458	Annual O&M + Leachate Plant Operati
2049	8	27	26		\$ 264,000.0	\$	\$ 127,825	\$ 668,700	204,458	Annual O&M + Leachate Plant Operati
2050	9	28	27		\$ 264,000.0	\$	\$ 127,825	\$ 682,100	198,458	Annual O&M + Leachate Plant Operati
2051	10	29	28		\$ 264,000.0	\$	\$ 137,825	\$ 713,500	198,458	Annual O&M and allowance for 5 year maintena
2052	11	30	29		\$ 264,000.0	\$	\$ 127,825	\$ 709,700	188,458	Annual O&M + Leachate Plant Operati
2053	12	31	30		\$ 264,000.0	\$	\$ 127,825	\$ 723,500	184,458	Annual O&M + Leachate Plant Operati
2054	13	32	31		\$ 264,000.0	\$	\$ 127,825	\$ 738,400	179,458	Annual O&M + Leachate Plant Operati
2055	14	33	32		\$ 264,000.0	\$	\$ 127,825	\$ 753,100	174,458	Annual O&M + Leachate Plant Operati
2056	15	34	33		\$ 264,000.0	\$	\$ 137,825	\$ 787,800	174,458	Annual O&M and allowance for 5 year maintena
2057	16	35	34		\$ 264,000.0	\$	\$ 127,825	\$ 783,600	166,458	Annual O&M + Leachate Plant Operati
2058	17	36	35		\$ 264,000.0	\$	\$ 127,825	\$ 799,200	161,458	Annual O&M + Leachate Plant Operati
2059	18	37	36		\$ 264,000.0	\$	\$ 127,825	\$ 815,200	157,458	Annual O&M + Leachate Plant Operati
2060	19	38	37		\$ 264,000.0	\$	\$ 127,825	\$ 831,500	153,458	Annual O&M + Leachate Plant Operati
2061	20	39	38		\$ 264,000.0	\$	\$ 137,825	\$ 869,800	153,458	Annual O&M and allowance for 5 year maintena
2062	21	40	39		\$ 264,000.0	\$	\$ 127,825	\$ 865,100	145,458	Annual O&M + Leachate Plant Operati
2063	22	41	40		\$ 264,000.0	\$	\$ 127,825	\$ 882,400	142,458	Annual O&M + Leachate Plant Operati
2064	23	42	41		\$ 264,000.0	\$	\$ 127,825	\$ 900,100	138,458	Annual O&M + Leachate Plant Operati
2065	24	43	42		\$ 264,000.0	\$	\$ 127,825	\$ 918,100	135,458	Annual O&M + Leachate Plant Operati
2066	25	44	43		\$ 264,000.0	\$	\$ 137,825	\$ 960,300	134,458	Annual O&M and allowance for 5 year maintena
2067	26	45	44		\$ 264,000.0	\$	\$ 127,825	\$ 955,200	128,458	Annual O&M + Leachate Plant Operati
2068	27	46	45		\$ 264,000.0	\$	\$ 127,825	\$ 974,300	124,458	Annual O&M + Leachate Plant Operati
2069	28	47	46		\$ 264,000.0	\$	\$ 127,825	\$ 993,800	121,458	Annual O&M + Leachate Plant Operati
2070	29	48	47		\$ 264,000.0	\$	\$ 137,825	\$ 1,013,600	118,458	Annual O&M + Leachate Plant Operati
2071	30	49	48		\$ 264,000.0	\$	\$ 137,825	\$ 1,060,300	118,458	Annual O&M and allowance for 5 year maintena
<b>TOTAL COST</b>						<b>\$ 7,268,952</b>	<b>\$ 3,894,714</b>	<b>\$ 34,587,263</b>	<b>10,954,458</b>	

**Table 5: Landfill Liability Assessment - Gold River Landfill - Retrospective to year of opening**

Data:	11/31/2023		
Landfill Cover Option	GCL		
Landfill Open Date	1992		
Landfill Closure Date (approximate)	2030		
Post Closure Period (years)	30		
Closure Costs (2023\$)	\$ 1,813,823	Note 1	Present Value Closure Sum
Annual post closure O&M (2023\$)	\$ 20,133	Note 2	\$ 375,104.06
5th year post closure O&M costs (2023\$)	\$ 40,133	Note 3	Present Value Post Closure Sum
Construction cost escalation rate	2.0000%	Note 4	\$ 101,967
Discount rate	4.67%	Note 5	<b>Total PV Closure + Post Closure</b>
Inflation rate	2.0000%	Note 6	\$ 477,071.51
			<b>\$ Ammortization</b>
			\$ 12,554.51
			<b>accumulated ammortization</b>
			\$ 376,635.40

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2019								
2020								
2022			30					
2023	0	1	31					Landfill still open
2024	0	2	32					Landfill still open
2025	0	3	33					Landfill still open
2026	0	4	34					Landfill still open
2027	0	5	35					Landfill still open
2028	0	6	36					Landfill still open
2029	0	7	37			-	-	Landfill still open
2030	0	8	38	1,813,823		2,125,183	375,104	DOC Plan and Closure construction
2031	1	9	39		20,133	24,060	4,057	Annual O&M
2032	2	10	40		20,133	24,542	3,954	Annual O&M
2033	3	11	41		20,133	25,032	3,853	Annual O&M
2034	4	12	42		20,133	25,533	3,755	Annual O&M
2035	5	13	43		40,133	51,916	7,294	maintenance
2036	6	14	44		20,133	26,565	3,566	Annual O&M
2037	7	15	45		20,133	27,096	3,475	Annual O&M
2038	8	16	46		20,133	27,638	3,386	Annual O&M
2039	9	17	47		20,133	28,191	3,300	Annual O&M
2040	10	18	48		40,133	57,319	6,410	maintenance
2041	11	19	49		20,133	29,329	3,133	Annual O&M
2042	12	20	50		20,133	29,916	3,053	Annual O&M
2043	13	21	51		20,133	30,514	2,976	Annual O&M
2044	14	22	52		20,133	31,125	2,900	Annual O&M
2045	15	23	53		40,133	63,285	5,633	maintenance
2046	16	24	54		20,133	32,382	2,754	Annual O&M
2047	17	25	55		20,133	33,030	2,683	Annual O&M
2048	18	26	56		20,133	33,690	2,615	Annual O&M
2049	19	27	57		20,133	34,364	2,548	Annual O&M
2050	20	28	58		40,133	69,872	4,950	maintenance
2051	21	29	59		20,133	35,752	2,420	Annual O&M
2052	22	30	60		20,133	36,467	2,358	Annual O&M
2053	23	31	61		20,133	37,197	2,298	Annual O&M
2054	24	32	62		20,133	37,941	2,239	Annual O&M
2055	25	33	63		40,133	77,144	4,350	maintenance
2056	26	34	64		20,133	39,474	2,127	Annual O&M
2057	27	35	65		20,133	40,263	2,072	Annual O&M
2058	28	36	66		20,133	41,068	2,019	Annual O&M
2059	29	37	67		20,133	41,890	1,968	Annual O&M
2060	30	38	68		40,133	85,173	3,823	maintenance
<b>TOTAL COST</b>				<b>\$1,813,823</b>	<b>\$723,978</b>	<b>\$3,302,950</b>	<b>\$477,072</b>	



**Table 5: Landfill Liability Assessment - Gold River Landfill**

Data:	11/31/2023		
Landfill Cover Option	GCL		
Landfill Closure Date (approximate)	2030		
Post Closure Period (years)	30		
Closure Costs (2023\$)	\$ 1,813,823	Note 1	Present Value Closure Sum
Annual post closure O&M (2023\$)	\$ 20,133	Note 2	\$ 1,475,089.89
5th year post closure O&M costs (2023\$)	\$ 40,133	Note 3	Present Value Post Closure Sum
Construction cost escalation rate	2.0000%	Note 4	\$ 400,985
Discount rate	4.67%	Note 5	Total PV Closure + Post Closure
Inflation rate	2.0000%	Note 6	\$ 1,876,075.05
Closure Accretion Expenses	\$ 68,886.70	Note 7	
Post Closure Accretion Expenses	\$ 18,726.01	Note 7	
Total Accretion Expenses	\$ 87,612.70	Note 7	

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2022			0					
2023	0	1	1					Landfill still open
2024	0	2	2					Landfill still open
2025	0	3	3					Landfill still open
2026	0	4	4					Landfill still open
2027	0	5	5					Landfill still open
2028	0	6	6					Landfill still open
2029	0	7	7			\$ -	\$ -	Landfill still open
2030	0	8	8	\$ 1,813,823		\$ 2,125,183	\$ 1,475,090	Closure engineering based on option 2 DOC plan + Closure construction
2031	1	9	9		\$ 20,133	\$ 24,060	\$ 15,955	Annual O&M
2032	2	10	10		\$ 20,133	\$ 24,542	\$ 15,548	Annual O&M
2033	3	11	11		\$ 20,133	\$ 25,032	\$ 15,152	Annual O&M
2034	4	12	12		\$ 20,133	\$ 25,533	\$ 14,765	Annual O&M
2035	5	13	13		\$ 40,133	\$ 51,916	\$ 28,682	Annual O&M plus allowance for 5 year maintenance
2036	6	14	14		\$ 20,133	\$ 26,565	\$ 14,021	Annual O&M
2037	7	15	15		\$ 20,133	\$ 27,096	\$ 13,664	Annual O&M
2038	8	16	16		\$ 20,133	\$ 27,638	\$ 13,315	Annual O&M
2039	9	17	17		\$ 20,133	\$ 28,191	\$ 12,976	Annual O&M
2040	10	18	18		\$ 40,133	\$ 57,319	\$ 25,206	Annual O&M plus allowance for 5 year maintenance
2041	11	19	19		\$ 20,133	\$ 29,329	\$ 12,322	Annual O&M
2042	12	20	20		\$ 20,133	\$ 29,916	\$ 12,008	Annual O&M
2043	13	21	21		\$ 20,133	\$ 30,514	\$ 11,701	Annual O&M
2044	14	22	22		\$ 20,133	\$ 31,125	\$ 11,403	Annual O&M
2045	15	23	23		\$ 40,133	\$ 63,285	\$ 22,151	Annual O&M plus allowance for 5 year maintenance
2046	16	24	24		\$ 20,133	\$ 32,382	\$ 10,829	Annual O&M
2047	17	25	25		\$ 20,133	\$ 33,030	\$ 10,552	Annual O&M
2048	18	26	26		\$ 20,133	\$ 33,690	\$ 10,283	Annual O&M
2049	19	27	27		\$ 20,133	\$ 34,364	\$ 10,021	Annual O&M
2050	20	28	28		\$ 40,133	\$ 69,872	\$ 19,466	Annual O&M plus allowance for 5 year maintenance
2051	21	29	29		\$ 20,133	\$ 35,752	\$ 9,516	Annual O&M
2052	22	30	30		\$ 20,133	\$ 36,467	\$ 9,273	Annual O&M
2053	23	31	31		\$ 20,133	\$ 37,197	\$ 9,037	Annual O&M
2054	24	32	32		\$ 20,133	\$ 37,941	\$ 8,806	Annual O&M
2055	25	33	33		\$ 40,133	\$ 77,144	\$ 17,107	Annual O&M plus allowance for 5 year maintenance
2056	26	34	34		\$ 20,133	\$ 39,474	\$ 8,363	Annual O&M
2057	27	35	35		\$ 20,133	\$ 40,263	\$ 8,149	Annual O&M
2058	28	36	36		\$ 20,133	\$ 41,068	\$ 7,942	Annual O&M
2059	29	37	37		\$ 20,133	\$ 41,890	\$ 7,739	Annual O&M
2060	30	38	38		\$ 40,133	\$ 85,173	\$ 15,033	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$1,813,823</b>	<b>\$723,978</b>	<b>\$3,302,950</b>	<b>\$1,876,075</b>	

- Notes:**
- (1) Construction Closure costs in 2023\$ from CVRD financial plan schedules.
  - (2) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
  - (3) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.
  - (4) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (5) Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
  - (6) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (7) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

Table 5: Landfill Liability Assessment - Gold River Landfill - Accretion

<b>Data:</b>	<b>11/31/2023</b>
Landfill Cover Option	GCL
Landfill Closure Date (approximate)	2030
Post Closure Period (years)	30
Closure Costs (2022\$) (2021-2030 PB)	\$ 1,813,823
Annual post closure O&M (2022\$)	\$ 20,133
5th year post closure O&M costs (2022\$)	\$ 40,133
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

Present Value Closure Sum  
 \$ 1,543,976.58  
 Present Value Post Closure Sum  
 \$ 419,711

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2022\$	Monitoring/Maintenance Cash Flow (2022\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2023	0	1	0					
2024	0	2	1					Landfill still open
2025	0	3	2					Landfill still open
2026	0	4	3					Landfill still open
2027	0	5	4					Landfill still open
2028	0	6	5					Landfill still open
2029	0	7	6			\$ -	\$ -	Closure engineering based on option 2 DOC plan
2030	0	8	7	\$ 1,813,823		\$ 2,125,183	\$ 1,543,977	Closure construction
2031	1	9	8		\$ 20,133	\$ 24,060	\$ 16,700	Annual O&M
2032	2	10	9		\$ 20,133	\$ 24,542	\$ 16,274	Annual O&M
2033	3	11	10		\$ 20,133	\$ 25,032	\$ 15,859	Annual O&M
2034	4	12	11		\$ 20,133	\$ 25,533	\$ 15,455	Annual O&M
2035	5	13	12		\$ 40,133	\$ 51,916	\$ 30,022	Annual O&M plus allowance for 5 year maintenance
2036	6	14	13		\$ 20,133	\$ 26,565	\$ 14,676	Annual O&M
2037	7	15	14		\$ 20,133	\$ 27,096	\$ 14,302	Annual O&M
2038	8	16	15		\$ 20,133	\$ 27,638	\$ 13,937	Annual O&M
2039	9	17	16		\$ 20,133	\$ 28,191	\$ 13,581	Annual O&M
2040	10	18	17		\$ 40,133	\$ 57,319	\$ 26,383	Annual O&M plus allowance for 5 year maintenance
2041	11	19	18		\$ 20,133	\$ 29,329	\$ 12,897	Annual O&M
2042	12	20	19		\$ 20,133	\$ 29,916	\$ 12,568	Annual O&M
2043	13	21	20		\$ 20,133	\$ 30,514	\$ 12,248	Annual O&M
2044	14	22	21		\$ 20,133	\$ 31,125	\$ 11,935	Annual O&M
2045	15	23	22		\$ 40,133	\$ 63,285	\$ 23,185	Annual O&M plus allowance for 5 year maintenance
2046	16	24	23		\$ 20,133	\$ 32,382	\$ 11,334	Annual O&M
2047	17	25	24		\$ 20,133	\$ 33,030	\$ 11,045	Annual O&M
2048	18	26	25		\$ 20,133	\$ 33,690	\$ 10,763	Annual O&M
2049	19	27	26		\$ 20,133	\$ 34,364	\$ 10,489	Annual O&M
2050	20	28	27		\$ 40,133	\$ 69,872	\$ 20,375	Annual O&M plus allowance for 5 year maintenance
2051	21	29	28		\$ 20,133	\$ 35,752	\$ 9,961	Annual O&M
2052	22	30	29		\$ 20,133	\$ 36,467	\$ 9,706	Annual O&M
2053	23	31	30		\$ 20,133	\$ 37,197	\$ 9,459	Annual O&M
2054	24	32	31		\$ 20,133	\$ 37,941	\$ 9,218	Annual O&M
2055	25	33	32		\$ 40,133	\$ 77,144	\$ 17,906	Annual O&M plus allowance for 5 year maintenance
2056	26	34	33		\$ 20,133	\$ 39,474	\$ 8,753	Annual O&M
2057	27	35	34		\$ 20,133	\$ 40,263	\$ 8,530	Annual O&M
2058	28	36	35		\$ 20,133	\$ 41,068	\$ 8,312	Annual O&M
2059	29	37	36		\$ 20,133	\$ 41,890	\$ 8,100	Annual O&M
2060	30	38	37		\$ 40,133	\$ 85,173	\$ 15,736	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$1,813,823</b>	<b>\$723,978</b>	<b>\$3,302,950</b>	<b>\$1,963,688</b>	

**Table 6: Landfill Liability Assessment - Tahsis Waste Management Centre - Retrospective to year of opening**

Data:	11/31/2023	
Landfill Cover Option	GCL	
Landfill Open Date	1988	
Landfill Closure Date (approximate)	2031	
Post Closure Period (years)	30	
Landfill Capacity at Closure (m3)	114,553	
Closure Costs (2023\$)	\$ 1,896,440	Note 1
Annual post closure O&M (2023\$)	\$ 7,023	Note 2
5th year post closure O&M costs (2023\$)	\$ 27,023	Note 3
Construction cost escalation rate	2.0000%	Note 4
Discount rate	4.67%	Note 5
Inflation rate	2.0000%	Note 6

<b>Present Value Closure Sum</b>	
\$	318,409
<b>Present Value Post Closure Sum</b>	
\$	37,431
<b>Total PV Closure + Post Closure</b>	
\$	355,840
<b>Ammortization</b>	
\$	8,275.35
<b>Accumulated Ammortization</b>	
\$	281,362.02

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2022			34					
2023	0	1	35					Landfill still open
2024	0	2	36			\$ -	\$ -	Landfill still open
2025	0	3	37			\$ -	\$ -	Landfill still open
2026	0	4	38			\$ -	\$ -	Landfill still open
2027	0	5	39			\$ -	\$ -	Landfill still open
2028	0	6	40			\$ -	\$ -	Landfill still open
2029	0	7	41			\$ -	\$ -	Landfill still open
2030	0	8	42			\$ -	\$ -	
2031	0	9	43	\$ 1,896,440		\$ 2,266,421	\$ 318,409	Final closure engineering + Final closure construction/final capping
2032	1	10	44		\$ 7,023	\$ 8,561	\$ 1,149	Annual O&M
2033	2	11	45		\$ 7,023	\$ 8,733	\$ 1,120	Annual O&M
2034	3	12	46		\$ 7,023	\$ 8,907	\$ 1,091	Annual O&M
2035	4	13	47		\$ 7,023	\$ 9,086	\$ 1,063	Annual O&M
2036	5	14	48		\$ 27,023	\$ 35,657	\$ 3,987	Annual O&M plus allowance for 5 year maintenance
2037	6	15	49		\$ 7,023	\$ 9,453	\$ 1,010	Annual O&M
2038	7	16	50		\$ 7,023	\$ 9,642	\$ 984	Annual O&M
2039	8	17	51		\$ 7,023	\$ 9,834	\$ 959	Annual O&M
2040	9	18	52		\$ 7,023	\$ 10,031	\$ 935	Annual O&M
2041	10	19	53		\$ 27,023	\$ 39,368	\$ 3,504	Annual O&M plus allowance for 5 year maintenance
2042	11	20	54		\$ 7,023	\$ 10,436	\$ 887	Annual O&M
2043	12	21	55		\$ 7,023	\$ 10,645	\$ 865	Annual O&M
2044	13	22	56		\$ 7,023	\$ 10,858	\$ 843	Annual O&M
2045	14	23	57		\$ 7,023	\$ 11,075	\$ 821	Annual O&M
2046	15	24	58		\$ 27,023	\$ 43,465	\$ 3,079	Annual O&M plus allowance for 5 year maintenance
2047	16	25	59		\$ 7,023	\$ 11,523	\$ 780	Annual O&M
2048	17	26	60		\$ 7,023	\$ 11,753	\$ 760	Annual O&M
2049	18	27	61		\$ 7,023	\$ 11,988	\$ 741	Annual O&M
2050	19	28	62		\$ 7,023	\$ 12,228	\$ 722	Annual O&M
2051	20	29	63		\$ 27,023	\$ 47,989	\$ 2,706	Annual O&M plus allowance for 5 year maintenance
2052	21	30	64		\$ 7,023	\$ 12,722	\$ 685	Annual O&M
2053	22	31	65		\$ 7,023	\$ 12,976	\$ 668	Annual O&M
2054	23	32	66		\$ 7,023	\$ 13,236	\$ 651	Annual O&M
2055	24	33	67		\$ 7,023	\$ 13,501	\$ 634	Annual O&M
2056	25	34	68		\$ 27,023	\$ 52,984	\$ 2,378	Annual O&M plus allowance for 5 year maintenance
2057	26	35	69		\$ 7,023	\$ 14,046	\$ 602	Annual O&M
2058	27	36	70		\$ 7,023	\$ 14,327	\$ 587	Annual O&M
2059	28	37	71		\$ 7,023	\$ 14,613	\$ 572	Annual O&M
2060	29	38	72		\$ 7,023	\$ 14,906	\$ 557	Annual O&M
2061	30	39	73		\$ 27,023	\$ 58,499	\$ 2,090	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,896,440</b>	<b>\$ 330,702</b>	<b>\$ 2,819,464</b>	<b>\$ 355,840</b>	

**Table 6: Landfill Liability Assessment - Tahsis Waste Management Centre**

Data:	11/31/2023		
Landfill Cover Option	GCL		
Landfill Closure Date (approximate)	2032		
Post Closure Period (years)	30		
Landfill Capacity at Closure (m3)	114,553		
Closure Costs (2023\$)	\$ 1,896,440	Note 1	Present Value Closure Sum
Annual post closure O&M (2023\$)	\$ 7,023	Note 2	\$ 1,502,937
5th year post closure O&M costs (2023\$)	\$ 27,023	Note 3	Present Value Post Closure Sun
Construction cost escalation rate	2.0000%	Note 4	\$ 176,682
Discount rate	4.67%	Note 5	Total PV Closure + Post Closure
Inflation rate	2.0000%	Note 6	\$ 1,679,618
Closure Accretion Expenses	\$ 70,187.14	Note 7	
Post Closure Accretion Expenses	\$ 8,251.05	Note 7	
Total Accretion Expenses	\$ 78,438.18	Note 7	

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/ Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2022			0					
2023	0	1	1					Landfill still open
2024	0	2	2					Landfill still open
2025	0	3	3					Landfill still open
2026	0	4	4					Landfill still open
2027	0	5	5					Landfill still open
2028	0	6	6					Landfill still open
2029	0	7	7					Landfill still open
2030	0	8	8					Landfill still open
2031	0	9	9	\$ 1,896,440		\$ 2,266,421	\$ 1,502,937	Final closure engineering + Final closure construction/final capping
2032	1	10	10		\$ 7,023	\$ 8,561	\$ 5,424	Annual O&M
2033	2	11	11		\$ 7,023	\$ 8,733	\$ 5,286	Annual O&M
2034	3	12	12		\$ 7,023	\$ 8,907	\$ 5,151	Annual O&M
2035	4	13	13		\$ 7,023	\$ 9,086	\$ 5,020	Annual O&M
2036	5	14	14		\$ 27,023	\$ 35,657	\$ 18,821	Annual O&M plus allowance for 5 year maintenance
2037	6	15	15		\$ 7,023	\$ 9,453	\$ 4,767	Annual O&M
2038	7	16	16		\$ 7,023	\$ 9,642	\$ 4,645	Annual O&M
2039	8	17	17		\$ 7,023	\$ 9,834	\$ 4,527	Annual O&M
2040	9	18	18		\$ 7,023	\$ 10,031	\$ 4,411	Annual O&M
2041	10	19	19		\$ 27,023	\$ 39,368	\$ 16,539	Annual O&M plus allowance for 5 year maintenance
2042	11	20	20		\$ 7,023	\$ 10,436	\$ 4,189	Annual O&M
2043	12	21	21		\$ 7,023	\$ 10,645	\$ 4,082	Annual O&M
2044	13	22	22		\$ 7,023	\$ 10,858	\$ 3,978	Annual O&M
2045	14	23	23		\$ 7,023	\$ 11,075	\$ 3,877	Annual O&M
2046	15	24	24		\$ 27,023	\$ 43,465	\$ 14,535	Annual O&M plus allowance for 5 year maintenance
2047	16	25	25		\$ 7,023	\$ 11,523	\$ 3,681	Annual O&M
2048	17	26	26		\$ 7,023	\$ 11,753	\$ 3,587	Annual O&M
2049	18	27	27		\$ 7,023	\$ 11,988	\$ 3,496	Annual O&M
2050	19	28	28		\$ 7,023	\$ 12,228	\$ 3,407	Annual O&M
2051	20	29	29		\$ 27,023	\$ 47,989	\$ 12,773	Annual O&M plus allowance for 5 year maintenance
2052	21	30	30		\$ 7,023	\$ 12,722	\$ 3,235	Annual O&M
2053	22	31	31		\$ 7,023	\$ 12,976	\$ 3,153	Annual O&M
2054	23	32	32		\$ 7,023	\$ 13,236	\$ 3,072	Annual O&M
2055	24	33	33		\$ 7,023	\$ 13,501	\$ 2,994	Annual O&M
2056	25	34	34		\$ 27,023	\$ 52,984	\$ 11,225	Annual O&M plus allowance for 5 year maintenance
2057	26	35	35		\$ 7,023	\$ 14,046	\$ 2,843	Annual O&M
2058	27	36	36		\$ 7,023	\$ 14,327	\$ 2,770	Annual O&M
2059	28	37	37		\$ 7,023	\$ 14,613	\$ 2,700	Annual O&M
2060	29	38	38		\$ 7,023	\$ 14,906	\$ 2,631	Annual O&M
2061	30	39	39		\$ 27,023	\$ 58,499	\$ 9,865	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,896,440</b>	<b>\$ 330,702</b>	<b>\$ 2,819,464</b>	<b>\$ 1,679,618</b>	

- Notes:**
- (1) Construction Closure costs in 2023\$ from CVRD financial plan schedules.
  - (2) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
  - (3) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.
  - (4) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (5) Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
  - (6) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (7) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

**Table 6: Landfill Liability Assessment - Tahsis Waste Management Centre - Accretion**

<b>Data:</b>	<b>11/31/2023</b>
Landfill Cover Option	GCL
Landfill Closure Date (approximate)	2032
Post Closure Period (years)	30
Airspace Consumed from Dec 31 2021-2022 (m3)	0
Current (Dec 2022) waste in place (m3)	114,553
Remaining Airspace (m3)	0
Landfill Capacity at Closure (m3)	114,553
Closure Costs (2022\$) (2021-2030 PB)	\$ 1,896,440
Annual post closure O&M (2022\$)	\$ 7,023
5th year post closure O&M costs (2022\$)	\$ 27,023
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

Present Value Closure Sum  
\$ 1,573,124  
Present Value Post Closure Sun  
\$ 184,933

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2022\$	Monitoring/ Maintenance Cash Flow (2022\$)	Cash Flow plus Inflation	Present Value	Description of Cost
2023	0	1	0					
2024	0	2	1			\$ -	\$ -	Landfill still oper
2025	0	3	2			\$ -	\$ -	Landfill still oper
2026	0	4	3			\$ -	\$ -	Landfill still oper
2027	0	5	4			\$ -	\$ -	Landfill still oper
2028	0	6	5			\$ -	\$ -	Landfill still oper
2029	0	7	6			\$ -	\$ -	Landfill still oper
2030	0	8	7			\$ -	\$ -	Final closure engineering (2022\$) based on CVRD revised dates
2031	0	9	8	\$ 1,896,440		\$ 2,266,421	\$ 1,573,124	Final closure construction/final capping (2022\$)
2032	1	10	9		\$ 7,023	\$ 8,561	\$ 5,677	Annual O&V
2033	2	11	10		\$ 7,023	\$ 8,733	\$ 5,533	Annual O&V
2034	3	12	11		\$ 7,023	\$ 8,907	\$ 5,391	Annual O&V
2035	4	13	12		\$ 7,023	\$ 9,086	\$ 5,254	Annual O&V
2036	5	14	13		\$ 27,023	\$ 35,657	\$ 19,699	Annual O&M plus allowance for 5 year maintenance
2037	6	15	14		\$ 7,023	\$ 9,453	\$ 4,989	Annual O&V
2038	7	16	15		\$ 7,023	\$ 9,642	\$ 4,862	Annual O&V
2039	8	17	16		\$ 7,023	\$ 9,834	\$ 4,738	Annual O&V
2040	9	18	17		\$ 7,023	\$ 10,031	\$ 4,617	Annual O&V
2041	10	19	18		\$ 27,023	\$ 39,368	\$ 17,312	Annual O&M plus allowance for 5 year maintenance
2042	11	20	19		\$ 7,023	\$ 10,436	\$ 4,385	Annual O&V
2043	12	21	20		\$ 7,023	\$ 10,645	\$ 4,273	Annual O&V
2044	13	22	21		\$ 7,023	\$ 10,858	\$ 4,164	Annual O&V
2045	14	23	22		\$ 7,023	\$ 11,075	\$ 4,058	Annual O&V
2046	15	24	23		\$ 27,023	\$ 43,465	\$ 15,214	Annual O&M plus allowance for 5 year maintenance
2047	16	25	24		\$ 7,023	\$ 11,523	\$ 3,853	Annual O&V
2048	17	26	25		\$ 7,023	\$ 11,753	\$ 3,755	Annual O&V
2049	18	27	26		\$ 7,023	\$ 11,988	\$ 3,659	Annual O&V
2050	19	28	27		\$ 7,023	\$ 12,228	\$ 3,566	Annual O&V
2051	20	29	28		\$ 27,023	\$ 47,989	\$ 13,370	Annual O&M plus allowance for 5 year maintenance
2052	21	30	29		\$ 7,023	\$ 12,722	\$ 3,386	Annual O&V
2053	22	31	30		\$ 7,023	\$ 12,976	\$ 3,300	Annual O&V
2054	23	32	31		\$ 7,023	\$ 13,236	\$ 3,216	Annual O&V
2055	24	33	32		\$ 7,023	\$ 13,501	\$ 3,134	Annual O&V
2056	25	34	33		\$ 27,023	\$ 52,984	\$ 11,749	Annual O&M plus allowance for 5 year maintenance
2057	26	35	34		\$ 7,023	\$ 14,046	\$ 2,976	Annual O&V
2058	27	36	35		\$ 7,023	\$ 14,327	\$ 2,900	Annual O&V
2059	28	37	36		\$ 7,023	\$ 14,613	\$ 2,826	Annual O&V
2060	29	38	37		\$ 7,023	\$ 14,906	\$ 2,754	Annual O&V
2061	30	39	38		\$ 27,023	\$ 58,499	\$ 10,325	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,896,440</b>	<b>\$ 330,702</b>	<b>\$ 2,819,464</b>	<b>\$ 1,758,057</b>	

**Table 7: Landfill Liability Assessment - Zeballos Landfill - Retrospective to year of opening**

<b>Data:</b>	<b>11/31/2023</b>	
Landfill Cover Option	GCL	
Landfill Open Date	1987	
Landfill Closure Date (approximate)	2029	
Post Closure Period (years)	30	
Landfill Capacity at Closure (m3)	-	
Closure Costs (2023\$)	<b>\$1,287,832.00</b>	Note 1
Annual post closure O&M (2023\$)	\$ 11,819	Note 2
5th year post closure O&M costs (2023\$)	\$ 31,819	Note 3
Construction cost escalation rate	2.0000%	Note 4
Discount rate	4.67%	Note 5
Inflation rate	2.0000%	Note 6

Present Value Closure Sum	\$ 217,534
Present Value Post Closure Sum	\$ 54,348
<b>Total PV Closure + Post Closure</b>	<b>\$ 271,882</b>
<b>Ammortization</b>	<b>\$ 6,473.39</b>
<b>Accumulated Amortization</b>	<b>\$ 226,568.53</b>

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Net Present Value	Description of Cost
2022			35					
2023	0	1	36					Landfill still open
2024	0	2	37					Landfill still open
2025	0	3	38					Landfill still open
2026	0	4	39					Landfill still open
2027	0	5	40					Landfill still open
2028	0	6	41			\$ -	\$ -	Landfill still open
2029	0	7	42	\$ 1,287,832		\$ 1,479,314	\$217,534	<b>Final closure engineering, option 2 DOC plan + Final closure construction/final capping</b>
2030	1	8	43		\$ 11,819	\$ 13,847	\$ 1,945	Annual O&M
2031	2	9	44		\$ 11,819	\$ 14,124	\$ 1,896	Annual O&M
2032	3	10	45		\$ 11,819	\$ 14,407	\$ 1,847	Annual O&M
2033	4	11	46		\$ 11,819	\$ 14,695	\$ 1,800	Annual O&M
2034	5	12	47		\$ 31,819	\$ 40,354	\$ 4,723	Annual O&M plus allowance for 5 year maintenance
2035	6	13	48		\$ 11,819	\$ 15,289	\$ 1,710	Annual O&M
2036	7	14	49		\$ 11,819	\$ 15,594	\$ 1,666	Annual O&M
2037	8	15	50		\$ 11,819	\$ 15,906	\$ 1,624	Annual O&M
2038	9	16	51		\$ 11,819	\$ 16,224	\$ 1,582	Annual O&M
2039	10	17	52		\$ 31,819	\$ 44,554	\$ 4,151	Annual O&M plus allowance for 5 year maintenance
2040	11	18	53		\$ 11,819	\$ 16,880	\$ 1,502	Annual O&M
2041	12	19	54		\$ 11,819	\$ 17,217	\$ 1,464	Annual O&M
2042	13	20	55		\$ 11,819	\$ 17,562	\$ 1,427	Annual O&M
2043	14	21	56		\$ 11,819	\$ 17,913	\$ 1,390	Annual O&M
2044	15	22	57		\$ 31,819	\$ 49,191	\$ 3,648	Annual O&M plus allowance for 5 year maintenance
2045	16	23	58		\$ 11,819	\$ 18,637	\$ 1,320	Annual O&M
2046	17	24	59		\$ 11,819	\$ 19,009	\$ 1,287	Annual O&M
2047	18	25	60		\$ 11,819	\$ 19,390	\$ 1,254	Annual O&M
2048	19	26	61		\$ 11,819	\$ 19,777	\$ 1,222	Annual O&M
2049	20	27	62		\$ 31,819	\$ 54,311	\$ 3,206	Annual O&M plus allowance for 5 year maintenance
2050	21	28	63		\$ 11,819	\$ 20,576	\$ 1,160	Annual O&M
2051	22	29	64		\$ 11,819	\$ 20,988	\$ 1,131	Annual O&M
2052	23	30	65		\$ 11,819	\$ 21,408	\$ 1,102	Annual O&M
2053	24	31	66		\$ 11,819	\$ 21,836	\$ 1,074	Annual O&M
2054	25	32	67		\$ 31,819	\$ 59,963	\$ 2,817	Annual O&M plus allowance for 5 year maintenance
2055	26	33	68		\$ 11,819	\$ 22,718	\$ 1,020	Annual O&M
2056	27	34	69		\$ 11,819	\$ 23,172	\$ 994	Annual O&M
2057	28	35	70		\$ 11,819	\$ 23,636	\$ 968	Annual O&M
2058	29	36	71		\$ 11,819	\$ 24,109	\$ 944	Annual O&M
2059	30	37	72		\$ 31,819	\$ 66,204	\$ 2,476	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,287,832</b>	<b>\$ 474,558</b>	<b>\$ 2,238,807</b>	<b>\$271,882</b>	

**Table 7: Landfill Liability Assessment - Zeballos Landfill**

Data:	11/31/2023	
Landfill Cover Option	GCL	
Landfill Open Date	1987	
Landfill Closure Date (approximate)	2029	Present Value Closure Surr
Post Closure Period (years)	30	\$ 1,074,744
Landfill Capacity at Closure (m3)	16,323	Present Value Post Closure Sun
Closure Costs (2023\$)	\$ 1,287,832.00	\$ 268,512
Annual post closure O&M (2023\$)	\$ 11,819	Total PV Closure + Post Closur
5th year post closure O&M costs (2023\$)	\$ 31,819	\$ 1,343,256
Construction cost escalation rate	2.0000%	Note 1
Discount rate	4.67%	Note 2
Inflation rate	2.0000%	Note 3
Closure Accretion Expenses	\$ 50,190.52	Note 4
Post Closure Accretion Expenses	\$ 12,539.52	Note 5
Total Accretion Expenses	\$ 62,730.04	Note 6
		Note 7

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2023\$	Monitoring/Maintenance Cash Flow (2023\$)	Cash Flow plus Inflation	Net Present Value	Description of Cost
2022			0					
2023	0	1	1					Landfill still open
2024	0	2	2					Landfill still open
2025	0	3	3					Landfill still open
2026	0	4	4					Landfill still open
2027	0	5	5					Landfill still open
2028	0	6	6			\$ -	\$ -	Landfill still open
2029	0	7	7	\$ 1,287,832		\$ 1,479,314	\$ 1,074,744	Final closure engineering, option 2 DOC plan + Final closure construction/final capping
2030	1	8	8		\$ 11,819	\$ 13,847	\$ 9,611	Annual O&M
2031	2	9	9		\$ 11,819	\$ 14,124	\$ 9,366	Annual O&M
2032	3	10	10		\$ 11,819	\$ 14,407	\$ 9,127	Annual O&M
2033	4	11	11		\$ 11,819	\$ 14,695	\$ 8,895	Annual O&M
2034	5	12	12		\$ 31,819	\$ 40,354	\$ 23,335	Annual O&M plus allowance for 5 year maintenance
2035	6	13	13		\$ 11,819	\$ 15,289	\$ 8,447	Annual O&M
2036	7	14	14		\$ 11,819	\$ 15,594	\$ 8,231	Annual O&M
2037	8	15	15		\$ 11,819	\$ 15,906	\$ 8,021	Annual O&M
2038	9	16	16		\$ 11,819	\$ 16,224	\$ 7,817	Annual O&M
2039	10	17	17		\$ 31,819	\$ 44,554	\$ 20,507	Annual O&M plus allowance for 5 year maintenance
2040	11	18	18		\$ 11,819	\$ 16,880	\$ 7,423	Annual O&M
2041	12	19	19		\$ 11,819	\$ 17,217	\$ 7,233	Annual O&M
2042	13	20	20		\$ 11,819	\$ 17,562	\$ 7,049	Annual O&M
2043	14	21	21		\$ 11,819	\$ 17,913	\$ 6,869	Annual O&M
2044	15	22	22		\$ 31,819	\$ 49,191	\$ 18,022	Annual O&M plus allowance for 5 year maintenance
2045	16	23	23		\$ 11,819	\$ 18,637	\$ 6,523	Annual O&M
2046	17	24	24		\$ 11,819	\$ 19,009	\$ 6,357	Annual O&M
2047	18	25	25		\$ 11,819	\$ 19,390	\$ 6,195	Annual O&M
2048	19	26	26		\$ 11,819	\$ 19,777	\$ 6,037	Annual O&M
2049	20	27	27		\$ 31,819	\$ 54,311	\$ 15,837	Annual O&M plus allowance for 5 year maintenance
2050	21	28	28		\$ 11,819	\$ 20,576	\$ 5,733	Annual O&M
2051	22	29	29		\$ 11,819	\$ 20,988	\$ 5,586	Annual O&M
2052	23	30	30		\$ 11,819	\$ 21,408	\$ 5,444	Annual O&M
2053	24	31	31		\$ 11,819	\$ 21,836	\$ 5,305	Annual O&M
2054	25	32	32		\$ 31,819	\$ 59,963	\$ 13,918	Annual O&M plus allowance for 5 year maintenance
2055	26	33	33		\$ 11,819	\$ 22,718	\$ 5,038	Annual O&M
2056	27	34	34		\$ 11,819	\$ 23,172	\$ 4,909	Annual O&M
2057	28	35	35		\$ 11,819	\$ 23,636	\$ 4,784	Annual O&M
2058	29	36	36		\$ 11,819	\$ 24,109	\$ 4,662	Annual O&M
2059	30	37	37		\$ 31,819	\$ 66,204	\$ 12,231	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,287,832</b>	<b>\$ 474,558</b>	<b>\$ 2,238,807</b>	<b>\$ 1,343,256</b>	

**Notes:**

- (1) Construction Closure costs in 2023\$ from CVRD financial plan schedules.
- (2) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
- (3) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVR waste management centres.
- (4)
- (5) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD. Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
- (6) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD.
- (7) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

Table 7: Landfill Liability Assessment - Zeballos Landfill - Accretion

<b>Data:</b>	<b>11/31/2023</b>
Landfill Cover Option	GCL
Landfill Closure Date (approximate)	2029
Post Closure Period (years)	30
Airspace Consumed from Dec 31 2021-2022 (m3)	-
Current (Dec 2022) waste in place (m3)	-
Remaining Airspace (m3)	-
Landfill Capacity at Closure (m3)	-
Closure Costs (2022\$) (2021-2030 PB)	\$ 1,287,832
Annual post closure O&M (2022\$)	\$ 11,818.60
5th year post closure O&M costs (2022\$)	\$ 31,818.60
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%
Closure Accretion Expenses	
Post Closure Accretion Expenses	
Total Accretion Expenses	

Present Value Closure Sur  
 \$ 1,124,934  
 Present Value Post Closure Sum  
 \$ 281,052

Year	Years Since Closure	Years for FV	Years for PV	Construction Cash Flow 2022\$	Monitoring/Maintenance Cash Flow (2022\$)	Cash Flow plus Inflation	Net Present Value	Description of Cost
2023	0	1	0					
2024	0	2	1					Landfill still open
2025	0	3	2					Landfill still open
2026	0	4	3					Landfill still open
2027	0	5	4					Landfill still open
2028	0	6	5			\$ -	\$ -	Final closure engineering, option 2 DOC plan
2029	0	7	6	\$ 1,287,832		\$ 1,479,314	\$ 1,124,934	Final closure construction/final capping
2030	1	8	7		\$ 11,819	\$ 13,847	\$ 10,060	Annual O&M
2031	2	9	8		\$ 11,819	\$ 14,124	\$ 9,804	Annual O&M
2032	3	10	9		\$ 11,819	\$ 14,407	\$ 9,554	Annual O&M
2033	4	11	10		\$ 11,819	\$ 14,695	\$ 9,310	Annual O&M
2034	5	12	11		\$ 31,819	\$ 40,354	\$ 24,425	Annual O&M plus allowance for 5 year maintenance
2035	6	13	12		\$ 11,819	\$ 15,289	\$ 8,841	Annual O&M
2036	7	14	13		\$ 11,819	\$ 15,594	\$ 8,615	Annual O&M
2037	8	15	14		\$ 11,819	\$ 15,906	\$ 8,396	Annual O&M
2038	9	16	15		\$ 11,819	\$ 16,224	\$ 8,182	Annual O&M
2039	10	17	16		\$ 31,819	\$ 44,554	\$ 21,465	Annual O&M plus allowance for 5 year maintenance
2040	11	18	17		\$ 11,819	\$ 16,880	\$ 7,769	Annual O&M
2041	12	19	18		\$ 11,819	\$ 17,217	\$ 7,571	Annual O&M
2042	13	20	19		\$ 11,819	\$ 17,562	\$ 7,378	Annual O&M
2043	14	21	20		\$ 11,819	\$ 17,913	\$ 7,190	Annual O&M
2044	15	22	21		\$ 31,819	\$ 49,191	\$ 18,863	Annual O&M plus allowance for 5 year maintenance
2045	16	23	22		\$ 11,819	\$ 18,637	\$ 6,828	Annual O&M
2046	17	24	23		\$ 11,819	\$ 19,009	\$ 6,654	Annual O&M
2047	18	25	24		\$ 11,819	\$ 19,390	\$ 6,484	Annual O&M
2048	19	26	25		\$ 11,819	\$ 19,777	\$ 6,319	Annual O&M
2049	20	27	26		\$ 31,819	\$ 54,311	\$ 16,577	Annual O&M plus allowance for 5 year maintenance
2050	21	28	27		\$ 11,819	\$ 20,576	\$ 6,000	Annual O&M
2051	22	29	28		\$ 11,819	\$ 20,988	\$ 5,847	Annual O&M
2052	23	30	29		\$ 11,819	\$ 21,408	\$ 5,698	Annual O&M
2053	24	31	30		\$ 11,819	\$ 21,836	\$ 5,553	Annual O&M
2054	25	32	31		\$ 31,819	\$ 59,963	\$ 14,568	Annual O&M plus allowance for 5 year maintenance
2055	26	33	32		\$ 11,819	\$ 22,718	\$ 5,273	Annual O&M
2056	27	34	33		\$ 11,819	\$ 23,172	\$ 5,139	Annual O&M
2057	28	35	34		\$ 11,819	\$ 23,636	\$ 5,007	Annual O&M
2058	29	36	35		\$ 11,819	\$ 24,109	\$ 4,880	Annual O&M
2059	30	37	36		\$ 31,819	\$ 66,204	\$ 12,802	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				<b>\$ 1,287,832</b>	<b>\$ 474,558</b>	<b>\$ 2,238,807</b>	<b>\$ 1,405,986</b>	



**Table 8: Landfill Liability Assessment - Field Sawmill Landfill - Retrospective to year of opening**

Data:	31-Dec-2023
Landfill Cover Option	
Landfill Open Date	1997
Landfill Closure Date (approximate)	1998
Post Closure Period (years)	30
Closure Costs	\$ -
Annual post closure O&M (2023\$)	\$ 8,129
5th year post closure O&M costs (2023\$)	\$ 13,129
Construction cost escalation rate	2.0000%
Discount rate	4.67%
Inflation rate	2.0000%

	Present Value Post Closure Sum
Note 1 \$	17,173
Note 2 Ammortization	
Note 3 \$	17,173.09
Note 4 Accumulated Ammortization	
Note 5 \$	17,173.09

Year	Years Since Closure	Years for FV	Years for PV	Cash Flow (2023\$)		Cash Flow plus Inflation	Net Present Value	Description of Cost
				Construction/Other	Monitoring /Maintenance (2023\$)			
2022			25					
2023	25	1	26		\$ 13,129	\$ 13,391	\$ 4,087	Annual O&M plus allowance for 5 year maintenance
2024	26	2	27		\$ 8,129	\$ 8,457	\$ 2,466	Annual O&M
2025	27	3	28		\$ 8,129	\$ 8,626	\$ 2,403	Annual O&M
2026	28	4	29		\$ 8,129	\$ 8,799	\$ 2,342	Annual O&M
2027	29	5	30		\$ 8,129	\$ 8,975	\$ 2,282	Annual O&M
2028	30	6	31		\$ 13,129	\$ 14,785	\$ 3,592	Annual O&M plus allowance for 5 year maintenance
<b>TOTAL COST</b>				\$ -	\$ 58,773	\$ 63,034	\$ 17,173	

**Table 8: Landfill Liability Assessment - Field Sawmill Landfill**

Data:		31-Dec-2023	
Landfill Cover Option			
Landfill Open Date		1997	
Landfill Closure Date (approximate)		1998	
Post Closure Period (years)		30	
Closure Costs		\$ -	Present Value Post Closure Sum
Annual post closure O&M (2023\$)		\$ 8,129	Note 1 \$ 53,753
5th year post closure O&M costs (2023\$)		\$ 13,129	Note 2
Construction cost escalation rate		2.0000%	Note 3
Discount rate		4.67%	Note 4
Inflation rate		2.0000%	Note 5
Post Closure Accretion Expenses		\$ 2,510.27	Note 6
Total Accretion Expenses		\$ 2,510.27	

Year	Years Since Closure	Years for FV	Years for PV	Cash Flow (2023\$)		Cash Flow plus Inflation	Net Present Value	Description of Cost	
				Construction/Other	Monitoring/Maintenance (2023\$)				
2023	25	1	1		\$ 13,129	\$ 13,391	\$ 12,794	Annual O&M plus allowance for 5 year maintenance	
2024	26	2	2		\$ 8,129	\$ 8,457	\$ 7,719	Annual O&M	
2025	27	3	3		\$ 8,129	\$ 8,626	\$ 7,522	Annual O&M	
2026	28	4	4		\$ 8,129	\$ 8,799	\$ 7,331	Annual O&M	
2027	29	5	5		\$ 8,129	\$ 8,975	\$ 7,144	Annual O&M	
2028	30	6	6		\$ 13,129	\$ 14,785	\$ 11,243	Annual O&M plus allowance for 5 year maintenance	
<b>TOTAL COST</b>					<b>\$ -</b>	<b>\$ 58,773</b>	<b>\$ 63,034</b>	<b>\$ 53,753</b>	

- Notes:**
- (1) Annual post closure operating and maintenance costs include environmental monitoring costs provided by CVRD and lab costs collected by GHD for the landfill in 2022. The lab costs were inflated by 20% to account for industry markups in 2023 and CVRD having less of a discount with ALS than GHD.
  - (2) 5th year post closure operating and maintenance costs include environmental monitoring costs, estimated based on GHD experience at CVRD waste management centres.
  - (3) Construction cost inflation rate applied to forecast construction costs, set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (4) Discount rate of 4.67% based on the Municipal Finance Authority of BC's (MFA) 30-year indicative lending rate, at December 31, 2022, provided by the CVRD.
  - (5) Operations and maintenance inflation rate applied to operations and maintenance costs. Set to Bank of Canada's target inflation rate of 2% as directed by CVRD
  - (6) Closure accretion is calculated from the difference of the present value of two closure costs. The difference is between the sum of the table above and below, where the table below has the present value years artificially adjusted by 1 to account for Jan 1 2023 to Dec 31 2023. Both Closure (construction/design costs) and post closure (O&M) accretion values are calculated and summed together.

**Table 8: Landfill Liability Assessment - Field Sawmill Landfill - Accretion**

Data:		11/31/2023	
Landfill Cover Option			
Landfill Closure Date (approximate)		1998	
Post Closure Period (years)		30	
Current (Dec 2022) waste in place (m3)		n/a	
Landfill Capacity at Closure (m3)		n/a	
Closure Costs		\$ -	Present Value Post Closure Sum
Annual post closure O&M (2022\$)		\$ 8,129	\$ 56,263
5th year post closure O&M costs (2022\$)		\$ 13,129	
Construction cost escalation rate		2.0000%	
Discount rate		4.67%	
Inflation rate		2.0000%	
Post Closure Accretion Expenses			
Total Accretion Expenses			

Year	Years Since Closure	Years for FV	Years for PV	Cash Flow (2022\$)		Cash Flow plus Inflation	Net Present Value	Description of Cost	
2023	25	1	0		\$ 13,129	\$ 13,391	\$ 13,391	Annual O&M plus allowance for 5 year maintenance	
2024	26	2	1		\$ 8,129	\$ 8,457	\$ 8,080	Annual O&M	
2025	27	3	2		\$ 8,129	\$ 8,626	\$ 7,874	Annual O&M	
2026	28	4	3		\$ 8,129	\$ 8,799	\$ 7,673	Annual O&M	
2027	29	5	4		\$ 8,129	\$ 8,975	\$ 7,477	Annual O&M	
2028	30	6	5		\$ 13,129	\$ 14,785	\$ 11,768	Annual O&M plus allowance for 5 year maintenance	
<b>TOTAL COST</b>					<b>\$ -</b>	<b>\$ 58,773</b>	<b>\$ 63,034</b>	<b>\$ 56,263</b>	

# **Appendix E**

**2023 Environmental Monitoring  
Specification**

## Environmental Monitoring Program Specifications – 2023

**PROJECT:** Comox Strathcona Waste Management  
Campbell River Waste Management Centre

**MONITORING STAFF:** **RESPONSIBILITY**  
Crystal Stuart Field Lead

**LABORATORIES USED:** ALS Environmental, Burnaby, BC

**AUTHORIZATION:** **MONITORING EVENT(S)**  
Feb, May, Aug, Nov

Revision #	Date	Revision	GHD
1	April, 2014	Monitoring spec creation.	MND
2	June, 2014	39950, EBA06-1, and HBT94-4 removed from sampling program. Phosphorus analysis changed to metals analysis instead of colorimetric method.	MND
3	January, 2016	SW-2 added to surface water monitoring program, updated field and database staffing, added WG matrix to field blank.	TE
4	March, 2016	Added dissolved metals analysis to WS schedule to differentiate from total metals when comparing criteria	CR
5	January, 2017	Reduced sampling for VOCs to a semi-annual schedule (February and August).	MND
6	May, 2017	Added SW03-17 and well tag 109728 (domestic well) to the monitoring program. Switched WS metals analyses to low levels analysis.	MND
7	January, 2018	Removed well tag 109728 from monitoring program. Updated project staffing. Added TDS to the parameter list.	NT
8	April, 2019	Removed EBA04-4 and EBA04-3 from monitoring program, as both are inaccessible. Added MW02-18 and MW03-18 to monitoring program (began sampling in August 2018).	NT
9	April, 2020	Added MW04-19 to the monitoring program (began sampling in October 2019). Added sampling the stormwater management pond and recording the water level at Ladore Dam. Updated project staffing.	CT
10	January, 2021	Updated PM. Removed lab pH from the GW and SW monitoring programs due to the 15-minute holding time. Field pH is more representative of sampling conditions.	NT
11	May, 2021	Removed HBT95-4 and GLL93-4 from the groundwater monitoring program, as per the 2020 Annual O&M Report, as they have consistently been dry for years. Removed EBA11-2 from the groundwater monitoring program since the well was found destroyed in Feb 2021.	NT
12	August, 2021	Added MW06-21, MW07-21 and MW08-21 to the groundwater monitoring program. Installation occurred in June 2021 as part of the 2017 DOCP.	NT
13	February, 2022	Added DOC to the SW monitoring program to be able to use the BLM calculator for copper.	NT

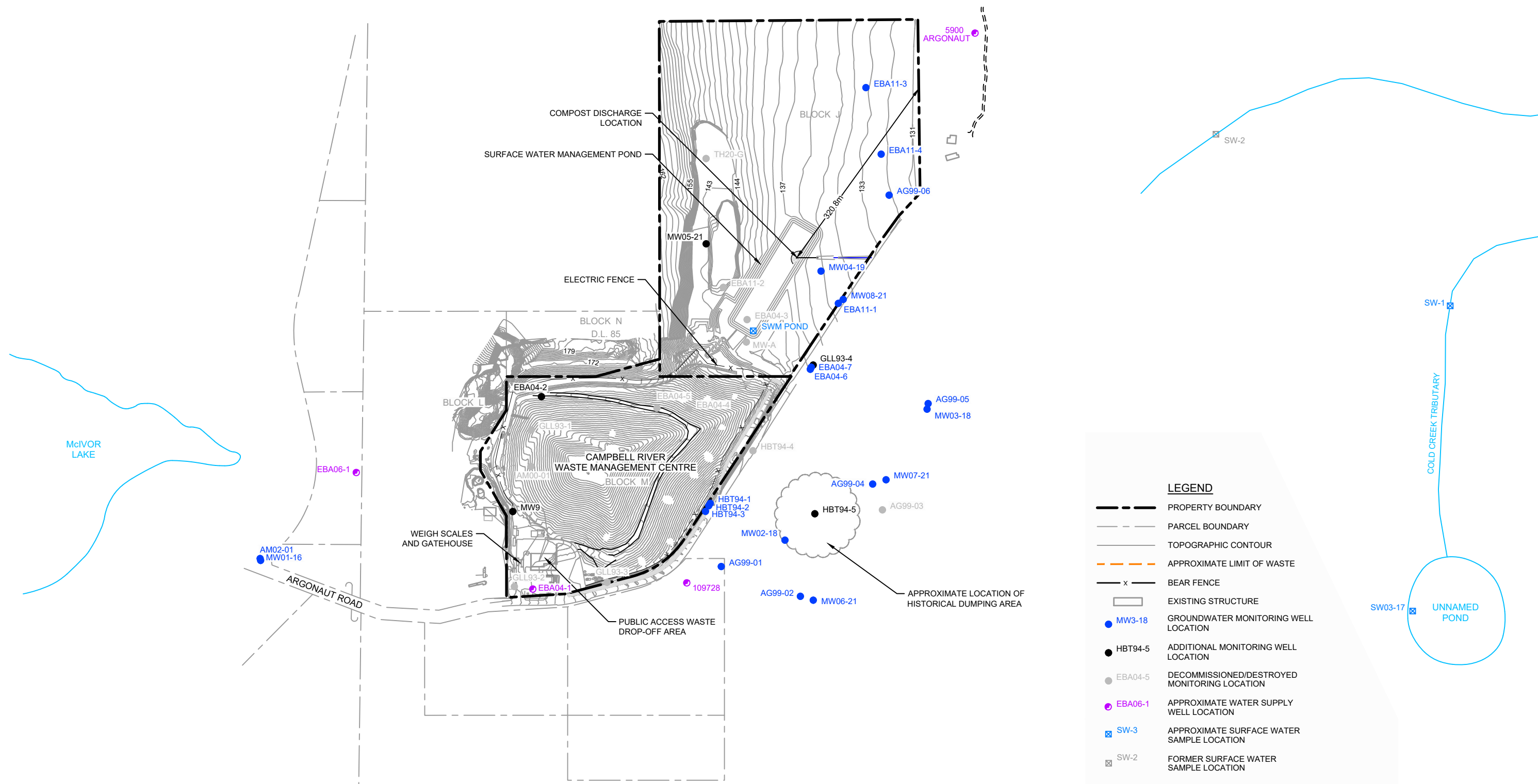
**Sampling Schedule  
Environmental Monitoring Program Specification - 2023**

Monitoring Location	Monitoring Location Purpose	Sample Matrix	Hydraulic Monitoring	Quarterly	Semi-annual
				Feb, May, Aug, Nov	Feb, Aug
<b>Groundwater Monitoring Program (22 locations)</b>					
AG99-01	Monitor downgradient groundwater quality to the east of the Site, off-Site.	WG	√	Schedule A	-
AG99-02	Monitor downgradient groundwater quality to the east of the landfill, off-Site, deep nested well..	WG	√	Schedule A	-
AG99-04	Monitor downgradient groundwater quality to the east of the landfill, off-Site, deep nested well.	WG	√	Schedule A	-
AG99-05	Monitor downgradient groundwater quality to the east of the Site, off-Site, deep nested well.	WG	√	Schedule A	-
AG99-06	Downgradient of the landfill, northeast.	WG	√	Schedule A	Schedule B
MW01-16	Background.	WG	√	Schedule A	Schedule B
AM02-01	Background.	WG	√	Schedule A	Schedule B
EBA04-1	Tap from the building near the scalehouse.	WG	-	Schedule A	-
EBA04-6	Northeast toe of landfill, off-Site.	WG	√	Schedule A	-
EBA04-7	Northeast toe of landfill, off-Site.	WG	√	Schedule A	Schedule B
EBA11-1	Downgradient of the Site to the northeast, off-Site, shallow nested well.	WG	√	Schedule A	Schedule B
EBA11-3	Downgradient of the landfill to the northeast.	WG	√	Schedule A	Schedule B
EBA11-4	Downgradient of the landfill to the northeast.	WG	√	Schedule A	Schedule B
HBT94-1	Downgradient, southeast property line.	WG	√	Schedule A	-
HBT94-2	Downgradient, southeast property line.	WG	√	Schedule A	Schedule B
HBT94-3	Downgradient, southeast property line.	WG	√	Schedule A	-
MW02-18	Downgradient of the Site, east, off-Site.	WG	√	Schedule A	Schedule B
MW03-18	Monitor downgradient groundwater quality to the east of the Site, off-Site, shallow nested well.	WG	√	Schedule A	-
MW04-19	Downgradient of the landfill, northeast.	WG	√	Schedule A	-
MW06-21	Monitor downgradient groundwater quality to the east of the landfill, off-Site, shallow nested well.	WG	√	Schedule A	-
MW07-21	Monitor downgradient groundwater quality to the east of the landfill, off-Site, shallow nested well.	WG	√	Schedule A	-
MW08-21	Downgradient of the Site to the northeast, off-Site, deep nested well.	WG	√	Schedule A	-
<b>Surface Water Monitoring Program (4 locations)</b>					
SW-1	Cold Creek Tributary.	WS	√	Schedule A	-
SW03-17	Unnamed Pond upstream of SW-1.	WS	√	Schedule A	-
SWM Pond	Surface Water Management Pond.	WS	√	Schedule A	-
Ladore Dam	Ladore Dam Reservoir (see link below).	WS	√	-	-
<b>Field Quality Assurance/Quality Control</b>					
Field Blank		WG	-	Schedule A	-
Groundwater Duplicate		WG	-	Schedule A	Schedule B
Surface Water Duplicate		WS	-	Schedule A (Feb only)	-
Trip Blank (VOCs only)		WG	-	-	Schedule B

[https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver\\_island/ladore\\_ldr.html](https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver_island/ladore_ldr.html)

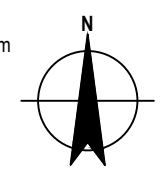
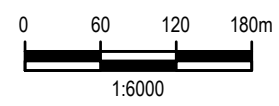
**Analytical Parameters  
Environmental Monitoring Program Specification - 2023**

Schedule A	Groundwater	Surface Water
<b>Hydraulic Monitoring</b>		
Water level	√	-
Depth to bottom of well	√	-
Flow	-	√
<b>Field Parameters</b>		
Dissolved Oxygen (mg/L)	√	√
Oxidation-Reduction Potential (mV)	√	√
pH (s.u.)	√	√
Conductivity (µS/cm)	√	√
Temperature (deg C)	√	√
Total Dissolved Solids (mg/L)	√	√
Turbidity (ntu)	√	√
<b>General Chemistry &amp; Nutrients</b>		
Alkalinity (Speciated)	√	√
Chloride (Dissolved)	√	√
Fluoride	√	√
Conductivity	√	√
Sulphate (Dissolved)	√	√
Total Dissolved Solids (TDS)	√	√
Ammonia-N	√	√
Nitrate (as N)	√	√
Nitrite (as N)	√	√
Nitrate/Nitrite (N+N)	√	√
Dissolved Organic Carbon (DOC)	-	√
<b>Metals</b>		
Dissolved CSR Metals (incl. Hg)	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√
Total CSR Metals (incl. Hg)	-	√
<b>Schedule B</b>		
VOCs	√	-
<b>Petroleum Hydrocarbons</b>		
Total VH (C6-C10)	√	-
Total VPH (C6-C10) less BTEX	√	-



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED DECEMBER 2, 2021.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.



COMOX STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2022 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Date March 2023

**SITE PLAN AND MONITORING  
 LOCATIONS**

**FIGURE 2**

# **Appendix F**

**Field Sample Keys and Laboratory Reports**



Q1 2023 Field Sample Key  
Campbell River Waste Management Centre  
Campbell River, BC

Facility ID	Sample Name	Location	Date	Time	Type	Matrix	Parent Sample Name	WaterDepth	DepthUnit	DryYesNo	Field pH (s.u.)	Conductivity	Conductivity Unit	Temperature	Temperature Unit	Turbidity (NTU)	ORP	ORP units	TDS	TDS Units
1056484000	WG-030823-CS-58	CAM_MW04-19	03/08/2023	11:30	N	WG		24.600	m BTOR	No	8.19	209	uS/cm	7.99	deg C	1000	226	millivolts	136	mg/L
1056484000	WG-022723-CS-39	CAM_MW01-16	02/27/2023	11:30	N	WG		33.056	m BTOR	No	7.29	75	uS/cm	15.15	deg C	10.9	328	millivolts	49	mg/L
1056484000	CAM_AM02-01-270223	CAM_AM02-01	02/27/2023	07:00	N	WG				Yes										
1056484000	WG-022723-CS-40	CAM_AG99-01	02/27/2023	12:35	N	WG		29.395	m BTOR	No	7.65	226	uS/cm	10.64	deg C	6.7	306	millivolts	147	mg/L
1056484000	WG-022723-CS-41	CAM_EBA04-1	02/27/2023	13:00	N	WG				No	8.41	89	uS/cm	7.35	deg C	19.5	270	millivolts	58	mg/L
1056484000	WG-022723-CS-42	CAM_AG99-02	02/27/2023	14:20	N	WG		27.379	m BTOR	No	8.12	286	uS/cm	10.57	deg C	0.0	268	millivolts	186	mg/L
1056484000	WG-030723-CS-49	CAM_MW06-21	03/07/2023	09:50	N	WG		27.135	m BTOR	No	7.69	185	uS/cm	10.36	deg C	385	260	millivolts	120	mg/L
1056484000	WG-022723-CS-43	CAM_MW02-18	02/27/2023	16:00	N	WG		25.486	m BTOR	No	6.95	522	uS/cm	10.99	deg C	0.0	125	millivolts	334	mg/L
1056484000	WG-022723-CS-44	CAM_MW02-18	02/27/2023	16:05	FD	WGQ	WG-022723-CS-43			No	6.95	522	uS/cm	10.99	deg C	0.0	125	millivolts	334	mg/L
1056484000	WG-022823-CS-45	CAM_EBA11-1	02/28/2023	09:49	N	WG		23.590	m BTOR	No	7.11	1010	uS/cm	8.81	deg C	14.0	264	millivolts	647	mg/L
1056484000	WG-022823-CS-46	CAM_MW08-21	02/28/2023	10:45	N	WG		23.989	m BTOR	No	7.42	492	uS/cm	9.00	deg C	267	282	millivolts	320	mg/L
1056484000	WG-022823-CS-47	CAM_AG99-05	02/28/2023	13:45	N	WG		21.560	m BTOR	No	8.01	164	uS/cm	10.28	deg C	0.0	265	millivolts	107	mg/L
1056484000	WG-022823-CS-48	CAM_MW03-18	02/28/2023	14:10	N	WG		21.516	m BTOR	No	8.10	156	uS/cm	10.65	deg C	0.0	265	millivolts	102	mg/L
1056484000	WG-030723-CS-50	CAM_AG99-04	03/07/2023	11:30	N	WG		24.155	m BTOR	No	8.08	104	uS/cm	11.16	deg C	0.0	256	millivolts	68	mg/L
1056484000	WG-030723-CS-51	CAM_MW07-21	03/07/2023	12:05	N	WG		23.939	m BTOR	No	8.19	136	uS/cm	11.32	deg C	8.4	255	millivolts	80	mg/L
1056484000	WG-030723-CS-52	CAM_AG99-06	03/07/2023	13:55	N	WG		22.958	m BTOR	No	7.56	129	uS/cm	9.26	deg C	222	301	millivolts	84	mg/L
1056484000	WG-030723-CS-53	CAM_EBA11-3	03/07/2023	14:40	N	WG		23.905	m BTOR	No	7.75	126	uS/cm	10.01	deg C	9.1	295	millivolts	82	mg/L
1056484000	WG-030723-CS-54	CAM_EBA11-4	03/07/2023	16:00	N	WG		23.834	m BTOR	No	7.98	121	uS/cm	9.51	deg C	121	286	millivolts	79	mg/L
1056484000	WG-030823-CS-55	CAM_EBA04-6	03/08/2023	10:00	N	WG		25.808	m BTOR	No	7.23	485	uS/cm	10.86	deg C	0.0	295	millivolts	315	mg/L
1056484000	WG-030823-CS-56	CAM_EBA04-6	03/08/2023	10:05	FD	WGQ	WG-030823-CS-55			No	7.23	485	uS/cm	10.86	deg C	0.0	295	millivolts	315	mg/L
1056484000	WG-030823-CS-57	CAM_EBA04-7	03/08/2023	10:45	N	WG		25.718	m BTOR	No	6.84	899	uS/cm	10.70	deg C	0.0	303	millivolts	576	mg/L
1056484000	WG-030823-CS-59	CAM_HBT94-2	03/08/2023	12:55	N	WG		27.991	m BTOR	No	7.20	641	uS/cm	11.86	deg C	5.1	5	millivolts	410	mg/L
1056484000	CAM_HBT94-3~080323	CAM_HBT94-3	03/08/2023	07:00	N	WG				Yes										
1056484000	CAM_HBT94-1~080323	CAM_HBT94-1	03/08/2023	07:00	N	WG				Yes										
1056484000	WG-030823-CS-60	CAM_Field Blank	03/08/2023	17:30	FB	WGQ				No										
1056484000	Trip Blank	CAM_Trip Blank	03/08/2023	17:00	TB	WGQ				No										
1056484000	WS-022823-CS-10	CAM_SW-1	02/28/2023	13:15	N	WS				No	6.37	30	uS/cm	3.50	deg C	8.6	310	millivolts	20	mg/L
1056484000	WS-022823-CS-08	CAM_SW03-17	02/28/2023	12:57	N	WS				No	6.38	40	uS/cm	1.73	deg C	28	286	millivolts	26	mg/L
1056484000	WS-022823-CS-09	CAM_SW03-17	02/28/2023	13:01	FD	WS	WS-022823-CS-08			No	6.38	40	uS/cm	1.73	deg C	28	286	millivolts	26	mg/L
1056484000	WS-022823-CS-11	CAM_SWM Pond	03/08/2023	13:40	N	WS				No	7.40	379	uS/cm	8.19	deg C	46.3	239	millivolts	246	mg/L
1056484000	WS-030823-CS-12	CAM_SW-1	03/08/2023	14:25	N	WS				No	5.77	28	uS/cm	5.01	deg C	0	338	millivolts	18	mg/L
1056484000	WS-030823-CS-13	CAM_SW-1	03/08/2023	14:30	FD	WS	WS-030823-CS-12			No	5.77	28	uS/cm	5.01	deg C	0	338	millivolts	18	mg/L





Q4 2023 Field Sample Key  
Campbell River Waste Management Centre  
Campbell River, BC

Facility ID	Sample Name	Location	Date	Time	Type	Matrix	Parent Sample Name	WaterDepth	DepthUnit	DryYesNo	Field pH (s.u.)	Conductivity	Conductivity Unit	Temperature	Temperature Unit	Turbidity (NTU)	ORP	ORP units	Dissolved Oxygen (DO)	DO Units	TDS	TDS Units
1056484000	WG-111323-CS-01	CAM_MW01-16	11/13/2023	09:30	N	WG		33.846	m BTOR	No	7.33	90	uS/cm	11.38	deg C	3.1	258	millivolts			58	mg/L
1056484000	CAM_AM02-01~131123	CAM_AM02-01	11/13/2023	07:00	N	WG				Yes												
1056484000	WG-111323-CS-02	CAM_AG99-01	11/13/2023	10:25	N	WG		30.119	m BTOR	No	7.72	204	uS/cm	10.67	deg C	3.5	247	millivolts			132	mg/L
1056484000	WG-111323-CS-03	CAM_EBA11-3	11/13/2023	11:10	N	WG		24.028	m BTOR	No	7.88	108	uS/cm	10.16	deg C	3.7	242	millivolts			70	mg/L
1056484000	WG-111323-CS-04	CAM_EBA11-4	11/13/2023	11:40	N	WG		24.205	m BTOR	No	8.05	139	uS/cm	10.04	deg C	25.8	243	millivolts			90	mg/L
1056484000	WG-111323-CS-05	CAM_EBA11-4	11/13/2023	11:45	FD	WGQ	WG-111323-CS-04			No	8.05	139	uS/cm	10.04	deg C	25.8	243	millivolts			90	mg/L
1056484000	WG-111323-CS-06	CAM_AG99-06	11/13/2023	12:20	N	WG		23.647	m BTOR	No	7.93	100	uS/cm	9.74	deg C	26.1	240	millivolts			65	mg/L
1056484000	WG-111323-CS-07	CAM_MW08-21	11/13/2023	14:30	N	WG		23.829	m BTOR	No	7.52	472	uS/cm	9.89	deg C	61.0	252	millivolts			307	mg/L
1056484000	WG-111323-CS-08	CAM_EBA11-1	11/13/2023	15:00	N	WG		23.719	m BTOR	No	7.44	702	uS/cm	9.06	deg C	2.9	248	millivolts			449	mg/L
1056484000	WG-111323-CS-09	CAM_EBA04-6	11/13/2023	15:40	N	WG		25.686	m BTOR	No	7.27	586	uS/cm	10.66	deg C	2.4	237	millivolts			375	mg/L
1056484000	WG-111323-CS-10	CAM_Field Blank	11/13/2023	17:00	FB	WGQ				No												
1056484000	WG-111423-CS-11	CAM_EBA04-7	11/14/2023	09:35	N	WG		25.595	m BTOR	No	6.85	927	uS/cm	10.57	deg C	1.4	262	millivolts			593	mg/L
1056484000	WG-111423-CS-12	CAM_MW04-19	11/14/2023	10:45	N	WG		24.649	m BTOR	No	7.51	114	uS/cm	8.93	deg C	354	202	millivolts			74	mg/L
1056484000	WG-111423-CS-13	CAM_MW06-21	11/14/2023	11:45	N	WG		26.875	m BTOR	No	7.87	181	uS/cm	10.38	deg C	51.8	222	millivolts			118	mg/L
1056484000	WG-111423-CS-14	CAM_AG99-02	11/14/2023	12:40	N	WG		27.130	m BTOR	No	8.34	184	uS/cm	10.91	deg C	1.8	219	millivolts			120	mg/L
1056484000	WG-111423-CS-15	CAM_AG99-02	11/14/2023	12:45	FD	WGQ	WG-111423-CS-14			No	8.34	184	uS/cm	10.91	deg C	1.8	219	millivolts			120	mg/L
1056484000	WG-111523-CS-16	CAM_MW02-18	11/15/2023	09:55	N	WG		25.266	m BTOR	No	6.97	547	uS/cm	11.27	deg C	0.5	93	millivolts			350	mg/L
1056484000	WG-111523-CS-17	CAM_MW07-21	11/15/2023	10:40	N	WG		23.789	m BTOR	No	8.21	165	uS/cm	10.53	deg C	8.7	169	millivolts			107	mg/L
1056484000	WG-111523-CS-18	CAM_AG99-04	11/15/2023	11:25	N	WG		24.009	m BTOR	No	8.31	108	uS/cm	10.25	deg C	0.7	193	millivolts			70	mg/L
1056484000	WG-111523-CS-19	CAM_AG99-05	11/15/2023	14:00	N	WG		24.372	m BTOR	No	8.22	100	uS/cm	10.70	deg C	3.2	240	millivolts			65	mg/L
1056484000	WG-111523-CS-20	CAM_MW03-18	11/15/2023	14:20	N	WG		21.340	m BTOR	No	8.22	221	uS/cm	11.19	deg C	0.3	241	millivolts			144	mg/L
1056484000	WG-111523-CS-21	CAM_MW03-18	11/15/2023	14:25	FD	WGQ	WG-111523-CS-20			No	8.22	221	uS/cm	11.19	deg C	0.3	241	millivolts			144	mg/L
1056484000	WG-111523-CS-22	CAM_WELL#66650	11/15/2023	15:00	N	WG				No	8.81	90	uS/cm	9.57	deg C	2.0	214	millivolts			58	mg/L
1056484000	CAM_HBT94-1~161123	CAM_HBT94-1	11/16/2023	07:00	N	WG				No												
1056484000	CAM_HBT94-3~161123	CAM_HBT94-3	11/16/2023	07:00	N	WG				Yes												
1056484000	WG-111623-CS-23	CAM_HBT94-2	11/16/2023	10:20	N	WG		27.709	m BTOR	No	7.38	468	uS/cm	11.25	deg C	0.0	32	millivolts			304	mg/L
1056484000	WG-111623-CS-24	CAM_EBA04-1	11/16/2023	10:51	N	WG				No	8.57	89	uS/cm	8.16	deg C	0.0	143	millivolts			58	mg/L
1056484000	WS-111523-CS-01	CAM_SW-1	11/15/2023	12:30	N	WS				No	6.55	32	uS/cm	7.82	deg C	1.0	266	millivolts	6.82	mg/L	21	mg/L
1056484000	WS-111523-CS-02	CAM_SW-1	11/15/2023	12:35	FD	WSQ	WS-111523-CS-01			No	6.55	32	uS/cm	7.82	deg C	1.0	266	millivolts	6.82	mg/L	21	mg/L
1056484000	WS-111523-CS-03	CAM_SW03-17	11/15/2023	12:49	N	WS				No	6.64	31	uS/cm	7.47	deg C	1.7	267	millivolts	5.53	mg/L	20	mg/L
1056484000	WS-111523-CS-04	CAM_SWM Pond	11/15/2023	15:15	N	WS				No	7.85	259	uS/cm	8.98	deg C	1.2	235	millivolts	6.49	mg/L	169	mg/L
1056484001	CP-111423-CS-01	CAM_CA Pond	11/14/2023	10:30	N	WS				No	7.89	584	uS/cm	7.82	deg C	68.2	199	millivolts	10.65	mg/L	374	mg/L



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A4471</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CStuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 01-Mar-2023 10:45</p> <p><b>Date Analysis Commenced</b> : 01-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:36</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caitlin Macey	Team Leader - Inorganics	Inorganics, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (22/03/2023): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-022723-CS-39	WG-022723-CS-40	WG-022723-CS-41	WG-022723-CS-42	WG-022723-CS-43
Client sampling date / time					27-Feb-2023 11:30	27-Feb-2023 12:35	27-Feb-2023 13:00	27-Feb-2023 14:20	27-Feb-2023 16:00
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-001	VA23A4471-002	VA23A4471-003	VA23A4471-004	VA23A4471-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	34.4	111	43.2	145	204
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	5.8	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	34.4	111	43.2	151	204
Conductivity	----	E100	2.0	µS/cm	74.3	217	89.7	282	498
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	31.8	102	40.3	141	141
Solids, total dissolved [TDS]	----	E162	10	mg/L	50	139	55	164	248
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	12.6
Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.81	2.13	0.86	1.37	33.6
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0614	0.188	0.0393	0.206	<0.0050
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0614	0.188	0.0393	0.206	<0.0051
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.35	3.05	2.32	2.61	2.59
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0046	0.0020	0.0030	0.0037	<0.0010
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00010	0.00077	0.00046	0.00184	0.00020
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00144	0.00228	0.00041	0.00679	0.0218
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.010	<0.010	<0.010	<0.010	0.209
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0.0000094	<0.0000050	0.0000676
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	10.4	32.9	13.2	43.5	42.0
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	0.00057	<0.00050	0.00069	<0.00050
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00088
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0.00166	<0.00020	0.00841
Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0.024	<0.010	0.022



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-022723-CS-39	WG-022723-CS-40	WG-022723-CS-41	WG-022723-CS-42	WG-022723-CS-43
Client sampling date / time					27-Feb-2023 11:30	27-Feb-2023 12:35	27-Feb-2023 13:00	27-Feb-2023 14:20	27-Feb-2023 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-001	VA23A4471-002	VA23A4471-003	VA23A4471-004	VA23A4471-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0.000183	<0.000050	<0.000050	
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	1.42	4.96	1.79	7.96	8.87	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00012	<0.00010	0.00036	<0.00010	1.44	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000210	0.000125	0.000296	0.000082	0.000768	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00175	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.190	0.815	0.288	1.51	8.54	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000089	0.000112	0.000098	0.000174	<0.000050	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.34	6.11	4.38	6.12	13.2	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.14	1.89	1.20	1.89	22.0	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0165	0.0563	0.0208	0.0557	0.198	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.56	0.63	<0.50	0.64	0.72	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	0.000102	0.000015	0.000332	0.000220	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00191	0.00554	0.00346	0.0176	0.00164	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0.0222	<0.0010	<0.0010	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	----	----	----	<0.50	
Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	----	----	----	<5.0	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	----	----	----	<0.50	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	----	----	----	<0.50	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	----	----	----	<0.50	





## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022723-CS-39	WG-022723-CS-40	WG-022723-CS-41	WG-022723-CS-42	WG-022723-CS-43
(Matrix: Water)					Client sampling date / time	27-Feb-2023 11:30	27-Feb-2023 12:35	27-Feb-2023 13:00	27-Feb-2023 14:20	27-Feb-2023 16:00
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-001	VA23A4471-002	VA23A4471-003	VA23A4471-004	VA23A4471-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	---	---	---	<0.75	
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	---	---	---	<0.20	
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	---	---	---	<1.0	
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	---	---	---	<0.40	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Styrene	100-42-5	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Toluene	108-88-3	E611C	0.40	µg/L	<0.40	---	---	---	<0.40	
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	---	---	---	<0.40	
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	---	---	---	<0.30	
Xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-022723-CS-39	WG-022723-CS-40	WG-022723-CS-41	WG-022723-CS-42	WG-022723-CS-43
Client sampling date / time					27-Feb-2023 11:30	27-Feb-2023 12:35	27-Feb-2023 13:00	27-Feb-2023 14:20	27-Feb-2023 16:00	
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-001	VA23A4471-002	VA23A4471-003	VA23A4471-004	VA23A4471-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	---	---	---	<0.50	
<b>Hydrocarbons</b>										
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	<100	---	---	---	<100	
VPHw	---	EC580A	100	µg/L	<100	---	---	---	<100	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	116	---	---	---	108	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	89.6	---	---	---	86.0	
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	98.7	---	---	---	98.5	

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



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022723-CS-44	----	----	----	----
(Matrix: Water)					Client sampling date / time	27-Feb-2023 16:05	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	203	---	---	---	---	
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	203	---	---	---	---	
Conductivity	----	E100	2.0	µS/cm	496	---	---	---	---	
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	139	---	---	---	---	
Solids, total dissolved [TDS]	----	E162	10	mg/L	248	---	---	---	---	
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	12.2	---	---	---	---	
Chloride	16887-00-6	E235.Cl	0.50	mg/L	33.3	---	---	---	---	
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	---	---	---	---	
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	---	---	---	---	
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	<0.0051	---	---	---	---	
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	---	---	---	---	
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.64	---	---	---	---	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	---	---	---	---	
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00018	---	---	---	---	
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0212	---	---	---	---	
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	---	---	---	---	
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.207	---	---	---	---	
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000613	---	---	---	---	
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	41.8	---	---	---	---	
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	---	---	---	---	
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00086	---	---	---	---	
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00825	---	---	---	---	
Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.022	---	---	---	---	
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022723-CS-44	----	----	----	----
(Matrix: Water)					Client sampling date / time	27-Feb-2023 16:05	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	8.49	---	---	---	---	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.43	---	---	---	---	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000754	---	---	---	---	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00169	---	---	---	---	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	---	---	---	---	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	8.40	---	---	---	---	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	---	---	---	---	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	13.1	---	---	---	---	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	21.9	---	---	---	---	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.190	---	---	---	---	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.74	---	---	---	---	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000221	---	---	---	---	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00158	---	---	---	---	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0027	---	---	---	---	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
Dissolved mercury filtration location	----	EP509	-	-	Field	---	---	---	---	
Dissolved metals filtration location	----	EP421	-	-	Field	---	---	---	---	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	---	---	---	---	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022723-CS-44	----	----	----	----
(Matrix: Water)					Client sampling date / time	27-Feb-2023 16:05	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Volatile Organic Compounds</b>										
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	---	---	---	---	
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	---	---	---	---	
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	---	---	---	---	
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	---	---	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Styrene	100-42-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Toluene	108-88-3	E611C	0.40	µg/L	<0.40	---	---	---	---	
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	---	---	---	---	
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	---	---	---	---	
Xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [THMs]</b>										



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022723-CS-44	----	----	----	----
(Matrix: Water)					Client sampling date / time	27-Feb-2023 16:05	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4471-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	---	---	---	---	
VPHw	----	EC580A	100	µg/L	<100	---	---	---	---	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	129	---	---	---	---	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	81.4	---	---	---	---	
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	98.6	---	---	---	---	

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23A4471</b>	<b>Page</b>	: 1 of 14
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 01-Mar-2023 10:45
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 01-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:36
<b>Sampler</b>	: CStuart      250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 6		
<b>No. of samples analysed</b>	: 6		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Caitlin Macey	Team Leader - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Dan Gebert	Laboratory Analyst	Vancouver Metals, Burnaby, British Columbia
Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia
Rebecca Sit	Supervisor - Organics Extractions	Vancouver Organics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA23A4471 Amendment 1  
Client : Comox Valley Regional District  
Project : 3



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 849773)</b>											
VA23A4421-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	4040	4040	0.00%	10%	----
<b>Physical Tests (QC Lot: 849776)</b>											
VA23A4424-004	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	231	231	0.130%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	231	231	0.130%	20%	----
<b>Physical Tests (QC Lot: 850225)</b>											
FJ2300458-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	234	227	3.25%	20%	----
<b>Anions and Nutrients (QC Lot: 849767)</b>											
VA23A4421-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 849768)</b>											
VA23A4421-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	0.199	0.201	0.0014	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 849769)</b>											
VA23A4424-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	15.0	mg/L	304	299	1.44%	20%	----
<b>Anions and Nutrients (QC Lot: 849770)</b>											
VA23A4424-002	Anonymous	Fluoride	16984-48-8	E235.F	1.00	mg/L	<1.00	<1.00	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 849771)</b>											
VA23A4424-002	Anonymous	Chloride	16887-00-6	E235.Cl	25.0	mg/L	3420	3360	1.60%	20%	----
<b>Anions and Nutrients (QC Lot: 852652)</b>											
VA23A4471-001	WG-022723-CS-39	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 850164)</b>											
VA23A4432-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0020	mg/L	0.353	0.335	5.21%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00020	mg/L	0.00527	0.00516	2.11%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000040	mg/L	<0.000040	<0.000040	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.020	mg/L	0.124	0.117	0.006	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000100	mg/L	0.000828	0.000817	1.31%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.100	mg/L	414	402	2.84%	20%	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 850164) - continued</b>											
VA23A4432-001	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00020	mg/L	0.00042	0.00044	0.00002	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00040	mg/L	0.00334	0.00340	0.00006	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0020	mg/L	0.0455	0.0430	5.80%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	39.6	37.7	4.97%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.196	0.191	2.65%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000100	mg/L	0.000128	0.000110	0.000018	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.965	0.919	0.047	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000100	mg/L	0.000180	0.000169	0.000010	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.100	mg/L	1.47	1.35	8.50%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	8.67	8.40	3.15%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00040	mg/L	1.91	1.95	1.75%	20%	----
		Sulfur, dissolved	7704-34-9	E421	1.00	mg/L	452	422	6.84%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000020	mg/L	0.000058	0.000059	0.0000007	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000020	mg/L	0.000034	0.000035	0.000001	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0020	mg/L	0.0220	0.0211	4.24%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 850498)**

FJ2300425-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
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**Volatile Organic Compounds (QC Lot: 853016)**

VA23A4471-001	WG-022723-CS-39	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 853016) - continued</b>											
VA23A4471-001	WG-022723-CS-39	Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 853015)</b>											
VA23A4471-001	WG-022723-CS-39	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 849773)</b>						
Conductivity	---	E100	1	µS/cm	1.3	---
<b>Physical Tests (QCLot: 849776)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 850225)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 849767)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 849768)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 849769)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 849770)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 849771)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 852652)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 850164)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 850164) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 850498)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 853016)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 853016) - continued</b>						
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 853015)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 849773)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
<b>Physical Tests (QCLot: 849776)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
<b>Physical Tests (QCLot: 850225)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	91.6	85.0	115	----
<b>Anions and Nutrients (QCLot: 849767)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 849768)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 849769)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 849770)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	92.1	90.0	110	----
<b>Anions and Nutrients (QCLot: 849771)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 852652)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.2	85.0	115	----
<b>Dissolved Metals (QCLot: 850164)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.2	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.3	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	89.1	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.8	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.0	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.4	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 850164) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	98.6	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.0	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.3	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.3	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.4	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	112	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.1	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	93.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	88.2	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.6	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	95.8	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	89.4	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	93.6	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 853016)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	98.8	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	99.3	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	101	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	96.5	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	106	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	99.1	70.0	130	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 853016) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	98.6	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	94.5	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	95.2	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	95.6	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	99.2	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	99.1	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	103	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	99.5	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	94.1	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	104	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	109	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	104	70.0	130	----
<b>Hydrocarbons (QCLot: 853015)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	84.1	70.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 849767)</b>										
VA23A4421-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.59 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 849768)</b>										
VA23A4421-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.9 mg/L	12.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 849769)</b>										
VA23A4424-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	5280 mg/L	5000 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 849770)</b>										
VA23A4424-003	Anonymous	Fluoride	16984-48-8	E235.F	49.7 mg/L	50 mg/L	99.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 849771)</b>										
VA23A4424-003	Anonymous	Chloride	16887-00-6	E235.Cl	5220 mg/L	5000 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 852652)</b>										
VA23A4471-002	WG-022723-CS-40	Ammonia, total (as N)	7664-41-7	E298	0.0997 mg/L	0.1 mg/L	99.7	75.0	125	----
<b>Dissolved Metals (QCLot: 850164)</b>										
VA23A4432-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.355 mg/L	0.4 mg/L	88.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0695 mg/L	0.08 mg/L	86.8	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0168 mg/L	0.02 mg/L	84.1	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.167 mg/L	0.2 mg/L	83.6	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00739 mg/L	0.008 mg/L	92.4	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	8 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0741 mg/L	0.08 mg/L	92.6	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0365 mg/L	0.04 mg/L	91.2	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0359 mg/L	0.04 mg/L	89.7	70.0	130	----
		Iron, dissolved	7439-89-6	E421	3.72 mg/L	4 mg/L	93.1	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0366 mg/L	0.04 mg/L	91.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.172 mg/L	0.2 mg/L	85.8	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0392 mg/L	0.04 mg/L	98.1	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 850164) - continued</b>										
VA23A4432-002	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0754 mg/L	0.08 mg/L	94.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	20.0 mg/L	20 mg/L	100	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	7.69 mg/L	8 mg/L	96.2	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0830 mg/L	0.08 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	17.5 mg/L	20 mg/L	87.3	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00718 mg/L	0.008 mg/L	89.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	40 mg/L	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00727 mg/L	0.008 mg/L	90.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0761 mg/L	0.08 mg/L	95.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00761 mg/L	0.008 mg/L	95.1	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.194 mg/L	0.2 mg/L	97.2	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.743 mg/L	0.8 mg/L	92.9	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0765 mg/L	0.08 mg/L	95.6	70.0	130	----
<b>Dissolved Metals (QCLot: 850498)</b>										
FJ2300425-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000958 mg/L	0.0001 mg/L	95.8	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 853016)</b>										
VA23A4471-005	WG-022723-CS-43	Benzene	71-43-2	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	98.8 µg/L	100 µg/L	98.8	60.0	140	----
		Bromoform	75-25-2	E611C	98.3 µg/L	100 µg/L	98.3	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Chlorobenzene	108-90-7	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Chloroethane	75-00-3	E611C	98.9 µg/L	100 µg/L	98.9	50.0	150	----
		Chloroform	67-66-3	E611C	96.9 µg/L	100 µg/L	96.9	60.0	140	----
		Chloromethane	74-87-3	E611C	97.3 µg/L	100 µg/L	97.3	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	98.5 µg/L	100 µg/L	98.5	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	98.7 µg/L	100 µg/L	98.7	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	91.2 µg/L	100 µg/L	91.2	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	97.7 µg/L	100 µg/L	97.7	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 853016) - continued</b>										
VA23A4471-005	WG-022723-CS-43	Dichloroethylene, trans-1,2-	156-60-5	E611C	97.9 µg/L	100 µg/L	97.9	60.0	140	----
		Dichloromethane	75-09-2	E611C	96.5 µg/L	100 µg/L	96.5	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	98.2 µg/L	100 µg/L	98.2	60.0	140	----
		Ethylbenzene	100-41-4	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Styrene	100-42-5	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	99.5 µg/L	100 µg/L	99.5	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Toluene	108-88-3	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	99.0 µg/L	100 µg/L	99.0	60.0	140	----
		Trichloroethylene	79-01-6	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	99.8 µg/L	100 µg/L	99.8	50.0	150	----
		Vinyl chloride	75-01-4	E611C	100 µg/L	100 µg/L	100	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	223 µg/L	200 µg/L	111	60.0	140	----
		Xylene, o-	95-47-6	E611C	107 µg/L	100 µg/L	107	60.0	140	----
<b>Hydrocarbons (QCLot: 853015)</b>										
VA23A4471-006	WG-022723-CS-44	VHw (C6-C10)	----	E581.VH+F1	5770 µg/L	6310 µg/L	91.5	60.0	140	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23A4471</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CStuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 17</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 01-Mar-2023 10:45</p> <p><b>Issue Date</b> : 22-Mar-2023 14:36</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-39	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-40	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-41	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-42	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-43	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-022723-CS-44	E298	27-Feb-2023	04-Mar-2023	----	----		04-Mar-2023	28 days	5 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-022723-CS-39	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022723-CS-40	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022723-CS-41	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022723-CS-42	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022723-CS-43	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022723-CS-44	E235.Cl	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022723-CS-39	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022723-CS-40	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022723-CS-41	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022723-CS-42	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-022723-CS-43	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-022723-CS-44	E235.F	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-39	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-40	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-41	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-42	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-43	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-44	E235.NO3-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>										
HDPE WG-022723-CS-39	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022723-CS-40	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022723-CS-41	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022723-CS-42	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022723-CS-43	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022723-CS-44	E235.NO2-L	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022723-CS-39	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022723-CS-40	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022723-CS-41	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022723-CS-42	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-022723-CS-43	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-022723-CS-44	E235.SO4	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-39	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-40	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-41	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-42	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-43	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022723-CS-44	E509	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-022723-CS-39	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-022723-CS-40	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-022723-CS-41	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-022723-CS-42	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-022723-CS-43	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-022723-CS-44	E421	27-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	180 days	3 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-022723-CS-39	E581.VH+F1	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-022723-CS-43	E581.VH+F1	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-022723-CS-44	E581.VH+F1	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-39	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-40	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-41	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-42	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-43	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022723-CS-44	E290	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022723-CS-39	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022723-CS-40	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022723-CS-41	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022723-CS-42	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-022723-CS-43	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-022723-CS-44	E100	27-Feb-2023	01-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-39	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-40	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-41	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-42	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-43	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-022723-CS-44	E162	27-Feb-2023	----	----	----		03-Mar-2023	7 days	4 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-39	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-43	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-44	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-39	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-43	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-44	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-39	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-43	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-44	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-022723-CS-39	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022723-CS-43	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022723-CS-44	E611C	27-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	14 days	6 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	849776	1	10	10.0	5.0	✔
Ammonia by Fluorescence	E298	852652	1	8	12.5	5.0	✔
Chloride in Water by IC	E235.Cl	849771	1	16	6.2	5.0	✔
Conductivity in Water	E100	849773	1	9	11.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	850498	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	850164	1	14	7.1	5.0	✔
Fluoride in Water by IC	E235.F	849770	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	849768	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	849767	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	849769	1	10	10.0	5.0	✔
TDS by Gravimetry	E162	850225	1	19	5.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	853015	1	7	14.2	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	853016	1	8	12.5	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	849776	1	10	10.0	5.0	✔
Ammonia by Fluorescence	E298	852652	1	8	12.5	5.0	✔
Chloride in Water by IC	E235.Cl	849771	1	16	6.2	5.0	✔
Conductivity in Water	E100	849773	1	9	11.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	850498	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	850164	1	14	7.1	5.0	✔
Fluoride in Water by IC	E235.F	849770	1	10	10.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	849768	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	849767	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	849769	1	10	10.0	5.0	✔
TDS by Gravimetry	E162	850225	1	19	5.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	853015	1	7	14.2	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	853016	1	8	12.5	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	849776	1	10	10.0	5.0	✔
Ammonia by Fluorescence	E298	852652	1	8	12.5	5.0	✔
Chloride in Water by IC	E235.Cl	849771	1	16	6.2	5.0	✔
Conductivity in Water	E100	849773	1	9	11.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	850498	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	850164	1	14	7.1	5.0	✔
Fluoride in Water by IC	E235.F	849770	1	10	10.0	5.0	✔



Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	849768	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	849767	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	849769	1	10	10.0	5.0	✓
TDS by Gravimetry	E162	850225	1	19	5.2	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	853015	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	853016	1	8	12.5	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	852652	1	8	12.5	5.0	✓
Chloride in Water by IC	E235.Cl	849771	1	16	6.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	850498	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	850164	1	14	7.1	5.0	✓
Fluoride in Water by IC	E235.F	849770	1	10	10.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	849768	1	13	7.6	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	849767	1	13	7.6	5.0	✓
Sulfate in Water by IC	E235.SO4	849769	1	10	10.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	853015	1	7	14.2	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	853016	1	8	12.5	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (BC List) by Headspace GC-MS	E611C  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

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Work Order : VA23A4471 Amendment 1  
Client : Comox Valley Regional District  
Project : 3



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

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<b>Report To</b> Contact and company name below will appear on the final report Company: Comox Valley Regional District Contact: Crystal Stuart Phone: 250-898-3722 Company address below will appear on the final report Street: 770 Hamston Avenue City/Province: Courtenay, BC Postal Code: V9N 0G8		<b>Report Format / Distribution</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: cstuart@comoxvalleyrd.ca Email 2: Email 3:		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b> Regular (R) <input checked="" type="checkbox"/> Standard TAT # received by 3 pm - business days - no surcharges apply 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> 1 Business day [E1 - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] <input type="checkbox"/> Date and Time Required for all E&P TATs: 30-mmm-yy hh:mm For tests that can not be performed according to the service level selected, you will be contacted.															
<b>Invoice To</b> Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Contact:		<b>Invoice Distribution</b> Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: Email 2:		<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below <table border="1"> <tr> <td>Alkalinity (specialized)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3) N+N</td> <td>Conductivity</td> <td>TDS</td> <td>Disolved CSR Metals (including Hg, Hardne)</td> <td>VOC/SMPH</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Disolved CSR Metals (including Hg, Hardne)	VOC/SMPH							
Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Disolved CSR Metals (including Hg, Hardne)	VOC/SMPH													
<b>Project Information</b> ALS Account # / Quote #: VA23-COVR100-001 Job #: 3 PO / AFE: 23-015 LSD: CRWMC - Quarterly - GW ALS Lab Work Order # (lab use only):		<b>Oil and Gas Required Fields (client use)</b> AFE/Cost Center: PO# Major/Minor Code: Routing Code: Requisitioner: Location:		Environmental Division Vancouver Work Order Reference <b>VA23A4471</b>  Telephone: +1 804 253 4188															
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mmm-yy)</b>	<b>Time (h:mm)</b>	<b>Sample Type</b>	<table border="1"> <tr> <td>Alkalinity (specialized)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3) N+N</td> <td>Conductivity</td> <td>TDS</td> <td>Disolved CSR Metals (including Hg, Hardne)</td> <td>VOC/SMPH</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Disolved CSR Metals (including Hg, Hardne)	VOC/SMPH							
Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Disolved CSR Metals (including Hg, Hardne)	VOC/SMPH													
	WG-022723-CS-39	27-Feb-23	1130	Water	X	X	X	X	X	X									
	WG-022723-CS-40		1235																
			1300																
			1420																
			1600							X									
	WG-022723 CS 44	27-Feb-23	1605	Water	↓	↓	↓	↓	↓	X									

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A4568</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 4</p> <p><b>No. of samples analysed</b> : 4</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 02-Mar-2023 10:10</p> <p><b>Date Analysis Commenced</b> : 02-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:35</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (22/03/2023): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-022823-CS-45	WG-022823-CS-46	WG-022823-CS-47	WG-022823-CS-48	----
Client sampling date / time					28-Feb-2023 09:49	28-Feb-2023 10:45	28-Feb-2023 13:45	28-Feb-2023 14:10	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4568-001	VA23A4568-002	VA23A4568-003	VA23A4568-004	-----
					Result	Result	Result	Result	----
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	208	229	77.7	78.6	----
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	208	229	77.7	78.6	----
Conductivity	----	E100	2.0	µS/cm	991	482	160	156	----
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	380	226	73.5	72.8	----
Solids, total dissolved [TDS]	----	E162	10	mg/L	634	295	93	91	----
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
Chloride	16887-00-6	E235.Cl	0.50	mg/L	133	19.0	3.12	1.26	----
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.100 <sup>DLDS</sup>	<0.020	<0.020	<0.020	----
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	14.2	0.986	0.0924	0.161	----
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	14.4	0.986	0.0924	0.161	----
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.217	<0.0010	<0.0010	<0.0010	----
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	47.2	6.31	2.13	2.12	----
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0015	0.0043	0.0033	0.0047	----
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00014	<0.00010	0.00027	0.00052	----
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0138	0.00870	0.00115	0.00182	----
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.148	0.017	<0.010	0.035	----
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000405	<0.0000050	<0.0000050	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	111	70.1	24.8	25.6	----
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	0.00166	<0.00050	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00074	<0.00010	<0.00010	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00509	0.00020	0.00044	0.00028	----
Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022823-CS-45	WG-022823-CS-46	WG-022823-CS-47	WG-022823-CS-48	----
(Matrix: Water)										
Client sampling date / time					28-Feb-2023 09:49	28-Feb-2023 10:45	28-Feb-2023 13:45	28-Feb-2023 14:10	----	
Analyte	CAS Number	Method	LOR	Unit	VA23A4568-001	VA23A4568-002	VA23A4568-003	VA23A4568-004	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	24.9	12.5	2.82	2.16	----	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.565	0.00016	<0.00010	<0.00010	----	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000096	<0.000050	0.000089	0.000106	----	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00134	<0.00050	<0.00050	<0.00050	----	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.52	1.30	0.459	0.508	----	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000156	0.000155	0.000090	0.000127	----	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	8.84	8.09	4.21	4.26	----	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	42.1	8.06	2.09	2.31	----	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.297	0.172	0.0422	0.0417	----	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	17.6	2.70	0.96	1.03	----	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000881	0.000343	0.000062	0.000056	----	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00332	0.00181	0.00214	0.00253	----	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	----	
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	----	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	----	----	----	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022823-CS-45	WG-022823-CS-46	WG-022823-CS-47	WG-022823-CS-48	----
(Matrix: Water)										
Client sampling date / time					28-Feb-2023 09:49	28-Feb-2023 10:45	28-Feb-2023 13:45	28-Feb-2023 14:10	----	
Analyte	CAS Number	Method	LOR	Unit	VA23A4568-001	VA23A4568-002	VA23A4568-003	VA23A4568-004	-----	
					Result	Result	Result	Result	----	
<b>Volatile Organic Compounds</b>										
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	<0.75	----	----	----	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	----	----	----	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	----	----	----	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	----	----	----	----
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----
Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	----	----	----	----
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	----	----	----	----
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	----	----	----	----
Xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-022823-CS-45	WG-022823-CS-46	WG-022823-CS-47	WG-022823-CS-48	----
(Matrix: Water)					Client sampling date / time	28-Feb-2023 09:49	28-Feb-2023 10:45	28-Feb-2023 13:45	28-Feb-2023 14:10	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4568-001	VA23A4568-002	VA23A4568-003	VA23A4568-004	-----	
					Result	Result	Result	Result	---	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	----	----	----	
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	----	----	----	
VPHw	----	EC580A	100	µg/L	<100	<100	----	----	----	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	94.7	98.1	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	85.0	88.8	----	----	----	
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	101	99.9	----	----	----	

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23A4568</b>	<b>Page</b>	: 1 of 16
<b>Amendment</b>	<b>: 1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 02-Mar-2023 10:10
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 02-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:35
<b>Sampler</b>	: C Stuart      250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

- Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO = Data Quality Objective.
- LOR = Limit of Reporting (detection limit).
- RPD = Relative Percent Difference
- # = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 851303)</b>											
VA23A4515-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	195	197	0.919%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	195	197	0.919%	20%	----
<b>Physical Tests (QC Lot: 851304)</b>											
VA23A4515-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	393	395	0.508%	10%	----
<b>Physical Tests (QC Lot: 851329)</b>											
VA23A4467-002	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	810	822	1.59%	20%	----
<b>Physical Tests (QC Lot: 853269)</b>											
VA23A3735-001	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	103	94	9	Diff <2x LOR	----
<b>Physical Tests (QC Lot: 853957)</b>											
VA23A4568-004	WG-022823-CS-48	Solids, total dissolved [TDS]	----	E162	13	mg/L	91	97	6	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 851296)</b>											
VA23A4515-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.194	0.193	0.001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 851297)</b>											
VA23A4515-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.25	5.26	0.202%	20%	----
<b>Anions and Nutrients (QC Lot: 851298)</b>											
VA23A4515-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.70	1.70	0.0681%	20%	----
<b>Anions and Nutrients (QC Lot: 851299)</b>											
VA23A4515-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0012	0.0013	0.0001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 851300)</b>											
VA23A4515-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	6.91	6.92	0.156%	20%	----
<b>Anions and Nutrients (QC Lot: 853170)</b>											
VA23A4566-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.313	0.325	3.95%	20%	----
<b>Dissolved Metals (QC Lot: 851089)</b>											
FJ2300461-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 851238)</b>											
FJ2300438-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0034	0.0035	0.00010	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00010	0.00011	0.000003	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 851238) - continued</b>											
FJ2300438-001	Anonymous	Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0603	0.0620	2.72%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.017	0.017	0.0001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	172	171	0.703%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00026	0.00006	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.013	0.013	0.0006	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0376	0.0368	2.16%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	98.9	99.9	0.979%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00976	0.0100	2.66%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000142	0.000143	0.000010	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00135	0.00137	0.00002	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.87	2.92	1.80%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00137	0.00146	6.05%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.56	1.54	1.25%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	15.1	15.5	2.40%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.316	0.313	0.826%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	247	247	0.0160%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00597	0.00605	1.34%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 853619)</b>											
VA23A4568-001	WG-022823-CS-45	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 853619) - continued</b>											
VA23A4568-001	WG-022823-CS-45	Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 853618)</b>											



Sub-Matrix: **Water**

*Laboratory Duplicate (DUP) Report*

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD(%) or Difference</i>	<i>Duplicate Limits</i>	<i>Qualifier</i>
<b>Hydrocarbons (QC Lot: 853618) - continued</b>											
VA23A4568-001	WG-022823-CS-45	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 851303)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 851304)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 851329)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 853269)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 853957)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 851296)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 851297)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 851298)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 851299)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 851300)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 853170)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 851089)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	---
<b>Dissolved Metals (QCLot: 851238)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 851238) - continued</b>						
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Volatile Organic Compounds (QCLot: 853619)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 853619) - continued</b>						
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 853618)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 851303)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
<b>Physical Tests (QCLot: 851304)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
<b>Physical Tests (QCLot: 851329)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
<b>Physical Tests (QCLot: 853269)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	107	85.0	115	----
<b>Physical Tests (QCLot: 853957)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	93.2	85.0	115	----
<b>Anions and Nutrients (QCLot: 851296)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 851297)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 851298)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 851299)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 851300)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 853170)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	103	85.0	115	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	98.3	80.0	120	----
<b>Dissolved Metals (QCLot: 851238)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.5	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.0	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	93.3	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.0	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.8	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 851238) - continued</b>									
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.1	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.9	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.1	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.4	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	91.3	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	107	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.6	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	100	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	93.5	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	108	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.5	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.0	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.3	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	90.3	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	90.5	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 853619)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	99.9	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	104	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 853619) - continued</b>									
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	98.3	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	96.2	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	107	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	99.2	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	99.4	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	108	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	98.2	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	117	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	99.6	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	114	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	108	70.0	130	----
<b>Hydrocarbons (QCLot: 853618)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	88.9	70.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 851296)</b>										
VA23A4633-001	Anonymous	Fluoride	16984-48-8	E235.F	5.09 mg/L	5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 851297)</b>										
VA23A4633-001	Anonymous	Chloride	16887-00-6	E235.Cl	502 mg/L	500 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 851298)</b>										
VA23A4633-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.6 mg/L	12.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 851299)</b>										
VA23A4633-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.50 mg/L	2.5 mg/L	99.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 851300)</b>										
VA23A4633-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	498 mg/L	500 mg/L	99.5	75.0	125	----
<b>Anions and Nutrients (QCLot: 853170)</b>										
VA23A4566-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	MS-B
<b>Dissolved Metals (QCLot: 851089)</b>										
FJ2300461-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000975 mg/L	0.0001 mg/L	97.5	70.0	130	----
<b>Dissolved Metals (QCLot: 851238)</b>										
FJ2300438-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.373 mg/L	0.4 mg/L	93.3	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0393 mg/L	0.04 mg/L	98.2	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0718 mg/L	0.08 mg/L	89.7	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0173 mg/L	0.02 mg/L	86.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.191 mg/L	0.2 mg/L	95.7	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00765 mg/L	0.008 mg/L	95.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0743 mg/L	0.08 mg/L	92.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0356 mg/L	0.04 mg/L	89.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	3.81 mg/L	4 mg/L	95.3	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.174 mg/L	0.2 mg/L	86.9	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 851238) - continued</b>										
FJ2300438-002	Anonymous	Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0405 mg/L	0.04 mg/L	101	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0694 mg/L	0.08 mg/L	86.8	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	18.8 mg/L	20 mg/L	94.1	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	7.11 mg/L	8 mg/L	88.9	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	18.9 mg/L	20 mg/L	94.3	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00741 mg/L	0.008 mg/L	92.6	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00742 mg/L	0.008 mg/L	92.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0372 mg/L	0.04 mg/L	93.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0735 mg/L	0.08 mg/L	91.9	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.194 mg/L	0.2 mg/L	96.8	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.675 mg/L	0.8 mg/L	84.4	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0798 mg/L	0.08 mg/L	99.8	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 853619)</b>										
VA23A4598-001	Anonymous	Benzene	71-43-2	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	99.3 µg/L	100 µg/L	99.3	60.0	140	----
		Bromoform	75-25-2	E611C	93.3 µg/L	100 µg/L	93.3	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		Chlorobenzene	108-90-7	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Chloroethane	75-00-3	E611C	111 µg/L	100 µg/L	111	50.0	150	----
		Chloroform	67-66-3	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Chloromethane	74-87-3	E611C	108 µg/L	100 µg/L	108	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	93.2 µg/L	100 µg/L	93.2	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	120 µg/L	100 µg/L	120	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 853619) - continued</b>										
VA23A4598-001	Anonymous	Dichloroethylene, cis-1,2-	156-59-2	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		Dichloromethane	75-09-2	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	99.1 µg/L	100 µg/L	99.1	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	98.8 µg/L	100 µg/L	98.8	60.0	140	----
		Ethylbenzene	100-41-4	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Styrene	100-42-5	E611C	96.1 µg/L	100 µg/L	96.1	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		Toluene	108-88-3	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----
		Trichloroethylene	79-01-6	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	127 µg/L	100 µg/L	127	50.0	150	----
		Vinyl chloride	75-01-4	E611C	111 µg/L	100 µg/L	111	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	241 µg/L	200 µg/L	120	60.0	140	----
		Xylene, o-	95-47-6	E611C	110 µg/L	100 µg/L	110	60.0	140	----
<b>Hydrocarbons (QCLot: 853618)</b>										
VA23A4568-002	WG-022823-CS-46	VHw (C6-C10)	----	E581.VH+F1	5020 µg/L	6310 µg/L	79.5	60.0	140	----

**Qualifiers**

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

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23A4568</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 4</p> <p><b>No. of samples analysed</b> : 4</p>	<p><b>Page</b> : 1 of 14</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 02-Mar-2023 10:10</p> <p><b>Issue Date</b> : 22-Mar-2023 14:35</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-022823-CS-45	E298	28-Feb-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-022823-CS-46	E298	28-Feb-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-022823-CS-47	E298	28-Feb-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-022823-CS-48	E298	28-Feb-2023	07-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-022823-CS-47	E235.Cl	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-022823-CS-48	E235.Cl	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-022823-CS-45	E235.Cl	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-022823-CS-46	E235.Cl	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022823-CS-47	E235.F	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022823-CS-48	E235.F	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022823-CS-45	E235.F	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-022823-CS-46	E235.F	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-47	E235.NO3-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-48	E235.NO3-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-45	E235.NO3-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-46	E235.NO3-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	3 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-47	E235.NO2-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-48	E235.NO2-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-45	E235.NO2-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-022823-CS-46	E235.NO2-L	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022823-CS-47	E235.SO4	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022823-CS-48	E235.SO4	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022823-CS-45	E235.SO4	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-022823-CS-46	E235.SO4	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-022823-CS-45	E509	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022823-CS-46	E509	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022823-CS-47	E509	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-022823-CS-48	E509	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-022823-CS-45	E421	28-Feb-2023	03-Mar-2023	----	----		04-Mar-2023	180 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-022823-CS-46	E421	28-Feb-2023	03-Mar-2023	----	----		04-Mar-2023	180 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-022823-CS-47	E421	28-Feb-2023	03-Mar-2023	----	----		04-Mar-2023	180 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-022823-CS-48	E421	28-Feb-2023	03-Mar-2023	----	----		04-Mar-2023	180 days	4 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-45	E581.VH+F1	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-46	E581.VH+F1	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022823-CS-45	E290	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022823-CS-46	E290	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022823-CS-47	E290	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-022823-CS-48	E290	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022823-CS-45	E100	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022823-CS-46	E100	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022823-CS-47	E100	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-022823-CS-48	E100	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	3 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-022823-CS-45	E162	28-Feb-2023	----	----	----		04-Mar-2023	7 days	4 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WG-022823-CS-46	E162	28-Feb-2023	----	----	----		04-Mar-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WG-022823-CS-47	E162	28-Feb-2023	----	----	----		07-Mar-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WG-022823-CS-48	E162	28-Feb-2023	----	----	----		07-Mar-2023	7 days	7 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-45	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-46	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-45	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-46	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-45	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-46	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-45	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-022823-CS-46	E611C	28-Feb-2023	06-Mar-2023	----	----		06-Mar-2023	14 days	6 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	851303	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	853170	1	13	7.6	5.0	✔
Chloride in Water by IC	E235.Cl	851297	1	20	5.0	5.0	✔
Conductivity in Water	E100	851304	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851089	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851238	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	851296	1	11	9.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851298	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851299	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	851300	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	851329	3	53	5.6	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	853618	1	5	20.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	853619	1	4	25.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	851303	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	853170	1	13	7.6	5.0	✔
Chloride in Water by IC	E235.Cl	851297	1	20	5.0	5.0	✔
Conductivity in Water	E100	851304	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851089	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851238	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	851296	1	11	9.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851298	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851299	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	851300	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	851329	3	53	5.6	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	853618	1	5	20.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	853619	1	4	25.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	851303	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	853170	1	13	7.6	5.0	✔
Chloride in Water by IC	E235.Cl	851297	1	20	5.0	5.0	✔
Conductivity in Water	E100	851304	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851089	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851238	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	851296	1	11	9.0	5.0	✔



Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	851298	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	851299	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	851300	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	851329	3	53	5.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	853618	1	5	20.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	853619	1	4	25.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	853170	1	13	7.6	5.0	✓
Chloride in Water by IC	E235.Cl	851297	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	851089	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	851238	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	851296	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	851298	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	851299	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	851300	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	853618	1	5	20.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	853619	1	4	25.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)





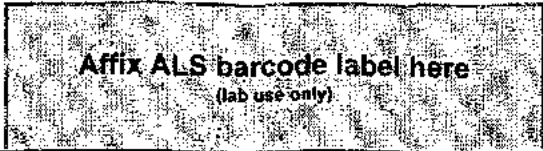
Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (BC List) by Headspace GC-MS	E611C  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

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Work Order : VA23A4568 Amendment 1  
Client : Comox Valley Regional District  
Project : 3



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)													
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply			<input type="checkbox"/> 4 day [P4-20%]				<input type="checkbox"/> 1 Business day [E1 - 100%]						
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			<input type="checkbox"/> 3 day [P3-25%]				<input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]						
Phone: 250-888-3722		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: dd-mm-yy hh:mm													
Company address below will appear on the final report		Email 1 or Fax: cstuart@comoxvalleyrd.ca			For tests that cannot be performed according to the service level selected, you will be contacted.													
Street: 770 Harmston Avenue		Email 2:			Analysis Request													
City/Province: Courtenay, BC		Email 3:			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below													
Postal Code: V9N 0G8		Invoice Distribution			Alkalinity (specialist)	Ammonia-N	Anions (Cl, F, SO <sub>4</sub> , NO <sub>3</sub> , N-H)	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne)	VOCa/MPH							
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax:																
Company:		Email 2:																
Contact:		Email 3:																
Project Information		Oil and Gas Required Fields (client use)																
ALS Account # / Quote #: VA23-COVR100-001		AFE/Cost Center:			PO#:													
Job #: 3		Major/Minor Code:			Routing Code:													
PO / AFE: 23-015		Requisitioner:																
LSD: CRWMC - Quarterly - GW		Location:																
ALS Lab Work Order # (lab use only): AL568		ALS Contact: Selam W.		Sampler: C. Stuart														
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type														
	WG-022823-CS-45	28-Feb-23	0949	Water	X	X	X	X	X	X	X							
	↓ ↓ ↓ 46		1045															
	↓ ↓ ↓ 47		1345															
	WG-022823-CS-48	28-Feb-23	1410	Water	X	X	X	X	X	X								

Environmental Division  
Vancouver  
Work Order Reference  
**VA23A4568**



Telephone: +1 604 253 4188

Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)				SAMPLE CONDITION AS RECEIVED (lab use only)			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO						Frozen <input type="checkbox"/>		SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>	
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO						Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/>		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>	
						Cooling Initiated <input checked="" type="checkbox"/>			
						INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)			
Released by: <i>C. Stuart</i> Date: Feb 28 2023 Time: 1700		Received by: _____ Date: _____ Time: _____				Received by: <i>RD</i> Date: <i>Mar 2, 23</i> Time: <i>10:00am</i>			

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A4596</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C Stuart</p> <p><b>Site</b> : CRWMC-Quartely-SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 3</p> <p><b>No. of samples analysed</b> : 3</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 02-Mar-2023 10:10</p> <p><b>Date Analysis Commenced</b> : 02-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:37</p>
--	--

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (22/03/2023): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID	WS-022823-CS-08	WS-022823-CS-09	WS-022823-CS-10	----	----
(Matrix: Water)					Client sampling date / time	28-Feb-2023 12:57	28-Feb-2023 13:01	28-Feb-2023 13:15	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4596-001	VA23A4596-002	VA23A4596-003	-----	-----	
					Result	Result	Result	----	----	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	8.0	8.4	7.8	----	----	
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----	
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----	
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	8.0	8.4	7.8	----	----	
Conductivity	----	E100	2.0	µS/cm	31.9	31.4	31.8	----	----	
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	9.09	8.88	9.04	----	----	
Hardness (as CaCO3), from total Ca/Mg	----	EC100A	0.60	mg/L	10.8	10.8	8.78	----	----	
Solids, total dissolved [TDS]	----	E162	10	mg/L	39	42	40	----	----	
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0418	0.0408	0.0112	----	----	
Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.48	3.48	3.53	----	----	
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0444	0.0444	0.0417	----	----	
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0444	0.0444	0.0417	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.88	0.88	1.00	----	----	
<b>Organic / Inorganic Carbon</b>										
Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.57	5.50	5.86	----	----	
<b>Total Metals</b>										
Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.162	0.162	0.0617	----	----	
Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00018	0.00016	0.00014	----	----	
Barium, total	7440-39-3	E420	0.00010	mg/L	0.00288	0.00292	0.00154	----	----	
Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000139	0.0000091	<0.0000050	----	----	
Calcium, total	7440-70-2	E420	0.050	mg/L	2.75	2.76	2.07	----	----	
Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00019	0.00020	<0.00010	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WS-022823-CS-08	WS-022823-CS-09	WS-022823-CS-10	----	----
(Matrix: Water)					Client sampling date / time	28-Feb-2023 12:57	28-Feb-2023 13:01	28-Feb-2023 13:15	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4596-001	VA23A4596-002	VA23A4596-003	-----	-----	
					Result	Result	Result	----	----	
<b>Total Metals</b>										
Copper, total	7440-50-8	E420	0.00050	mg/L	0.00139	0.00136	<0.00050	----	----	
Iron, total	7439-89-6	E420	0.010	mg/L	0.344	0.340	0.107	----	----	
Lead, total	7439-92-1	E420	0.000050	mg/L	0.000650	0.000645	<0.000050	----	----	
Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Magnesium, total	7439-95-4	E420	0.100	mg/L	0.952	0.959	0.878	----	----	
Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0213	0.0218	0.00690	----	----	
Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
Potassium, total	7440-09-7	E420	0.100	mg/L	0.171	0.172	0.137	----	----	
Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000062	0.000053	<0.000050	----	----	
Silicon, total	7440-21-3	E420	0.10	mg/L	3.72	3.66	2.90	----	----	
Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Sodium, total	7440-23-5	E420	0.050	mg/L	2.60	2.68	2.54	----	----	
Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0118	0.0118	0.00880	----	----	
Sulfur, total	7704-34-9	E420	0.50	mg/L	0.72	<0.50	<0.50	----	----	
Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00546	0.00535	0.00176	----	----	
Uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00105	0.00109	<0.00050	----	----	
Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	<0.0030	----	----	
Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0633	0.0590	0.105 <sup>DTC</sup>	----	----	
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	0.00012	0.00013	----	----	
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00148	0.00143	0.00140	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WS-022823-CS-08	WS-022823-CS-09	WS-022823-CS-10	----	----
(Matrix: Water)					Client sampling date / time	28-Feb-2023 12:57	28-Feb-2023 13:01	28-Feb-2023 13:15	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4596-001	VA23A4596-002	VA23A4596-003	-----	-----	
					Result	Result	Result	----	----	
<b>Dissolved Metals</b>										
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.13	2.13	2.12	----	----	
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0.00612 <sup>OTC</sup>	----	----	
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00032	0.00033	0.00038	----	----	
Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.174	0.168	0.109	----	----	
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000056	0.000059	<0.000050	----	----	
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.917	0.864	0.910	----	----	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0159	0.0151	0.00514	----	----	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0.00256 <sup>OTC</sup>	----	----	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.165	0.151	0.165	----	----	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.88	3.60	3.02	----	----	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.64	2.48	2.59	----	----	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.00934	0.00930	0.00895	----	----	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	<0.50	0.72	----	----	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00119	0.00098	0.00078	----	----	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0014	0.0015	0.0025	----	----	





## Analytical Results

Sub-Matrix: Water					Client sample ID	WS-022823-CS-08	WS-022823-CS-09	WS-022823-CS-10	----	----
(Matrix: Water)					Client sampling date / time	28-Feb-2023 12:57	28-Feb-2023 13:01	28-Feb-2023 13:15	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A4596-001	VA23A4596-002	VA23A4596-003	-----	-----	
Dissolved Metals					Result	Result	Result	----	----	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23A4596</b>	<b>Page</b>	: 1 of 14
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 02-Mar-2023 10:10
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 02-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:37
<b>Sampler</b>	: C Stuart      250-898-3722		
<b>Site</b>	: CRWMC-Quartely-SW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 851256)</b>											
VA23A4574-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	950	946	0.437%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	35.1	36.4	3.39%	20%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	985	982	0.298%	20%	----
<b>Physical Tests (QC Lot: 851257)</b>											
VA23A4574-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	3930	3900	0.766%	10%	----
<b>Physical Tests (QC Lot: 853269)</b>											
VA23A3735-001	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	103	94	9	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 851249)</b>											
VA23A4574-001	Anonymous	Fluoride	16984-48-8	E235.F	0.400	mg/L	<0.400	<0.400	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 851250)</b>											
VA23A4574-001	Anonymous	Chloride	16887-00-6	E235.Cl	10.0	mg/L	529	527	0.502%	20%	----
<b>Anions and Nutrients (QC Lot: 851252)</b>											
VA23A4574-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	11.2	11.2	0.134%	20%	----
<b>Anions and Nutrients (QC Lot: 851253)</b>											
VA23A4574-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	0.465	0.463	0.502%	20%	----
<b>Anions and Nutrients (QC Lot: 851254)</b>											
VA23A4574-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	6.00	mg/L	10.7	10.6	0.07	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 853246)</b>											
VA23A4596-001	WS- 022823-CS-08	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0418	0.0469	0.0051	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 853247)</b>											
VA23A4596-001	WS- 022823-CS-08	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.57	5.94	6.46%	20%	----
<b>Total Metals (QC Lot: 851236)</b>											
VA23A4560-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.303	0.293	3.23%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00057	0.00057	0.000002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0168	0.0164	2.76%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.012	0.012	0.0003	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 851236) - continued</b>											
VA23A4560-001	Anonymous	Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000126	0.0000140	0.0000013	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	15.2	14.8	2.54%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00060	0.00054	0.00006	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00021	0.00021	0.000002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00136	0.00131	0.00004	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.449	0.440	2.10%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000287	0.000279	0.000008	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0011	0.0011	0.0000001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	5.02	4.96	1.30%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0184	0.0183	0.218%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000807	0.000784	2.88%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00112	0.00110	0.00001	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.35	1.36	0.586%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000098	0.000103	0.000004	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	3.78	3.82	0.932%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	15.4	15.5	0.341%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0847	0.0826	2.46%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	4.54	4.21	0.32	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.0121	0.0117	3.63%	20%	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000243	0.000248	1.96%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00123	0.00124	0.000010	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00023	0.00022	0.000007	Diff <2x LOR	----
<b>Total Metals (QC Lot: 851265)</b>											
VA23A4565-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 851241)</b>											
VA23A4565-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0018	0.0012	0.0006	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00791	0.00802	1.31%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0128	0.0129	0.716%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0230	0.0234	1.78%	20%	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 851241) - continued</b>											
VA23A4565-001	Anonymous	Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.010	<0.010	0.0003	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000300	mg/L	<0.0000300	<0.0000300	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	131	126	3.92%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00030	0.00032	0.00002	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0058	0.0054	0.0003	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	6.29	6.23	0.983%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00328	0.00334	1.80%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.0666	0.0657	1.42%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00266	0.00276	0.00010	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.676	0.677	0.273%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00671	0.00664	0.965%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.40	2.36	1.83%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.83	2.80	1.02%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.779	0.774	0.744%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	81.4	77.2	5.24%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000126	0.000132	5.42%	20%	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.0717	0.0733	2.20%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00271	0.00270	0.00001	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0076	0.0072	0.0004	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 851348)</b>											
VA23A4577-017	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	0.0000118	0.0000117	0.0000001	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 851256)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 851257)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 853269)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 851249)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 851250)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 851252)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 851253)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 851254)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 853246)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Organic / Inorganic Carbon (QCLot: 853247)</b>						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 851236)</b>						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 851236) - continued</b>						
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 851265)</b>						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 851241)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 851241) - continued</b>						
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 851348)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 851256)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
<b>Physical Tests (QCLot: 851257)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	101	90.0	110	----
<b>Physical Tests (QCLot: 853269)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	107	85.0	115	----
<b>Anions and Nutrients (QCLot: 851249)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 851250)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 851252)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 851253)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 851254)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 853246)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.5	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 853247)</b>									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
<b>Total Metals (QCLot: 851236)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	106	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.9	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	105	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	103	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	108	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	109	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 851236) - continued</b>									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	99.5	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	113	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	103	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	107	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	99.2	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	110	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	111	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	105	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	95.2	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	103	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	108	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	104	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	99.0	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	106	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	97.3	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	98.4	80.0	120	----
<b>Total Metals (QCLot: 851265)</b>									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.8	80.0	120	----
<b>Dissolved Metals (QCLot: 851241)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.8	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	100	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	99.8	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	96.9	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	97.0	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	97.9	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.5	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 851241) - continued</b>									
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.6	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	94.8	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	95.8	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.7	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	96.3	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.7	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	95.6	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.4	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	97.6	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.6	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	94.0	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.5	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	96.9	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	95.0	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	95.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	112	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.2	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	94.2	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	96.9	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.4	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 851249)</b>										
VA23A4574-002	Anonymous	Fluoride	16984-48-8	E235.F	50.1 mg/L	50 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 851250)</b>										
VA23A4574-002	Anonymous	Chloride	16887-00-6	E235.Cl	4970 mg/L	5000 mg/L	99.4	75.0	125	----
<b>Anions and Nutrients (QCLot: 851252)</b>										
VA23A4574-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	125 mg/L	125 mg/L	99.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 851253)</b>										
VA23A4574-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	24.7 mg/L	25 mg/L	98.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 851254)</b>										
VA23A4574-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	5020 mg/L	5000 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 853246)</b>										
VA23A4596-002	WS- 022823-CS-09	Ammonia, total (as N)	7664-41-7	E298	0.0930 mg/L	0.1 mg/L	93.0	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 853247)</b>										
VA23A4596-002	WS- 022823-CS-09	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 851236)</b>										
VA23A4560-002	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0181 mg/L	0.02 mg/L	90.7	70.0	130	----
		Barium, total	7440-39-3	E420	0.0174 mg/L	0.02 mg/L	86.8	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00948 mg/L	0.01 mg/L	94.8	70.0	130	----
		Boron, total	7440-42-8	E420	0.098 mg/L	0.1 mg/L	98.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0362 mg/L	0.04 mg/L	90.4	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Copper, total	7440-50-8	E420	0.0185 mg/L	0.02 mg/L	92.3	70.0	130	----
		Iron, total	7439-89-6	E420	1.82 mg/L	2 mg/L	90.8	70.0	130	----
		Lead, total	7439-92-1	E420	0.0187 mg/L	0.02 mg/L	93.7	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0955 mg/L	0.1 mg/L	95.5	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 851236) - continued</b>										
VA23A4560-002	Anonymous	Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.66 mg/L	10 mg/L	96.6	70.0	130	----
		Potassium, total	7440-09-7	E420	3.68 mg/L	4 mg/L	92.0	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		Silicon, total	7440-21-3	E420	8.96 mg/L	10 mg/L	89.6	70.0	130	----
		Silver, total	7440-22-4	E420	0.00366 mg/L	0.004 mg/L	91.5	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	18.5 mg/L	20 mg/L	92.4	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00377 mg/L	0.004 mg/L	94.3	70.0	130	----
		Tin, total	7440-31-5	E420	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0356 mg/L	0.04 mg/L	89.1	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00389 mg/L	0.004 mg/L	97.4	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0951 mg/L	0.1 mg/L	95.1	70.0	130	----
		Zinc, total	7440-66-6	E420	0.368 mg/L	0.4 mg/L	92.0	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0361 mg/L	0.04 mg/L	90.3	70.0	130	----
<b>Total Metals (QCLot: 851265)</b>										
VA23A4565-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000989 mg/L	0.0001 mg/L	98.9	70.0	130	----
<b>Dissolved Metals (QCLot: 851241)</b>										
VA23A4565-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.199 mg/L	0.2 mg/L	99.6	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00882 mg/L	0.01 mg/L	88.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00384 mg/L	0.004 mg/L	96.1	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	96.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.85 mg/L	2 mg/L	92.5	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 851241) - continued</b>										
VA23A4565-002	Anonymous	Lead, dissolved	7439-92-1	E421	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0928 mg/L	0.1 mg/L	92.8	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.4 mg/L	10 mg/L	104	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.09 mg/L	4 mg/L	102	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	8.87 mg/L	10 mg/L	88.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00376 mg/L	0.004 mg/L	94.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00376 mg/L	0.004 mg/L	94.1	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.388 mg/L	0.4 mg/L	97.0	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
<b>Dissolved Metals (QCLot: 851348)</b>										
VA23A4577-018	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000945 mg/L	0.0001 mg/L	94.5	70.0	130	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23A4596</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C Stuart</p> <p><b>Site</b> : CRWMC-Quartely-SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 3</p> <p><b>No. of samples analysed</b> : 3</p>	<p><b>Page</b> : 1 of 12</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 02-Mar-2023 10:10</p> <p><b>Issue Date</b> : 22-Mar-2023 14:37</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WS- 022823-CS-08	E298	28-Feb-2023	05-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WS- 022823-CS-09	E298	28-Feb-2023	05-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WS- 022823-CS-10	E298	28-Feb-2023	05-Mar-2023	----	----		07-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS- 022823-CS-08	E235.Cl	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS- 022823-CS-09	E235.Cl	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS- 022823-CS-10	E235.Cl	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> WS- 022823-CS-08	E235.F	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS- 022823-CS-09	E235.F	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS- 022823-CS-10	E235.F	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-08	E235.NO3-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-09	E235.NO3-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-10	E235.NO3-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-08	E235.NO2-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-09	E235.NO2-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS- 022823-CS-10	E235.NO2-L	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS- 022823-CS-08	E235.SO4	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WS- 022823-CS-09	E235.SO4	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WS- 022823-CS-10	E235.SO4	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WS- 022823-CS-08	E509	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WS- 022823-CS-09	E509	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WS- 022823-CS-10	E509	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WS- 022823-CS-08	E421	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	180 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WS- 022823-CS-09	E421	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	180 days	4 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WS- 022823-CS-10	E421	28-Feb-2023	03-Mar-2023	----	----		03-Mar-2023	180 days	4 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> WS- 022823-CS-08	E358-L	28-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	28 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> WS- 022823-CS-09	E358-L	28-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	28 days	5 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> WS- 022823-CS-10	E358-L	28-Feb-2023	05-Mar-2023	----	----		05-Mar-2023	28 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WS- 022823-CS-08	E290	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WS- 022823-CS-09	E290	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WS- 022823-CS-10	E290	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> WS- 022823-CS-08	E100	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> WS- 022823-CS-09	E100	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> WS- 022823-CS-10	E100	28-Feb-2023	02-Mar-2023	----	----		03-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
<b>HDPE</b> WS- 022823-CS-08	E162	28-Feb-2023	----	----	----		07-Mar-2023	7 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WS- 022823-CS-09	E162	28-Feb-2023	----	----	----		07-Mar-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WS- 022823-CS-10	E162	28-Feb-2023	----	----	----		07-Mar-2023	7 days	7 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WS- 022823-CS-08	E508	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WS- 022823-CS-09	E508	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WS- 022823-CS-10	E508	28-Feb-2023	02-Mar-2023	----	----		02-Mar-2023	28 days	2 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WS- 022823-CS-08	E420	28-Feb-2023	04-Mar-2023	----	----		05-Mar-2023	180 days	5 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WS- 022823-CS-09	E420	28-Feb-2023	04-Mar-2023	----	----		05-Mar-2023	180 days	5 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WS- 022823-CS-10	E420	28-Feb-2023	04-Mar-2023	----	----		05-Mar-2023	180 days	5 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	851256	1	15	6.6	5.0	✔
Ammonia by Fluorescence	E298	853246	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	851250	1	19	5.2	5.0	✔
Conductivity in Water	E100	851257	1	15	6.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851348	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851241	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	853247	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	851249	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851252	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851253	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	851254	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	853269	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	851265	1	16	6.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	851236	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	851256	1	15	6.6	5.0	✔
Ammonia by Fluorescence	E298	853246	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	851250	1	19	5.2	5.0	✔
Conductivity in Water	E100	851257	1	15	6.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851348	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851241	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	853247	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	851249	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851252	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851253	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	851254	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	853269	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	851265	1	16	6.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	851236	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	851256	1	15	6.6	5.0	✔
Ammonia by Fluorescence	E298	853246	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	851250	1	19	5.2	5.0	✔
Conductivity in Water	E100	851257	1	15	6.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851348	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Metals in Water by CRC ICPMS	E421	851241	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	853247	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	851249	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851252	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851253	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	851254	1	16	6.2	5.0	✔
TDS by Gravimetry	E162	853269	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	851265	1	16	6.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	851236	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	853246	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	851250	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	851348	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	851241	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	853247	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	851249	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	851252	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	851253	1	16	6.2	5.0	✔
Sulfate in Water by IC	E235.SO4	851254	1	16	6.2	5.0	✔
Total Mercury in Water by CVAAS	E508	851265	1	16	6.2	5.0	✔
Total metals in Water by CRC ICPMS	E420	851236	1	20	5.0	5.0	✔





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)

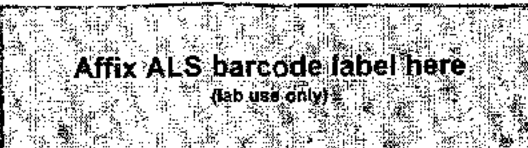


Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Vancouver - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	Vancouver - Environmental			
Preparation for Dissolved Organic Carbon for Combustion	EP358 Vancouver - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)														
Company:	Comox Valley Regional District	Select Report Format:	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDO (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply					EMERGENCY								
Contact:	Crystal Stuart	Quality Control (QC) Report with Report	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Priority (Business Days)		4 day [P4-20%]		3 day [P3-25%]		2 day [P2-50%]		1 Business day [E1 - 100%]					
Phone:	250-898-3722	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]										
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs:					dd-mmm-yy hh:mm								
Street:	770 Harmston Avenue	Email 1 or Fax:	cstuart@comoxvalleyrd.ca			For tests that can not be performed according to the service level selected, you will be contacted.													
City/Province:	Courtenay, BC	Email 2:				Analysis Request													
Postal Code:	V9N 0G8	Email 3:				Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below													
Invoice To:	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Invoice Distribution			SAMPLES ON HOLD														
	Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input checked="" type="checkbox"/> FAX			Sample is hazardous (please provide further detail)													
Company:		Email 1 or Fax:				NUMBER OF CONTAINERS													
Contact:		Email 2:																	
Project Information		Oil and Gas, Required Fields (client use)																	
ALS Account # / Quote #:	VA23-COVR100-001	AFE/Cost Center:	PO#																
Job #:	3	Major/Minor Code:	Routing Code:																
PO / AFE:	23-015	Requisitioner:																	
LSD:	CRWMC - Quarterly - SW	Location:																	
ALS Lab Work Order # (lab use only):	A4596	ALS Contact:	Selam W.	Sampler:	C Stuart														
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hachness)	Dissolved CSR Metals (including Hg, Hachness)							
	WS-022823-CS-08	28-Feb-23	12:57	Water	X	X	X	X	X	X	X	X							
	↓ ↓ ↓ 09	28-Feb-23	13:01	Water	X	X	X	X	X	X	X	X							
	WS-022823-CS-10	28-Feb-23	13:15	Water	X	X	X	X	X	X	X	X							
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)														
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>														
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>														
					Cooling Initiated <input type="checkbox"/>														
					INITIAL COOLER TEMPERATURES °C														
					FINAL COOLER TEMPERATURES °C														
					5														
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)														
Released by:	C Stuart CS	Time:	Feb 28 2023	Received by:	Date:	Time:	Received by:	Date:	Feb 28, 23	Time:	10:00am								



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A5076</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 09-Mar-2023 09:10</p> <p><b>Date Analysis Commenced</b> : 10-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:38</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (22/03/2023): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-030723-CS-49	WG-030723-CS-50	WG-030723-CS-51	WG-030723-CS-52	WG-030723-CS-53
Client sampling date / time					07-Mar-2023 09:50	07-Mar-2023 11:30	07-Mar-2023 12:05	07-Mar-2023 13:55	07-Mar-2023 14:40
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-001	VA23A5076-002	VA23A5076-003	VA23A5076-004	VA23A5076-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	90.8	50.4	67.3	60.2	55.8
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	90.8	50.4	67.3	60.2	55.8
Conductivity	----	E100	2.0	µS/cm	185	105	137	146	124
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	93.9	51.7	68.8	70.3	59.5
Solids, total dissolved [TDS]	----	E162	10	mg/L	120	68	78	89	87
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	<0.0050	0.0050	0.0055
Chloride	16887-00-6	E235.Cl	0.50	mg/L	2.56	1.08	1.20	8.09	4.22
Fluoride	16984-48-8	E235.F	0.020	mg/L	0.022	<0.020	<0.020	0.021	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.586	0.123	0.140	0.172	0.230
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.586	0.123	0.140	0.172	0.230
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.79	2.33	2.37	2.72	2.51
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0062	0.0060	0.0056	0.0641	0.0019
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00030	0.00031	0.00033	0.00013	0.00020
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00756	0.00073	0.00151	0.00618	0.00063
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0.014	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.0	18.0	24.7	22.0	19.4
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00253	<0.00050	<0.00050	0.00076	<0.00050
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	0.00023	0.00021	0.00746	0.00088
Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	0.050	<0.010



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-030723-CS-49	WG-030723-CS-50	WG-030723-CS-51	WG-030723-CS-52	WG-030723-CS-53
Client sampling date / time					07-Mar-2023 09:50	07-Mar-2023 11:30	07-Mar-2023 12:05	07-Mar-2023 13:55	07-Mar-2023 14:40
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-001	VA23A5076-002	VA23A5076-003	VA23A5076-004	VA23A5076-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	6.43	1.64	1.72	3.73	2.69
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00010	<0.00010	<0.00010	0.00196	<0.00010
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000152	0.000115	0.000115	0.000102	0.000128
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.481	0.280	0.382	0.272	0.281
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000117	0.000113	0.000128	0.000064	0.000150
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	6.12	3.94	4.16	4.81	4.34
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.53	1.61	1.93	2.82	2.39
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0451	0.0283	0.0395	0.0507	0.0332
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	0.66	0.68	0.78	0.69
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00012	<0.00010
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	0.00200	<0.00030
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000261	0.000025	0.000039	0.000122	0.000041
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00593	0.00247	0.00239	0.00329	0.00370
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0021	<0.0010
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds</b>									
Chlorobenzene	108-90-7	E611C	0.50	µg/L	----	----	----	<0.50	<0.50
Chloromethane	74-87-3	E611C	5.0	µg/L	----	----	----	<5.0	<5.0
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	----	----	----	<0.50	<0.50
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	----	----	----	<0.50	<0.50
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	----	----	----	<0.50	<0.50





## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030723-CS-49	WG-030723-CS-50	WG-030723-CS-51	WG-030723-CS-52	WG-030723-CS-53
(Matrix: Water)					Client sampling date / time	07-Mar-2023 09:50	07-Mar-2023 11:30	07-Mar-2023 12:05	07-Mar-2023 13:55	07-Mar-2023 14:40
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-001	VA23A5076-002	VA23A5076-003	VA23A5076-004	VA23A5076-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	---	---	---	<0.75	<0.75	
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	---	---	---	<0.20	<0.20	
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Chloroethane	75-00-3	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloromethane	75-09-2	E611C	1.0	µg/L	---	---	---	<1.0	<1.0	
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichloroethylene	79-01-6	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Vinyl chloride	75-01-4	E611C	0.40	µg/L	---	---	---	<0.40	<0.40	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Ethylbenzene	100-41-4	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Styrene	100-42-5	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	
Toluene	108-88-3	E611C	0.40	µg/L	---	---	---	<0.40	<0.40	
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	---	---	---	<0.40	<0.40	
Xylene, o-	95-47-6	E611C	0.30	µg/L	---	---	---	<0.30	<0.30	
Xylenes, total	1330-20-7	E611C	0.50	µg/L	---	---	---	<0.50	<0.50	



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-030723-CS-49	WG-030723-CS-50	WG-030723-CS-51	WG-030723-CS-52	WG-030723-CS-53
Client sampling date / time					07-Mar-2023 09:50	07-Mar-2023 11:30	07-Mar-2023 12:05	07-Mar-2023 13:55	07-Mar-2023 14:40	
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-001	VA23A5076-002	VA23A5076-003	VA23A5076-004	VA23A5076-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	----	----	----	<0.50	<0.50	
Bromoform	75-25-2	E611C	0.50	µg/L	----	----	----	<0.50	<0.50	
Chloroform	67-66-3	E611C	0.50	µg/L	----	----	----	<0.50	<0.50	
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	----	----	----	<0.50	<0.50	
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	----	----	----	<100	<100	
VPHw	----	EC580A	100	µg/L	----	----	----	<100	<100	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	----	----	----	84.3	82.7	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	----	----	----	104	105	
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	----	----	----	100	99.7	

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



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030723-CS-54	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Mar-2023 16:00	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as CaCO3)	---	E290	1.0	mg/L	50.9	---	---	---	---	
Alkalinity, carbonate (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, hydroxide (as CaCO3)	---	E290	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, total (as CaCO3)	---	E290	1.0	mg/L	50.9	---	---	---	---	
Conductivity	---	E100	2.0	µS/cm	121	---	---	---	---	
Hardness (as CaCO3), dissolved	---	EC100	0.60	mg/L	53.6	---	---	---	---	
Solids, total dissolved [TDS]	---	E162	10	mg/L	72	---	---	---	---	
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	---	---	---	---	
Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.59	---	---	---	---	
Fluoride	16984-48-8	E235.F	0.020	mg/L	0.021	---	---	---	---	
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.277	---	---	---	---	
Nitrate + Nitrite (as N)	---	EC235.N+N	0.0050	mg/L	0.277	---	---	---	---	
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	---	---	---	---	
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.22	---	---	---	---	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0038	---	---	---	---	
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00200	---	---	---	---	
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00137	---	---	---	---	
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	---	---	---	---	
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	---	---	---	---	
Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	---	---	---	---	
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	---	---	---	---	
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	17.0	---	---	---	---	
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00194	---	---	---	---	
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	---	---	---	---	
Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	---	---	---	---	
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030723-CS-54	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Mar-2023 16:00	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	---	---	---	---	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.71	---	---	---	---	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	---	---	---	---	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000094	---	---	---	---	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	---	---	---	---	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	---	---	---	---	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.821	---	---	---	---	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000255	---	---	---	---	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.71	---	---	---	---	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	---	---	---	---	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.97	---	---	---	---	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0319	---	---	---	---	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	---	---	---	---	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	---	---	---	---	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	---	---	---	---	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	---	---	---	---	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000282	---	---	---	---	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.0164	---	---	---	---	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	---	---	---	---	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	---	---	---	---	
Dissolved mercury filtration location	----	EP509	-	-	Field	---	---	---	---	
Dissolved metals filtration location	----	EP421	-	-	Field	---	---	---	---	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	---	---	---	---	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030723-CS-54	----	----	----	----
(Matrix: Water)					Client sampling date / time	07-Mar-2023 16:00	---	---	---	---
Analyte	CAS Number	Method	LOR	Unit	VA23A5076-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Volatile Organic Compounds</b>										
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	---	---	---	---	
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	---	---	---	---	
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	---	---	---	---	
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	---	---	---	---	
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	---	---	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	<0.50	---	---	---	---	
Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	---	---	---	---	
Styrene	100-42-5	E611C	0.50	µg/L	<0.50	---	---	---	---	
Toluene	108-88-3	E611C	0.40	µg/L	<0.40	---	---	---	---	
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	---	---	---	---	
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	---	---	---	---	
Xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [THMs]</b>										



**Analytical Results**

Sub-Matrix: <b>Water</b>					Client sample ID	<b>WG-030723-CS-54</b>	----	----	----	----
(Matrix: <b>Water</b> )					Client sampling date / time	07-Mar-2023 16:00	----	----	----	----
<i>Analyte</i>	<i>CAS Number</i>	<i>Method</i>	<i>LOR</i>	<i>Unit</i>	<b>VA23A5076-006</b>	-----	-----	-----	-----	-----
					Result	---	---	---	---	---
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	---	---	---	---	---
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	---	---	---	---	---
VPHw	----	EC580A	100	µg/L	<100	---	---	---	---	---
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	78.8	---	---	---	---	---
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	93.0	---	---	---	---	---
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	97.9	---	---	---	---	---

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23A5076</b>	<b>Page</b>	: 1 of 19
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 09-Mar-2023 09:10
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 10-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:38
<b>Sampler</b>	: Crystal Stuart, 250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 6		
<b>No. of samples analysed</b>	: 6		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Parnian Sane	Analyst	Vancouver Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 858577)</b>											
KS2300688-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	2500	2470	1.21%	10%	----
<b>Physical Tests (QC Lot: 858578)</b>											
VA23A5076-003	WG-030723-CS-51	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	67.3	67.3	0.00%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	67.3	67.3	0.00%	20%	----
<b>Physical Tests (QC Lot: 862935)</b>											
KS2300710-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	8210	7940	3.29%	20%	----
<b>Anions and Nutrients (QC Lot: 858570)</b>											
VA23A5135-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 858571)</b>											
VA23A5135-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 858572)</b>											
VA23A5135-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 858573)</b>											
VA23A5135-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	1.48	1.45	0.03	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 858574)</b>											
VA23A5135-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.034	0.034	0.0001	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 859757)</b>											
VA23A4889-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<5.0 µg/L	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 858601)</b>											
VA23A5076-001	WG-030723-CS-49	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0062	0.0050	0.0012	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00030	0.00027	0.00003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00756	0.00755	0.0232%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.0	27.6	2.09%	20%	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 858601) - continued</b>											
VA23A5076-001	WG-030723-CS-49	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00253	0.00253	0.000001	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	6.43	6.28	2.39%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00010	0.00011	0.00001	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000152	0.000148	0.000004	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.481	0.479	0.002	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000117	0.000109	0.000008	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	6.12	6.28	2.49%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.53	2.57	1.53%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0451	0.0442	2.04%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	<0.50	0.55	0.05	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000261	0.000249	4.87%	20%	----		
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00593	0.00581	2.02%	20%	----		
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----		
<b>Dissolved Metals (QC Lot: 859285)</b>											
KS2300711-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 862536)</b>											
VA23A5076-004	WG-030723-CS-52	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 862536) - continued</b>											
VA23A5076-004	WG-030723-CS-52	Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----		
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----		
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----		
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----		
<b>Volatile Organic Compounds (QC Lot: 864332)</b>											
VA23A5076-006	WG-030723-CS-54	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 864332) - continued</b>											
VA23A5076-006	WG-030723-CS-54	Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----		
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----		
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----		
<b>Hydrocarbons (QC Lot: 862534)</b>											
VA23A4862-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	140	170	17.2%	30%	----
<b>Hydrocarbons (QC Lot: 864331)</b>											



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Hydrocarbons (QC Lot: 864331) - continued</b>											
VA23A5076-006	WG-030723-CS-54	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



### Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 858577)</b>						
Conductivity	---	E100	1	µS/cm	1.3	---
<b>Physical Tests (QCLot: 858578)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 862935)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 858570)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 858571)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 858572)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 858573)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 858574)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 859757)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 858601)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 858601) - continued</b>						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 859285)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 862536)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 862536) - continued</b>						
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Volatile Organic Compounds (QCLot: 864332)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 864332) - continued</b>						
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 862534)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----
<b>Hydrocarbons (QCLot: 864331)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 858577)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.4	90.0	110	----
<b>Physical Tests (QCLot: 858578)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
<b>Physical Tests (QCLot: 862935)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 858570)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 858571)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 858572)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 858573)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 858574)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 859757)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	102	85.0	115	----
<b>Dissolved Metals (QCLot: 858601)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	99.2	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	106	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	95.3	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.4	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	111	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	94.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.4	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	100	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.3	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 858601) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.9	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.3	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	91.3	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.6	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.5	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	100	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	95.9	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.3	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.9	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	95.8	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	109	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	97.9	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	104	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.8	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	104	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.0	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	92.9	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 862536)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	121	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	118	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	114	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	117	70.0	130	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 862536) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	98.1	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	114	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	106	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	93.3	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	126	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	111	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	115	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	120	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	107	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	118	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	114	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	111	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 864332)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	94.2	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	93.8	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	99.4	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	97.4	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	101	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	105	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 864332) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	93.6	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	95.4	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	99.6	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	91.5	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	90.6	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	91.6	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	92.0	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	93.2	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	100	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	100	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	97.4	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	95.6	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	98.7	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	100	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	102	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 862534)</b>									
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	6310 µg/L	105	70.0	130	----
<b>Hydrocarbons (QCLot: 864331)</b>									
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	6310 µg/L	99.8	70.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 858570)</b>										
VA23A5139-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.4 mg/L	12.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 858571)</b>										
VA23A5139-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.48 mg/L	2.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 858572)</b>										
VA23A5139-001	Anonymous	Chloride	16887-00-6	E235.Cl	495 mg/L	500 mg/L	99.0	75.0	125	----
<b>Anions and Nutrients (QCLot: 858573)</b>										
VA23A5139-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	494 mg/L	500 mg/L	98.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 858574)</b>										
VA23A5139-001	Anonymous	Fluoride	16984-48-8	E235.F	5.11 mg/L	5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 859757)</b>										
VA23A5076-001	WG-030723-CS-49	Ammonia, total (as N)	7664-41-7	E298	0.0996 mg/L	0.1 mg/L	99.6	75.0	125	----
<b>Dissolved Metals (QCLot: 858601)</b>										
VA23A5076-002	WG-030723-CS-50	Aluminum, dissolved	7429-90-5	E421	0.175 mg/L	0.2 mg/L	87.6	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0178 mg/L	0.02 mg/L	89.2	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0376 mg/L	0.04 mg/L	94.1	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00887 mg/L	0.01 mg/L	88.7	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.093 mg/L	0.1 mg/L	92.8	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00370 mg/L	0.004 mg/L	92.6	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0361 mg/L	0.04 mg/L	90.3	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0182 mg/L	0.02 mg/L	90.9	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.85 mg/L	2 mg/L	92.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0186 mg/L	0.02 mg/L	93.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0956 mg/L	0.1 mg/L	95.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0185 mg/L	0.02 mg/L	92.4	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 858601) - continued</b>										
VA23A5076-002	WG-030723-CS-50	Nickel, dissolved	7440-02-0	E421	0.0374 mg/L	0.04 mg/L	93.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.38 mg/L	10 mg/L	93.8	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.63 mg/L	4 mg/L	90.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0393 mg/L	0.04 mg/L	98.3	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	8.76 mg/L	10 mg/L	87.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00374 mg/L	0.004 mg/L	93.6	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.84 mg/L	2 mg/L	91.9	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.8 mg/L	20 mg/L	94.2	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00379 mg/L	0.004 mg/L	94.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0183 mg/L	0.02 mg/L	91.5	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00377 mg/L	0.004 mg/L	94.3	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0909 mg/L	0.1 mg/L	90.9	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.391 mg/L	0.4 mg/L	97.7	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
<b>Dissolved Metals (QCLot: 859285)</b>										
VA23A5007-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000997 mg/L	0.0001 mg/L	99.7	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 862536)</b>										
VA23A5076-005	WG-030723-CS-53	Benzene	71-43-2	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Bromoform	75-25-2	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	132 µg/L	100 µg/L	132	60.0	140	----
		Chlorobenzene	108-90-7	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Chloroethane	75-00-3	E611C	122 µg/L	100 µg/L	122	50.0	150	----
		Chloroform	67-66-3	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		Chloromethane	74-87-3	E611C	127 µg/L	100 µg/L	127	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	117 µg/L	100 µg/L	117	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	118 µg/L	100 µg/L	118	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	108 µg/L	100 µg/L	108	60.0	140	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 862536) - continued</b>										
VA23A5076-005	WG-030723-CS-53	Dichloroethylene, trans-1,2-	156-60-5	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Dichloromethane	75-09-2	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	92.4 µg/L	100 µg/L	92.4	60.0	140	----
		Ethylbenzene	100-41-4	E611C	119 µg/L	100 µg/L	119	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Styrene	100-42-5	E611C	111 µg/L	100 µg/L	111	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	120 µg/L	100 µg/L	120	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	139 µg/L	100 µg/L	139	60.0	140	----
		Toluene	108-88-3	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	121 µg/L	100 µg/L	121	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Trichloroethylene	79-01-6	E611C	132 µg/L	100 µg/L	132	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	137 µg/L	100 µg/L	137	50.0	150	----
		Vinyl chloride	75-01-4	E611C	129 µg/L	100 µg/L	129	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	238 µg/L	200 µg/L	119	60.0	140	----
		Xylene, o-	95-47-6	E611C	117 µg/L	100 µg/L	117	60.0	140	----
<b>Volatile Organic Compounds (QCLot: 864332)</b>										
VA23A5142-002	Anonymous	Benzene	71-43-2	E611C	92.2 µg/L	100 µg/L	92.2	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	93.8 µg/L	100 µg/L	93.8	60.0	140	----
		Bromofom	75-25-2	E611C	113 µg/L	100 µg/L	113	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	94.6 µg/L	100 µg/L	94.6	60.0	140	----
		Chlorobenzene	108-90-7	E611C	93.7 µg/L	100 µg/L	93.7	60.0	140	----
		Chloroethane	75-00-3	E611C	90.9 µg/L	100 µg/L	90.9	50.0	150	----
		Chloroform	67-66-3	E611C	98.5 µg/L	100 µg/L	98.5	60.0	140	----
		Chloromethane	74-87-3	E611C	89.1 µg/L	100 µg/L	89.1	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	94.6 µg/L	100 µg/L	94.6	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	88.0 µg/L	100 µg/L	88.0	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	88.0 µg/L	100 µg/L	88.0	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	90.5 µg/L	100 µg/L	90.5	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	96.8 µg/L	100 µg/L	96.8	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	92.4 µg/L	100 µg/L	92.4	60.0	140	----





Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 864332) - continued</b>										
VA23A5142-002	Anonymous	Dichloroethylene, cis-1,2-	156-59-2	E611C	87.4 µg/L	100 µg/L	87.4	60.0	140	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	90.4 µg/L	100 µg/L	90.4	60.0	140	----
		Dichloromethane	75-09-2	E611C	89.2 µg/L	100 µg/L	89.2	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	91.3 µg/L	100 µg/L	91.3	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	77.5 µg/L	100 µg/L	77.5	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	68.9 µg/L	100 µg/L	68.9	60.0	140	----
		Ethylbenzene	100-41-4	E611C	92.4 µg/L	100 µg/L	92.4	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	99.8 µg/L	100 µg/L	99.8	60.0	140	----
		Styrene	100-42-5	E611C	93.1 µg/L	100 µg/L	93.1	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	96.0 µg/L	100 µg/L	96.0	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		Toluene	108-88-3	E611C	92.6 µg/L	100 µg/L	92.6	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	94.0 µg/L	100 µg/L	94.0	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	97.9 µg/L	100 µg/L	97.9	60.0	140	----
		Trichloroethylene	79-01-6	E611C	88.6 µg/L	100 µg/L	88.6	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	96.2 µg/L	100 µg/L	96.2	50.0	150	----
		Vinyl chloride	75-01-4	E611C	88.0 µg/L	100 µg/L	88.0	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	188 µg/L	200 µg/L	94.0	60.0	140	----
		Xylene, o-	95-47-6	E611C	94.5 µg/L	100 µg/L	94.5	60.0	140	----
<b>Hydrocarbons (QCLot: 862534)</b>										
VA23A4862-003	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5650 µg/L	6310 µg/L	89.6	60.0	140	----
<b>Hydrocarbons (QCLot: 864331)</b>										
VA23A5134-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5080 µg/L	6310 µg/L	80.6	60.0	140	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23A5076</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 17</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 09-Mar-2023 09:10</p> <p><b>Issue Date</b> : 22-Mar-2023 14:39</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### Summary of Outliers

#### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-49	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-50	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-51	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-52	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-53	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030723-CS-54	E298	07-Mar-2023	10-Mar-2023	----	----		13-Mar-2023	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-030723-CS-52	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030723-CS-53	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030723-CS-54	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030723-CS-49	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030723-CS-50	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030723-CS-51	E235.Cl	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-52	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-53	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-54	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-49	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-50	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030723-CS-51	E235.F	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-52	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-53	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-54	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-49	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-50	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-51	E235.NO3-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-52	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-53	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-54	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-49	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-50	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030723-CS-51	E235.NO2-L	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030723-CS-52	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030723-CS-53	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030723-CS-54	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030723-CS-49	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-030723-CS-50	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-030723-CS-51	E235.SO4	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-49	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-50	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-51	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-52	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-53	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030723-CS-54	E509	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-49	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-50	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-51	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-52	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-53	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030723-CS-54	E421	07-Mar-2023	10-Mar-2023	----	----		11-Mar-2023	180 days	4 days	✔
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030723-CS-52	E581.VH+F1	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030723-CS-53	E581.VH+F1	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030723-CS-54	E581.VH+F1	07-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	8 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-030723-CS-52	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	2 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030723-CS-53	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030723-CS-54	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	2 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030723-CS-49	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030723-CS-50	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030723-CS-51	E290	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	14 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-52	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-53	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-54	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	2 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-49	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-50	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030723-CS-51	E100	07-Mar-2023	10-Mar-2023	----	----		10-Mar-2023	28 days	3 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-49	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-50	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-51	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-52	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-53	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030723-CS-54	E162	07-Mar-2023	----	----	----		15-Mar-2023	7 days	8 days	* EHT	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-030723-CS-52	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-53	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-54	E611C	07-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	8 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-52	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-53	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-54	E611C	07-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	8 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-52	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-53	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-54	E611C	07-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	8 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-030723-CS-52	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030723-CS-53	E611C	07-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	14 days	7 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030723-CS-54	E611C	07-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	14 days	8 days	✔

**Legend & Qualifier Definitions**

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	858578	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	859757	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	858572	1	12	8.3	5.0	✓
Conductivity in Water	E100	858577	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	859285	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	858601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	858574	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	858570	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	858571	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	858573	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	862935	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	862534	2	25	8.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	862536	2	13	15.3	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	858578	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	859757	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	858572	1	12	8.3	5.0	✓
Conductivity in Water	E100	858577	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	859285	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	858601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	858574	1	9	11.1	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	858570	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	858571	1	12	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	858573	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	862935	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	862534	2	25	8.0	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	862536	2	13	15.3	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	858578	1	10	10.0	5.0	✓
Ammonia by Fluorescence	E298	859757	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	858572	1	12	8.3	5.0	✓
Conductivity in Water	E100	858577	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	859285	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	858601	1	13	7.6	5.0	✓
Fluoride in Water by IC	E235.F	858574	1	9	11.1	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	858570	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	858571	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	858573	1	11	9.0	5.0	✔
TDS by Gravimetry	E162	862935	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	862534	2	25	8.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	862536	2	13	15.3	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	859757	1	19	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	858572	1	12	8.3	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	859285	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	858601	1	13	7.6	5.0	✔
Fluoride in Water by IC	E235.F	858574	1	9	11.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	858570	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	858571	1	12	8.3	5.0	✔
Sulfate in Water by IC	E235.SO4	858573	1	11	9.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	862534	2	25	8.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	862536	2	13	15.3	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (BC List) by Headspace GC-MS	E611C  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

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Work Order : VA23A5076 Amendment 1  
Client : Comox Valley Regional District  
Project : 3



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



**Chain of Custody (COC) / Analytical Request Form**

Canada Toll Free: 1 800 668 9878

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(lab use only)

COC Number: 17 -

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Report To		Report Format / Distribution			Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																																		
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																		
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			4 day [P4-20%] <input type="checkbox"/>		3 day [P3-25%] <input type="checkbox"/>		2 day [P2-50%] <input type="checkbox"/>		1 Business day [E1 - 100%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																										
Phone: 250-898-3722		Compare Results to Criteria on Report - provide details below if box checked <input type="checkbox"/>			Date and Time Required for all E&P TATs:																																		
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			For tests that can not be performed according to the service level selected, you will be contacted.																																		
Street: 770 Hamston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca			Analysis Request																																		
City/Province: Courtenay, BC		Email 2			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																		
Postal Code: V9N 0G8		Email 3			<table border="1"> <tr> <td>Alkalinity (separated)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3)-N-N</td> <td>Conductivity</td> <td>TDS</td> <td>Dissolved CSR Metals (including Hg, Hardne)</td> <td>VOCs/NPH</td> <td colspan="4">SAMPLES ON HOLD</td> <td rowspan="2">Sample is hazardous (please provide further detail)</td> <td rowspan="2">NUMBER OF CONTAINERS</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Alkalinity (separated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3)-N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne)	VOCs/NPH	SAMPLES ON HOLD				Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS												
Alkalinity (separated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3)-N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne)	VOCs/NPH	SAMPLES ON HOLD				Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS																											
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution																																					
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																																					
Company:		Email 1 or Fax																																					
Contact:		Email 2																																					
Project Information		Oil and Gas Required Fields (client use)																																					
ALS Account # / Quote #: VA23-COVR100-001		AFE/Cost Center:		PO#																																			
Job #: 3		Major/Minor Code:		Routing Code:																																			
PO / AFE: 23-015		Requisitioner:																																					
LSD: CRWMC - Quarterly - GW		Location:																																					
ALS Lab Work Order # (lab use only):		ALS Contact: Selam W.		Sampler: C Stuart																																			
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Alkalinity (separated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3)-N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne)	VOCs/NPH	SAMPLES ON HOLD		Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS																								
	WG-030723-CS-49	07-Mar-23	0950	Water	X	X	X	X	X	X																													
	- 50		1130																																				
	- 51		1205																																				
	- 52		1355																																				
	- 53		1440																																				
	WG-03-070723-CS-54	07-Mar-23	1600	Water	X	X	X	X	X	X	X																												
Drinking Water (DW) Samples <sup>1</sup> (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)			SAMPLE CONDITION AS RECEIVED (lab use only)																																		
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																																		
Are samples for human consumption use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																																		
					Cooling Initiated <input type="checkbox"/>																																		
					INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C																													
										3																													
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)																															
Released by: C Stuart		Date: Mar 07 2023		Received by:		Date: Mar 9 2023		Received by: JLU		Date: MAR 9 2023		Time: 9:10 AM																											

Environmental Division  
Vancouver  
Work Order Reference  
**VA23A5076**



Telephone: +1 604 253 4188

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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

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



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A5217</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 7</p> <p><b>No. of samples analysed</b> : 7</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 10-Mar-2023 09:50</p> <p><b>Date Analysis Commenced</b> : 11-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:33</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (22/03/2023): This report has been amended to allow the distribution of an Electronic Data Deliverable (EDD) not previously provided. All analysis results are as per the previous report.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-030823-CS-55	WG-030823-CS-56	WG-030823-CS-57	TRIP BLANK	WG-030823-CS-58
Client sampling date / time					08-Mar-2023 10:00	08-Mar-2023 10:05	08-Mar-2023 10:45	08-Mar-2023 17:00	08-Mar-2023 11:30
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-001	VA23A5217-002	VA23A5217-003	VA23A5217-004	VA23A5217-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	252	253	323	<1.0	105
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	252	254	323	<1.0	105
Conductivity	----	E100	2.0	µS/cm	466	469	841	<2.0	198
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	252	257	424	<0.60	90.8
Solids, total dissolved [TDS]	----	E162	10	mg/L	269	289	535	<10	122
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0.0122	<0.0050	0.0222
Chloride	16887-00-6	E235.Cl	0.50	mg/L	2.58	2.56	63.1	<0.50	5.99
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.100 <sup>DLDS</sup>	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	1.70	1.69	9.68	<0.0050	0.219
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	1.70	1.69	9.68	<0.0051	0.220
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0010	0.0012
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.04	2.02	11.7	<0.30	5.10
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0014	0.0011	0.0010	<0.0010	0.0048
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0.00012	<0.00010	0.00017
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00585	0.00598	0.0157	<0.00010	0.00454
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.034	0.035	0.174	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000083	0.0000054	0.0000561	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	76.0	77.8	127	<0.050	23.7
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00124	0.00126	<0.00050	<0.00050	0.00780
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0.00036	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0.00208	<0.00020	<0.00020
Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-030823-CS-55	WG-030823-CS-56	WG-030823-CS-57	TRIP BLANK	WG-030823-CS-58
Client sampling date / time					08-Mar-2023 10:00	08-Mar-2023 10:05	08-Mar-2023 10:45	08-Mar-2023 17:00	08-Mar-2023 11:30	
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-001	VA23A5217-002	VA23A5217-003	VA23A5217-004	VA23A5217-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	15.2	15.2	25.9	<0.100	7.68	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0.369	<0.00010	<0.00010	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0.000099	<0.000050	0.000092	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0.00110	<0.00050	<0.00050	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.26	1.24	2.26	<0.100	0.772	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	0.000255	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	11.4	11.3	12.6	<0.050	7.31	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	6.26	6.23	24.8	<0.050	4.87	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.181	0.172	0.323	<0.00020	0.0685	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.75	0.83	4.32	<0.50	1.48	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000188	0.000196	0.000747	<0.000010	0.000309	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00165	0.00163	0.00161	<0.00050	0.00406	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	Field	Field	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	----	----	<0.50	<0.50	----	
Chloromethane	74-87-3	E611C	5.0	µg/L	----	----	<5.0	<5.0	----	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	----	----	<0.50	<0.50	----	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	----	----	<0.50	<0.50	----	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	----	----	<0.50	<0.50	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-55	WG-030823-CS-56	WG-030823-CS-57	TRIP BLANK	WG-030823-CS-58
(Matrix: Water)					Client sampling date / time	08-Mar-2023 10:00	08-Mar-2023 10:05	08-Mar-2023 10:45	08-Mar-2023 17:00	08-Mar-2023 11:30
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-001	VA23A5217-002	VA23A5217-003	VA23A5217-004	VA23A5217-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	---	---	<0.75	<0.75	---	
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	---	---	<0.20	<0.20	---	
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Chloroethane	75-00-3	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dichloromethane	75-09-2	E611C	1.0	µg/L	---	---	<1.0	<1.0	---	
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Trichloroethylene	79-01-6	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Vinyl chloride	75-01-4	E611C	0.40	µg/L	---	---	<0.40	<0.40	---	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Ethylbenzene	100-41-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Styrene	100-42-5	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Toluene	108-88-3	E611C	0.40	µg/L	---	---	<0.40	<0.40	---	
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	---	---	<0.40	<0.40	---	
Xylene, o-	95-47-6	E611C	0.30	µg/L	---	---	<0.30	<0.30	---	
Xylenes, total	1330-20-7	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-030823-CS-55	WG-030823-CS-56	WG-030823-CS-57	TRIP BLANK	WG-030823-CS-58
Client sampling date / time					08-Mar-2023 10:00	08-Mar-2023 10:05	08-Mar-2023 10:45	08-Mar-2023 17:00	08-Mar-2023 11:30	
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-001	VA23A5217-002	VA23A5217-003	VA23A5217-004	VA23A5217-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Bromoform	75-25-2	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Chloroform	67-66-3	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	---	---	<0.50	<0.50	---	
<b>Hydrocarbons</b>										
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	---	---	<100	<100	---	
VPHw	---	EC580A	100	µg/L	---	---	<100	<100	---	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	---	---	111	107	---	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	---	---	70.2	75.0	---	
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	---	---	96.2	96.8	---	

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



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-030823-CS-59	WG-030823-CS-60	----	----	----
Client sampling date / time					08-Mar-2023 12:55	08-Mar-2023 17:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-006	VA23A5217-007	-----	-----	-----
					Result	Result	----	----	----
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	254	<1.0	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	----	----	----
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	254	<1.0	----	----	----
Conductivity	----	E100	2.0	µS/cm	612	<2.0	----	----	----
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	250	<0.60	----	----	----
Solids, total dissolved [TDS]	----	E162	10	mg/L	357	<10	----	----	----
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	7.02	0.0098	----	----	----
Chloride	16887-00-6	E235.Cl	0.50	mg/L	47.5	<0.50	----	----	----
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0404	<0.0050	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	0.0404	<0.0051	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.87	<0.30	----	----	----
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0041	<0.0010	----	----	----
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00166	<0.00010	----	----	----
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0174	<0.00010	----	----	----
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	----	----	----
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.150	<0.010	----	----	----
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000480	<0.0000050	----	----	----
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	84.8	<0.050	----	----	----
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	----	----	----
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00018	<0.00010	----	----	----
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00026	<0.00020	----	----	----
Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.371	<0.010	----	----	----
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	----	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-59	WG-030823-CS-60	---	---	---
(Matrix: Water)										
Client sampling date / time					08-Mar-2023 12:55	08-Mar-2023 17:30	---	---	---	
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-006	VA23A5217-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Dissolved Metals</b>										
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	9.30	<0.100	---	---	---	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	1.42	<0.00010	---	---	---	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000132	<0.000050	---	---	---	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00138	<0.00050	---	---	---	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	---	---	---	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	5.26	<0.100	---	---	---	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	---	---	---	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	7.91	<0.050	---	---	---	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	25.2	<0.050	---	---	---	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.265	<0.00020	---	---	---	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.12	<0.50	---	---	---	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	---	---	---	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	---	---	---	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	---	---	---	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000110	<0.000010	---	---	---	
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	---	---	---	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	---	---	---	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	---	---	---	
Dissolved mercury filtration location	---	EP509	-	-	Field	Field	---	---	---	
Dissolved metals filtration location	---	EP421	-	-	Field	Field	---	---	---	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	---	---	---	---	
Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	---	---	---	---	
Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	---	---	---	---	



### Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-59	WG-030823-CS-60	----	----	----
(Matrix: Water)					Client sampling date / time	08-Mar-2023 12:55	08-Mar-2023 17:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-006	VA23A5217-007	-----	-----	-----	
					Result	Result	----	----	----	
<b>Volatile Organic Compounds</b>										
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C	0.75	µg/L	<0.75	---	---	---	---	---
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	---	---	---	---	---
Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	---	---	---	---	---
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	---	---	---	---	---
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Styrene	100-42-5	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Toluene	108-88-3	E611C	0.40	µg/L	<0.40	---	---	---	---	---
Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	---	---	---	---	---
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	---	---	---	---	---
Xylenes, total	1330-20-7	E611C	0.50	µg/L	<0.50	---	---	---	---	---
<b>Volatile Organic Compounds [THMs]</b>										



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-59	WG-030823-CS-60	----	----	----
(Matrix: Water)					Client sampling date / time	08-Mar-2023 12:55	08-Mar-2023 17:30	----	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5217-006	VA23A5217-007	-----	-----	-----	
					Result	Result	---	---	---	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	---	---	---	---	---
Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	---	---	---	---	---
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	---	---	---	---	---
VPHw	----	EC580A	100	µg/L	<100	---	---	---	---	---
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1	1.0	%	93.4	---	---	---	---	---
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C	1.0	%	73.1	---	---	---	---	---
Difluorobenzene, 1,4-	540-36-3	E611C	1.0	%	96.9	---	---	---	---	---

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23A5217</b>	<b>Page</b>	: 1 of 14
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 10-Mar-2023 09:50
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 11-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:33
<b>Sampler</b>	: Crystal Stuart, 250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 7		
<b>No. of samples analysed</b>	: 7		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 860422)</b>											
VA23A5217-003	WG-030823-CS-57	Conductivity	----	E100	2.0	µS/cm	841	846	0.593%	10%	----
<b>Physical Tests (QC Lot: 860423)</b>											
VA23A5217-003	WG-030823-CS-57	Alkalinity, bicarbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	323	326	0.709%	20%	----
		Alkalinity, carbonate (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO <sub>3</sub> )	----	E290	1.0	mg/L	323	326	0.709%	20%	----
<b>Physical Tests (QC Lot: 864178)</b>											
KS2300749-003	Anonymous	Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	<10	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 860425)</b>											
VA23A5293-001	Anonymous	Sulfate (as SO <sub>4</sub> )	14808-79-8	E235.SO4	0.30	mg/L	169	169	0.134%	20%	----
<b>Anions and Nutrients (QC Lot: 860426)</b>											
VA23A5293-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.48	3.47	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 860427)</b>											
VA23A5293-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.870	0.868	0.235%	20%	----
<b>Anions and Nutrients (QC Lot: 860428)</b>											
VA23A5293-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 860429)</b>											
VA23A5293-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.359	0.358	0.0825%	20%	----
<b>Anions and Nutrients (QC Lot: 863783)</b>											
VA23A5217-001	WG-030823-CS-55	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 860018)</b>											
VA23A5208-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0337	0.0327	3.12%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0182	0.0181	0.574%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	4.76	4.73	0.675%	20%	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 860018) - continued</b>											
VA23A5208-001	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00022	0.00021	0.00002	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.030	0.029	0.0008	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.451	0.443	1.76%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00216	0.00202	6.95%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000235	0.000248	0.000013	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.426	0.417	0.008	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.08	2.02	2.63%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.986	0.973	1.30%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0541	0.0560	3.49%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.43	1.35	0.08	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000061	0.000062	0.000002	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 862689)</b>											
VA23A5197-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 862690)</b>											
VA23A5217-007	WG-030823-CS-60	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 865363)</b>											
VA23A5198-001	Anonymous	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 865363) - continued</b>											
VA23A5198-001	Anonymous	Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 865362)</b>											
VA23A5198-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 860422)</b>						
Conductivity	---	E100	1	µS/cm	1.2	---
<b>Physical Tests (QCLot: 860423)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 864178)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 860425)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 860426)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 860427)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 860428)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 860429)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 863783)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 860018)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 860018) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 862689)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 862690)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 865363)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 865363) - continued</b>						
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 865362)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 860422)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
<b>Physical Tests (QCLot: 860423)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 864178)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 860425)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 860426)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860427)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860428)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860429)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 863783)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.8	85.0	115	----
<b>Dissolved Metals (QCLot: 860018)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	98.3	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	98.4	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	98.7	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	95.0	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.2	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.6	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	96.2	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.6	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 860018) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.2	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	95.5	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	90.7	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.3	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	94.5	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.8	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.8	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	95.2	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.4	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.3	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	97.6	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	99.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	97.3	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	96.2	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.5	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.5	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	97.3	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.6	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	92.8	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 865363)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	97.9	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	99.3	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	106	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	98.4	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	103	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	98.4	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 865363) - continued</b>									
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	98.6	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	91.2	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	95.4	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	91.2	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	96.3	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	99.7	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	88.7	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	86.5	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	106	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	98.1	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	108	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	102	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	98.3	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	107	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	102	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	114	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	106	70.0	130	----
<b>Hydrocarbons (QCLot: 865362)</b>									
VHw (C6-C10)	---	E581.VH+F1	100	µg/L	6310 µg/L	77.1	70.0	130	----





### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 860425)</b>										
VA23A5293-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 860426)</b>										
VA23A5293-002	Anonymous	Chloride	16887-00-6	E235.Cl	114 mg/L	100 mg/L	114	75.0	125	----
<b>Anions and Nutrients (QCLot: 860427)</b>										
VA23A5293-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.86 mg/L	2.5 mg/L	114	75.0	125	----
<b>Anions and Nutrients (QCLot: 860428)</b>										
VA23A5293-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.578 mg/L	0.5 mg/L	116	75.0	125	----
<b>Anions and Nutrients (QCLot: 860429)</b>										
VA23A5293-002	Anonymous	Fluoride	16984-48-8	E235.F	1.17 mg/L	1 mg/L	117	75.0	125	----
<b>Anions and Nutrients (QCLot: 863783)</b>										
VA23A5217-002	WG-030823-CS-56	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
<b>Dissolved Metals (QCLot: 860018)</b>										
VA23A5208-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.188 mg/L	0.2 mg/L	93.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0189 mg/L	0.02 mg/L	94.5	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0190 mg/L	0.02 mg/L	95.1	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00873 mg/L	0.01 mg/L	87.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	97.8	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0379 mg/L	0.04 mg/L	94.6	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	90.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.84 mg/L	2 mg/L	91.8	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0906 mg/L	0.1 mg/L	90.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0190 mg/L	0.02 mg/L	94.8	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 860018) - continued</b>										
VA23A5208-002	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.38 mg/L	10 mg/L	93.8	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.23 mg/L	4 mg/L	106	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0378 mg/L	0.04 mg/L	94.6	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.25 mg/L	10 mg/L	92.5	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.0 mg/L	20 mg/L	94.8	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00364 mg/L	0.004 mg/L	91.1	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0357 mg/L	0.04 mg/L	89.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00382 mg/L	0.004 mg/L	95.5	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0938 mg/L	0.1 mg/L	93.8	70.0	130	----
Zinc, dissolved	7440-66-6	E421	0.373 mg/L	0.4 mg/L	93.2	70.0	130	----		
Zirconium, dissolved	7440-67-7	E421	0.0391 mg/L	0.04 mg/L	97.7	70.0	130	----		
<b>Dissolved Metals (QCLot: 862689)</b>										
VA23A5197-003	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000100 mg/L	0.0001 mg/L	100	70.0	130	----
<b>Dissolved Metals (QCLot: 862690)</b>										
VA23A5220-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000956 mg/L	0.0001 mg/L	95.6	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 865363)</b>										
VA23A5217-003	WG-030823-CS-57	Benzene	71-43-2	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Bromoform	75-25-2	E611C	98.9 µg/L	100 µg/L	98.9	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Chlorobenzene	108-90-7	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Chloroethane	75-00-3	E611C	108 µg/L	100 µg/L	108	50.0	150	----
		Chloroform	67-66-3	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Chloromethane	74-87-3	E611C	106 µg/L	100 µg/L	106	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	103 µg/L	100 µg/L	103	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 865363) - continued</b>										
VA23A5217-003	WG-030823-CS-57	Dichloroethane, 1,2-	107-06-2	E611C	93.6 µg/L	100 µg/L	93.6	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	98.1 µg/L	100 µg/L	98.1	60.0	140	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloromethane	75-09-2	E611C	98.1 µg/L	100 µg/L	98.1	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	92.7 µg/L	100 µg/L	92.7	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	88.4 µg/L	100 µg/L	88.4	60.0	140	----
		Ethylbenzene	100-41-4	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Styrene	100-42-5	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	79-34-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		Toluene	108-88-3	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Trichloroethylene	79-01-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	108 µg/L	100 µg/L	108	50.0	150	----
		Vinyl chloride	75-01-4	E611C	104 µg/L	100 µg/L	104	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	232 µg/L	200 µg/L	116	60.0	140	----
		Xylene, o-	95-47-6	E611C	110 µg/L	100 µg/L	110	60.0	140	----
<b>Hydrocarbons (QCLot: 865362)</b>										
VA23A5217-004	TRIP BLANK	VHw (C6-C10)	----	E581.VH+F1	4920 µg/L	6310 µg/L	77.9	60.0	140	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23A5217</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 7</p> <p><b>No. of samples analysed</b> : 7</p>	<p><b>Page</b> : 1 of 18</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 10-Mar-2023 09:50</p> <p><b>Issue Date</b> : 22-Mar-2023 14:34</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### Summary of Outliers

#### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) TRIP BLANK	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-55	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-56	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-57	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-58	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-59	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-60	E298	08-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE TRIP BLANK	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-55	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-56	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-57	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-58	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-59	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-030823-CS-60	E235.Cl	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE TRIP BLANK	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-55	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-56	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-57	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-58	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-59	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-60	E235.F	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE TRIP BLANK	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-55	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-56	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-57	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-58	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-59	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-60	E235.NO3-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE TRIP BLANK	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-55	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-56	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-57	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-58	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-59	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-60	E235.NO2-L	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE TRIP BLANK	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-55	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-56	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-57	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-58	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-59	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-60	E235.SO4	08-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) TRIP BLANK	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-55	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-56	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-57	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-58	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-59	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-030823-CS-60	E509	08-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) TRIP BLANK	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-030823-CS-55	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-030823-CS-56	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-57	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-58	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-59	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-60	E421	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	180 days	5 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> TRIP BLANK	E581.VH+F1	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-57	E581.VH+F1	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✔	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-59	E581.VH+F1	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> TRIP BLANK	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-030823-CS-55	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030823-CS-56	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030823-CS-57	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030823-CS-58	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030823-CS-59	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-030823-CS-60	E290	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE TRIP BLANK	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-55	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-56	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-57	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-58	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-59	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-030823-CS-60	E100	08-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	5 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030823-CS-55	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030823-CS-56	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030823-CS-57	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030823-CS-58	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-030823-CS-59	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE TRIP BLANK	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	* EHT	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
<b>HDPE</b> WG-030823-CS-60	E162	08-Mar-2023	----	----	----		16-Mar-2023	7 days	8 days	*
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TRIP BLANK	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-57	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-59	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TRIP BLANK	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-57	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-59	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TRIP BLANK	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-57	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-59	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> TRIP BLANK	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-57	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-030823-CS-59	E611C	08-Mar-2023	16-Mar-2023	----	----		16-Mar-2023	14 days	8 days	✓

**Legend & Qualifier Definitions**

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862689	2	29	6.9	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	860018	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	864178	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	865362	1	20	5.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	865363	1	15	6.6	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862689	2	29	6.9	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	860018	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	864178	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	865362	1	20	5.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	865363	1	15	6.6	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862689	2	29	6.9	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	860018	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	864178	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	865362	1	20	5.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	865363	1	15	6.6	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862689	2	29	6.9	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	860018	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	865362	1	20	5.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	865363	1	15	6.6	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421  Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509  Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1  Vancouver - Environmental	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (BC List) by Headspace GC-MS	E611C  Vancouver - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100  Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N  Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A  Vancouver - Environmental	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298  Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509  Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

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Work Order : VA23A5217 Amendment 1  
Client : Comox Valley Regional District  
Project : 3



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
VOCs Preparation for Headspace Analysis	EP581  Vancouver - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



all of these are in 2 coolers.

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>								
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply								
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			Emergency <input type="checkbox"/>		Emergency <input type="checkbox"/>						
Phone: 250-898-3722		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked.			4 day [P4-20%] <input type="checkbox"/>		1 Business day [E1 - 100%] <input type="checkbox"/>						
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>						
Street: 770 Harmston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca			Date and Time Required for all E&P TATs: _____								
City/Province: Courtenay, BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.								
Postal Code: V9N 0G8		Email 3			<b>Analysis Request</b>								
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below								
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Alkalinity (speciated)								
Company:		Email 1 or Fax			Ammonia-N								
Contact:		Email 2			Anions (Cl, F, SO4, NO2, NO3) N+N								
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>			Conductivity								
ALS Account # / Quote #: VA23-COVR100-001		AFE/Coast Center: _____ PO#: _____			TDS								
Job #: 3		Major/Minor Code: _____ Routing Code: _____			Dissolved CSR Metals (including Hg, Hach) _____								
PO / AFE: 23-015		Requisitioner: _____			VOCs/MPH _____								
LSD: CRWMC - Quarterly - GW		Location: _____			SON HOLD								
ALS Lab Work Order # (lab use only): 5217		ALS Contact: Selam W. Sample: Stuart			COMPONENT IS HAZARDOUS (please provide further detail)								
ALS Sample # (lab use only)		Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mm-yy)		Time (hh:mm)		Sample Type		NUMBER OF CONTAINERS		
		WG-030823-CS-55			08-Mar-23		1000		Water		X X X X X X		
		WG-030823-CS-56			08-Mar-23		1005		↓		↓ ↓ ↓ ↓ ↓ ↓		
		WG-030823-CS-57			08-Mar-23		1045		↓		↓ ↓ ↓ ↓ ↓ ↓ X		
		Trip blank			08-Mar-23		1700		Water		X X X X X X X		
		WG-030823-CS-58			08-Mar-23		1130		Water		↓ ↓ ↓ ↓ ↓ ↓		
		WG-030823-CS-59			09-Mar-23		1255		Water		↓ ↓ ↓ ↓ ↓ ↓ X		
		WG-030823-CS-60			08-Mar-23		1730		Water		X X X X X X X		
<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>											
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>											
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO		Frozen <input type="checkbox"/> Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Cooling Initiated <input type="checkbox"/>											
		Sf Observations Yes <input type="checkbox"/> No <input type="checkbox"/>											
		Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>											
		INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C						
							2 2 3						
<b>SHIPMENT RELEASE (client use)</b>				<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>				<b>FINAL SHIPMENT RECEPTION (lab use only)</b>					
Released by: Stuart		Date: Mar 09/2023		Time: 0000		Received by: JC		Date: MAR 10 2023		Time: 950am			



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23A5220</b></p> <p><b>Amendment</b> : <b>2</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 3</p> <p><b>No. of samples analysed</b> : 3</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 10-Mar-2023 09:50</p> <p><b>Date Analysis Commenced</b> : 11-Mar-2023</p> <p><b>Issue Date</b> : 22-Mar-2023 14:40</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (16/03/2023): This report has been amended to alter the site details, project reference code or order number. All analysis results are as per the previous report.





## Analytical Results

Sub-Matrix: Water					Client sample ID		WG-030823-CS-11	WG-030823-CS-12	WG-030823-CS-13	----	----
(Matrix: Water)					Client sampling date / time		03-Mar-2023 13:40	03-Mar-2023 14:25	03-Mar-2023 14:30	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5220-001	VA23A5220-002	VA23A5220-003	-----	-----		
					Result	Result	Result	----	----		
<b>Physical Tests</b>											
Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	39.7	6.3	6.7	----	----		
Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----		
Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	<1.0	----	----		
Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	39.7	6.3	6.7	----	----		
Conductivity	----	E100	2.0	µS/cm	390	28.9	29.1	----	----		
Hardness (as CaCO3), dissolved	----	EC100	0.60	mg/L	89.1	7.96	8.02	----	----		
Solids, total dissolved [TDS]	----	E162	10	mg/L	234	17	31	----	----		
<b>Anions and Nutrients</b>											
Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0054	0.0126	0.0117	----	----		
Chloride	16887-00-6	E235.Cl	0.50	mg/L	50.0	3.32	3.32	----	----		
Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	<0.020	----	----		
Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	10.9	0.0512	0.0493	----	----		
Nitrate + Nitrite (as N)	----	EC235.N+N	0.0050	mg/L	10.9	0.0512	0.0493	----	----		
Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0062	<0.0010	<0.0010	----	----		
Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	29.1	0.94	0.94	----	----		
<b>Total Metals</b>											
Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.299	0.0540	0.0531	----	----		
Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00012	<0.00010	<0.00010	----	----		
Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00024	0.00013	0.00012	----	----		
Barium, total	7440-39-3	E420	0.00010	mg/L	0.00537	0.00144	0.00138	----	----		
Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----		
Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----		
Boron, total	7440-42-8	E420	0.010	mg/L	0.023	<0.010	<0.010	----	----		
Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000246	<0.0000050	<0.0000050	----	----		
Calcium, total	7440-70-2	E420	0.050	mg/L	26.9	1.89	1.92	----	----		
Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----		
Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----		
Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00024	<0.00010	<0.00010	----	----		
Copper, total	7440-50-8	E420	0.00050	mg/L	0.00390	<0.00050	<0.00050	----	----		



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-11	WG-030823-CS-12	WG-030823-CS-13	----	----
(Matrix: Water)										
Client sampling date / time					03-Mar-2023 13:40	03-Mar-2023 14:25	03-Mar-2023 14:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA23A5220-001	VA23A5220-002	VA23A5220-003	-----	-----	
					Result	Result	Result	----	----	
<b>Total Metals</b>										
Iron, total	7439-89-6	E420	0.010	mg/L	0.306	0.096	0.094	----	----	
Lead, total	7439-92-1	E420	0.000050	mg/L	0.000313	<0.000050	<0.000050	----	----	
Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Magnesium, total	7439-95-4	E420	0.0050	mg/L	5.05	0.804	0.798	----	----	
Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0415	0.00668	0.00734	----	----	
Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000229	<0.000050	<0.000050	----	----	
Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00085	<0.00050	<0.00050	----	----	
Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
Potassium, total	7440-09-7	E420	0.050	mg/L	0.947	0.134	0.129	----	----	
Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00064	0.00021	<0.00020	----	----	
Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000081	0.000051	0.000062	----	----	
Silicon, total	7440-21-3	E420	0.10	mg/L	5.04	2.44	2.46	----	----	
Silver, total	7440-22-4	E420	0.000010	mg/L	0.000011	<0.000010	<0.000010	----	----	
Sodium, total	7440-23-5	E420	0.050	mg/L	37.6	2.51	2.47	----	----	
Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0991	0.00875	0.00863	----	----	
Sulfur, total	7704-34-9	E420	0.50	mg/L	9.04	<0.50	<0.50	----	----	
Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Titanium, total	7440-32-6	E420	0.00030	mg/L	0.0208	0.00130	0.00111	----	----	
Tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000017	<0.000010	<0.000010	----	----	
Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00138	<0.00050	<0.00050	----	----	
Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0089	<0.0030	<0.0030	----	----	
Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0204	0.0495	0.0495	----	----	
Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00011	<0.00010	<0.00010	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-11	WG-030823-CS-12	WG-030823-CS-13	----	----
(Matrix: Water)										
Client sampling date / time					03-Mar-2023 13:40	03-Mar-2023 14:25	03-Mar-2023 14:30	----	----	
Analyte	CAS Number	Method	LOR	Unit	VA23A5220-001	VA23A5220-002	VA23A5220-003	-----	-----	
					Result	Result	Result	----	----	
<b>Dissolved Metals</b>										
Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00016	<0.00010	<0.00010	----	----	
Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00449	0.00134	0.00135	----	----	
Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.022	<0.010	<0.010	----	----	
Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000208	<0.0000050	<0.0000050	----	----	
Calcium, dissolved	7440-70-2	E421	0.050	mg/L	27.0	1.83	1.88	----	----	
Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	0.00092	<0.00050	----	----	
Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00266	0.00027	0.00022	----	----	
Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.024	0.074	0.072	----	----	
Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	5.27	0.824	0.807	----	----	
Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0344	0.00527	0.00515	----	----	
Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000239	<0.000050	<0.000050	----	----	
Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	0.00056	<0.00050	----	----	
Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
Potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.00	0.140	0.132	----	----	
Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000092	<0.000050	<0.000050	----	----	
Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.90	2.54	2.57	----	----	
Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Sodium, dissolved	7440-23-5	E421	0.050	mg/L	37.6	2.58	2.46	----	----	
Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0974	0.00800	0.00802	----	----	
Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	9.33	<0.50	<0.50	----	----	
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00069	0.00078	0.00068	----	----	
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	



### Analytical Results

Sub-Matrix: Water					Client sample ID	WG-030823-CS-11	WG-030823-CS-12	WG-030823-CS-13	----	----
(Matrix: Water)					Client sampling date / time	03-Mar-2023 13:40	03-Mar-2023 14:25	03-Mar-2023 14:30	----	----
Analyte	CAS Number	Method	LOR	Unit	VA23A5220-001	VA23A5220-002	VA23A5220-003	-----	-----	
					Result	Result	Result	----	----	
<b>Dissolved Metals</b>										
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----	
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0066	0.0012	<0.0010	----	----	
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Dissolved mercury filtration location	----	EP509	-	-	Field	Field	Field	----	----	
Dissolved metals filtration location	----	EP421	-	-	Field	Field	Field	----	----	

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

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23A5220</b>	<b>Page</b>	: 1 of 16
<b>Amendment</b>	: <b>2</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3	<b>Date Samples Received</b>	: 10-Mar-2023 09:50
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 11-Mar-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 22-Mar-2023 14:40
<b>Sampler</b>	: Crystal Stuart, 250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-SW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 3		
<b>No. of samples analysed</b>	: 3		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 859948)</b>											
KS2300731-007	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	518	553	6.44%	20%	----
<b>Physical Tests (QC Lot: 860422)</b>											
VA23A5217-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	841	846	0.593%	10%	----
<b>Physical Tests (QC Lot: 860423)</b>											
VA23A5217-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	323	326	0.709%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	323	326	0.709%	20%	----
<b>Anions and Nutrients (QC Lot: 860425)</b>											
VA23A5293-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	169	169	0.134%	20%	----
<b>Anions and Nutrients (QC Lot: 860426)</b>											
VA23A5293-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.48	3.47	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 860427)</b>											
VA23A5293-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.870	0.868	0.235%	20%	----
<b>Anions and Nutrients (QC Lot: 860428)</b>											
VA23A5293-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 860429)</b>											
VA23A5293-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.359	0.358	0.0825%	20%	----
<b>Anions and Nutrients (QC Lot: 863783)</b>											
VA23A5217-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 860115)</b>											
VA23A5191-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0926	0.0907	2.10%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00013	0.00013	0.000004	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00038	0.00042	0.00004	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0153	0.0154	0.352%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.022	0.022	0.0003	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000244	0.0000232	0.0000012	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	36.0	34.3	4.82%	20%	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 860115) - continued</b>											
VA23A5191-001	Anonymous	Cesium, total	7440-46-2	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.000010	mg/L	0.000020	0.000020	0.000002	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.000050	mg/L	0.00218	0.00214	0.000005	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.296	0.299	0.952%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000059	0.000058	0.0000007	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0010	0.0011	0.00002	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	14.2	14.3	0.608%	20%	----
		Manganese, total	7439-96-5	E420	0.000010	mg/L	0.173	0.176	1.66%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00358	0.00376	4.78%	20%	----
		Nickel, total	7440-02-0	E420	0.000050	mg/L	0.00080	0.00082	0.00002	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	1.40	1.41	0.668%	20%	----
		Rubidium, total	7440-17-7	E420	0.000020	mg/L	0.00054	0.00051	0.00003	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000121	0.000139	0.000018	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	5.94	5.98	0.684%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	66.6	66.5	0.128%	20%	----
		Strontium, total	7440-24-6	E420	0.000020	mg/L	0.156	0.160	2.65%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	5.56	5.42	2.54%	20%	----
		Tellurium, total	13494-80-9	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.000030	mg/L	0.00410	0.00422	2.87%	20%	----
		Tungsten, total	7440-33-7	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000386	0.000384	0.572%	20%	----
		Vanadium, total	7440-62-2	E420	0.000050	mg/L	0.00061	0.00064	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0171	0.0169	0.0002	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 862964)</b>											
VA23A5220-001	WG-030823-CS-11	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 861621)</b>											
VA23A5242-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0155	0.0146	5.92%	20%	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 861621) - continued</b>											
VA23A5242-001	Anonymous	Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00053	0.00056	0.00003	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00371	0.00365	1.71%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0233	0.0227	2.70%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.039	0.040	0.001	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	51.8	54.3	4.59%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	0.00136	0.00142	0.00006	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00020	0.00021	0.000009	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00090	0.00082	0.00007	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.160	0.162	1.14%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.000056	0.000057	0.0000009	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.128	0.130	2.11%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	9.43	9.40	0.271%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0818	0.0826	0.986%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00209	0.00207	0.904%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00185	0.00185	0.0000004	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	3.79	3.81	0.572%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.32	3.35	0.948%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	70.0	70.8	1.03%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	1.55	1.53	1.31%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	58.5	58.8	0.522%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000849	0.000835	1.69%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0014	0.0012	0.0002	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 862690)**



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 862690) - continued</b>											
VA23A5217-007	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 859948)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 860422)</b>						
Conductivity	---	E100	1	µS/cm	1.2	---
<b>Physical Tests (QCLot: 860423)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Anions and Nutrients (QCLot: 860425)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 860426)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 860427)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 860428)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 860429)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 863783)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Total Metals (QCLot: 860115)</b>						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	---
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 860115) - continued</b>						
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 862964)</b>						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 861621)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 861621) - continued</b>						
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 862690)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----





### Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 859948)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	92.5	85.0	115	----
<b>Physical Tests (QCLot: 860422)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	99.6	90.0	110	----
<b>Physical Tests (QCLot: 860423)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Anions and Nutrients (QCLot: 860425)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 860426)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860427)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860428)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 860429)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 863783)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.8	85.0	115	----
<b>Total Metals (QCLot: 860115)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	103	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	105	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	98.0	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	98.0	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	98.8	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	99.1	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	102	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.9	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.8	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 860115) - continued</b>									
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	94.8	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	104	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.2	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	95.0	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	98.6	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	96.8	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	98.5	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	96.1	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	100	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	99.4	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100.0	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	102	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	103	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	104	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	106	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	95.6	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.4	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	97.1	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	100	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	95.6	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	101	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.1	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	100	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	97.0	80.0	120	----
<b>Total Metals (QCLot: 862964)</b>									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----
<b>Dissolved Metals (QCLot: 861621)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----





Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 861621) - continued</b>									
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.9	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	96.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.3	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.0	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.8	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.5	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	92.3	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	96.3	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	99.8	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	97.6	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	95.7	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	99.3	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	96.0	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.0	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	112	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	106	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.8	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	98.9	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.3	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	92.4	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	101	80.0	120	----



**Matrix Spike (MS) Report**

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 860425)</b>										
VA23A5293-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	100 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 860426)</b>										
VA23A5293-002	Anonymous	Chloride	16887-00-6	E235.Cl	114 mg/L	100 mg/L	114	75.0	125	----
<b>Anions and Nutrients (QCLot: 860427)</b>										
VA23A5293-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.86 mg/L	2.5 mg/L	114	75.0	125	----
<b>Anions and Nutrients (QCLot: 860428)</b>										
VA23A5293-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.578 mg/L	0.5 mg/L	116	75.0	125	----
<b>Anions and Nutrients (QCLot: 860429)</b>										
VA23A5293-002	Anonymous	Fluoride	16984-48-8	E235.F	1.17 mg/L	1 mg/L	117	75.0	125	----
<b>Anions and Nutrients (QCLot: 863783)</b>										
VA23A5217-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
<b>Total Metals (QCLot: 860115)</b>										
VA23A5191-002	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Barium, total	7440-39-3	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0377 mg/L	0.04 mg/L	94.3	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00950 mg/L	0.01 mg/L	95.0	70.0	130	----
		Boron, total	7440-42-8	E420	0.096 mg/L	0.1 mg/L	96.6	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00963 mg/L	0.01 mg/L	96.3	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		Copper, total	7440-50-8	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Iron, total	7439-89-6	E420	1.90 mg/L	2 mg/L	95.0	70.0	130	----
		Lead, total	7439-92-1	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0898 mg/L	0.1 mg/L	89.8	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 860115) - continued</b>										
VA23A5191-002	Anonymous	Molybdenum, total	7439-98-7	E420	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.46 mg/L	10 mg/L	94.6	70.0	130	----
		Potassium, total	7440-09-7	E420	4.23 mg/L	4 mg/L	106	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0397 mg/L	0.04 mg/L	99.3	70.0	130	----
		Silicon, total	7440-21-3	E420	8.57 mg/L	10 mg/L	85.7	70.0	130	----
		Silver, total	7440-22-4	E420	0.00402 mg/L	0.004 mg/L	100	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	18.3 mg/L	20 mg/L	91.5	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00389 mg/L	0.004 mg/L	97.2	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0165 mg/L	0.02 mg/L	82.4	70.0	130	----
		Tin, total	7440-31-5	E420	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00398 mg/L	0.004 mg/L	99.5	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0974 mg/L	0.1 mg/L	97.4	70.0	130	----
		Zinc, total	7440-66-6	E420	0.382 mg/L	0.4 mg/L	95.6	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
<b>Total Metals (QCLot: 862964)</b>										
VA23A5220-002	WG-030823-CS-12	Mercury, total	7439-97-6	E508	0.0000978 mg/L	0.0001 mg/L	97.8	70.0	130	----
<b>Dissolved Metals (QCLot: 861621)</b>										
VA23A5243-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	97.0	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0197 mg/L	0.02 mg/L	98.6	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00874 mg/L	0.01 mg/L	87.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.100 mg/L	0.1 mg/L	99.6	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00395 mg/L	0.004 mg/L	98.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	3.77 mg/L	4 mg/L	94.3	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0383 mg/L	0.04 mg/L	95.7	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 861621) - continued</b>										
VA23A5243-002	Anonymous	Copper, dissolved	7440-50-8	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.90 mg/L	2 mg/L	95.2	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0992 mg/L	0.1 mg/L	99.2	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	0.968 mg/L	1 mg/L	96.8	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0192 mg/L	0.02 mg/L	95.8	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.30 mg/L	10 mg/L	93.0	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.97 mg/L	4 mg/L	99.2	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0391 mg/L	0.04 mg/L	97.9	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.35 mg/L	10 mg/L	93.5	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	2.00 mg/L	2 mg/L	100	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.3 mg/L	20 mg/L	96.5	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00379 mg/L	0.004 mg/L	94.7	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0381 mg/L	0.04 mg/L	95.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0960 mg/L	0.1 mg/L	96.0	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.388 mg/L	0.4 mg/L	97.0	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
<b>Dissolved Metals (QCLot: 862690)</b>										
VA23A5220-001	WG-030823-CS-11	Mercury, dissolved	7439-97-6	E509	0.0000956 mg/L	0.0001 mg/L	95.6	70.0	130	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23A5220</b></p> <p><b>Amendment</b> : <b>2</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 3</p> <p><b>No. of samples analysed</b> : 3</p>	<p><b>Page</b> : 1 of 11</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 10-Mar-2023 09:50</p> <p><b>Issue Date</b> : 22-Mar-2023 14:40</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-11	E298	03-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-12	E298	03-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	12 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-030823-CS-13	E298	03-Mar-2023	15-Mar-2023	----	----		15-Mar-2023	28 days	12 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-030823-CS-11	E235.Cl	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-030823-CS-12	E235.Cl	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-030823-CS-13	E235.Cl	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-030823-CS-11	E235.F	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-12	E235.F	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-030823-CS-13	E235.F	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-11	E235.NO3-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-12	E235.NO3-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-13	E235.NO3-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-11	E235.NO2-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-12	E235.NO2-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-030823-CS-13	E235.NO2-L	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	3 days	8 days	* EHTR-FM	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-030823-CS-11	E235.SO4	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✓	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> WG-030823-CS-12	E235.SO4	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✔
<b>Anions and Nutrients : Sulfate in Water by IC</b>										
<b>HDPE</b> WG-030823-CS-13	E235.SO4	03-Mar-2023	11-Mar-2023	----	----		11-Mar-2023	28 days	8 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030823-CS-11	E509	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030823-CS-12	E509	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial dissolved (hydrochloric acid)</b> WG-030823-CS-13	E509	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-11	E421	03-Mar-2023	13-Mar-2023	----	----		14-Mar-2023	180 days	10 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-12	E421	03-Mar-2023	13-Mar-2023	----	----		14-Mar-2023	180 days	10 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE dissolved (nitric acid)</b> WG-030823-CS-13	E421	03-Mar-2023	13-Mar-2023	----	----		14-Mar-2023	180 days	10 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-030823-CS-11	E290	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	10 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-030823-CS-12	E290	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	10 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-030823-CS-13	E290	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	14 days	10 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-030823-CS-11	E100	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	10 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-030823-CS-12	E100	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	10 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-030823-CS-13	E100	03-Mar-2023	11-Mar-2023	----	----		13-Mar-2023	28 days	10 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-030823-CS-11	E162	03-Mar-2023	----	----	----		12-Mar-2023	7 days	9 days	* EHTL
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-030823-CS-12	E162	03-Mar-2023	----	----	----		12-Mar-2023	7 days	9 days	* EHTL
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-030823-CS-13	E162	03-Mar-2023	----	----	----		12-Mar-2023	7 days	9 days	* EHTL
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial total (hydrochloric acid) WG-030823-CS-11	E508	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WG-030823-CS-12	E508	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WG-030823-CS-13	E508	03-Mar-2023	14-Mar-2023	----	----		14-Mar-2023	28 days	11 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WG-030823-CS-11	E420	03-Mar-2023	11-Mar-2023	----	----		12-Mar-2023	180 days	9 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WG-030823-CS-12	E420	03-Mar-2023	11-Mar-2023	----	----		12-Mar-2023	180 days	9 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WG-030823-CS-13	E420	03-Mar-2023	11-Mar-2023	----	----		12-Mar-2023	180 days	9 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862690	1	9	11.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	861621	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	859948	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	862964	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	860115	1	15	6.6	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862690	1	9	11.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	861621	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	859948	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	862964	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	860115	1	15	6.6	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	860423	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Conductivity in Water	E100	860422	1	10	10.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862690	1	9	11.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	861621	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	859948	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	862964	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	860115	1	15	6.6	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	863783	1	15	6.6	5.0	✔
Chloride in Water by IC	E235.Cl	860426	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	862690	1	9	11.1	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	861621	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	860429	1	20	5.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	860427	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	860428	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	860425	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	862964	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	860115	1	15	6.6	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



ALS Environmental

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 17 -

Page 1 of 1

www.alsglobal.com

**Report To** Contact and company name below will appear on the final report

Company: Comox Valley Regional District

Contact: Crystal Stuart

Phone: 250-898-3722

Street: 770 Harmston Avenue

City/Province: Courtenay, BC

Postal Code: V9N 0G8

Invoice To: Same as Report To  YES  NO

Copy of Invoice with Report  YES  NO

Company: [blank]

Contact: [blank]

**Project Information**

ALS Account # / Quote #: VA23-COVR100-001

Job #: 3

PO / AFE: 23-015

LSD: CRWMC - Quarterly - SW

ALS Lab Work Order # (lab use only): 5220

**Report Format / Distribution**

Select Report Format:  PDF  EXCEL  EDD (DIGITAL)

Quality Control (QC) Report with Report  YES  NO

Compare Results to Criteria on Report - provide details below if box checked

Select Distribution:  EMAIL  MAIL  FAX

Email 1 or Fax: cstuart@comoxvalleyrd.ca

Email 2: [blank]

Email 3: [blank]

**Invoice Distribution**

Select Invoice Distribution:  EMAIL  MAIL  FAX

Email 1 or Fax: [blank]

Email 2: [blank]

**Oil and Gas Required Fields (client use)**

AFE/Cost Center: [blank] PO#: [blank]

Major/Minor Code: [blank] Routing Code: [blank]

Requisitioner: [blank]

Location: [blank]

ALS Contact: Selam W. Sampler: C Stuart

**Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)**

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

Priority (Business Days):

4 day [P4-20%]  1 Business day [E1 - 100%]

3 day [P3-25%]  Same Day, Weekend or Statutory holiday [E2 -200%]

2 day [P2-50%]  (Laboratory opening fees may apply)

Date and Time Required for all E&P TATs: [blank]

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

**Analysis Request**

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Alkalinity (Speciated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3, Ne-N)	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Dissolved CSR Metals (including Hg, Hardness)	SAMPLES ON HOLD	NUMBER OF CONTAINERS
X	X	X	X	X	X	X	X		
								X	
X	X	X	X	X	X	X	X	X	

**Drinking Water (DW) Samples<sup>1</sup> (client use)**

Are samples taken from a Regulated DW System?  YES  NO

Are samples for human consumption/ use?  YES  NO

Special Instructions: [blank]

**Environmental Division Vancouver**

Work Order Reference VA23A5220

Telephone: +1 604 253 4188

**Drop-downs list below**

**SAMPLE CONDITION AS RECEIVED (lab use only)**

Frozen  Ice Packs  Ice Cubes  Cooling Initiated

SIF Observations Yes  No

Custody seal intact Yes  No

INITIAL COOLER TEMPERATURES °C: [blank]

FINAL COOLER TEMPERATURES °C: 2 2 3

**SHIPMENT RELEASE (client use)**

Released by: C Stuart Date: Mar 9/2023 Time: 10:00

**INITIAL SHIPMENT RECEPTION (lab use only)**

Received by: [blank] Date: [blank] Time: [blank]

**FINAL SHIPMENT RECEPTION (lab use only)**

Received by: JC Date: MAR 10 2023 Time: 9:50am



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B0448</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 12-May-2023 12:15</p> <p><b>Date Analysis Commenced</b> : 13-May-2023</p> <p><b>Issue Date</b> : 19-May-2023 16:04</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					WG-051023-CS-01	WG-051023-CS-02	WG-051023-CS-03	WG-051023-CS-04	WG-051023-CS-05
Client sampling date / time					10-May-2023 10:15	10-May-2023 11:30	10-May-2023 12:25	10-May-2023 13:40	10-May-2023 13:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0448-001	VA23B0448-002	VA23B0448-003	VA23B0448-004	VA23B0448-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	37.3	113	90.1	97.9	98.0
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	37.3	113	90.1	97.9	98.0
Conductivity	----	E100/VA	2.0	µS/cm	79.9	223	186	197	197
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	36.1	111	89.7	96.1	95.1
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	63	154	123	120	122
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	1.03	2.49	2.72	1.48	1.48
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	0.025	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0770	0.228	0.650	0.193	0.193
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0770	0.228	0.650	0.193	0.193
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.53	3.22	2.09	2.70	2.71
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0023	0.0026	0.0035	0.0044	0.0048
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	<0.00010	0.00068	0.00027	0.00189	0.00195
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00129	0.00219	0.00745	0.00433	0.00439
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	11.9	35.8	25.9	29.8	29.2
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	0.00057	0.00259	0.00052	0.00055
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					WG-051023-CS-01	WG-051023-CS-02	WG-051023-CS-03	WG-051023-CS-04	WG-051023-CS-05
Client sampling date / time					10-May-2023 10:15	10-May-2023 11:30	10-May-2023 12:25	10-May-2023 13:40	10-May-2023 13:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0448-001	VA23B0448-002	VA23B0448-003	VA23B0448-004	VA23B0448-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.56	5.32	6.08	5.27	5.38
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000164	0.000106	0.000164	0.000106	0.000105
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.176	0.795	0.497	1.18	1.21
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000109	0.000094	0.000125	0.000200	0.000224
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.28	6.43	6.61	6.10	6.07
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.11	1.87	2.33	1.53	1.54
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0176	0.0570	0.0425	0.0389	0.0397
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.70	1.01	0.56	0.80	0.82
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	0.000107	0.000237	0.000197	0.000192
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00159	0.00512	0.00613	0.0180	0.0185
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

WG-051023-CS-06

(Matrix: Water)

Client sampling date / time

10-May-2023  
14:45

Analyte	CAS Number	Method/Lab	LOR	Unit	Result				
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	291	---	---	---	---
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	291	---	---	---	---
Conductivity	---	E100/VA	2.0	µS/cm	691	---	---	---	---
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	220	---	---	---	---
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	354	---	---	---	---
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	14.9	---	---	---	---
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	47.4	---	---	---	---
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.100 <sup>DLDS</sup>	---	---	---	---
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	<0.0250 <sup>DLDS</sup>	---	---	---	---
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	<0.0255	---	---	---	---
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	---	---	---	---
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.11	---	---	---	---
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0011	---	---	---	---
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00021	---	---	---	---
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.0329	---	---	---	---
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	---	---	---	---
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.222	---	---	---	---
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000869	---	---	---	---
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	65.9	---	---	---	---
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	---	---	---	---
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	0.00120	---	---	---	---
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00869	---	---	---	---



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

<b>WG-051023-CS-06</b>	----	----	----	----
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(Matrix: Water)

Client sampling date / time

10-May-2023 14:45	----	----	----	----
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Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0448-006	-----	-----	-----	-----
					Result	---	---	---	---

Dissolved Metals									
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.035	---	---	---	---
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	---	---	---	---
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	13.4	---	---	---	---
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	2.12	---	---	---	---
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	0.0000052	---	---	---	---
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000636	---	---	---	---
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	0.00175	---	---	---	---
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	---	---	---	---
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	10.0	---	---	---	---
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	14.2	---	---	---	---
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	---	---	---	---
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	27.5	---	---	---	---
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.304	---	---	---	---
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.80	---	---	---	---
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	---	---	---	---
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	---	---	---	---
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000365	---	---	---	---
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00164	---	---	---	---
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	---	---	---	---
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	---	---	---	---
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	---	---	---	---
Dissolved metals filtration location	----	EP421/VA	-	-	Field	---	---	---	---

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23B0448</b></p> <p>Client : Comox Valley Regional District</p> <p>Contact : Crystal Stuart</p> <p>Address : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p>Telephone :</p> <p>Project : 22</p> <p>PO : 23-015</p> <p>C-O-C number : ----</p> <p>Sampler : Crystal Stuart, 250-898-3722</p> <p>Site : CRWMC - Quarterly - GW</p> <p>Quote number : VA23-COVR100-001</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 10</p> <p>Laboratory : Vancouver - Environmental</p> <p>Account Manager : Thomas Chang</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 12-May-2023 12:15</p> <p>Date Analysis Commenced : 13-May-2023</p> <p>Issue Date : 19-May-2023 16:04</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 937083)</b>											
VA23B0267-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	104	104	0.0962%	10%	----
<b>Physical Tests (QC Lot: 937084)</b>											
VA23B0267-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	44.9	44.9	0.00%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	44.9	44.9	0.00%	20%	----
<b>Physical Tests (QC Lot: 942918)</b>											
KS2301553-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	776	758	2.35%	20%	----
<b>Anions and Nutrients (QC Lot: 937075)</b>											
VA23B0267-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.59	0.59	0.006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 937076)</b>											
VA23B0267-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 937078)</b>											
VA23B0267-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	6.94	6.92	0.284%	20%	----
<b>Anions and Nutrients (QC Lot: 937080)</b>											
VA23B0267-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.052	0.053	0.0009	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 937081)</b>											
VA23B0489-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0058	<0.0050	0.0008	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 944615)</b>											
VA23B0366-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.250	mg/L	13.1	13.3	1.31%	20%	----
<b>Dissolved Metals (QC Lot: 936306)</b>											
VA23B0403-048	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0159	0.0156	2.00%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00166	0.00168	1.41%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00031	0.00033	0.00002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0311	0.0316	1.41%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.011	0.011	0.00002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000888	0.0000858	3.40%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	53.0	52.9	0.173%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 936306) - continued</b>											
VA23B0403-048	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00054	0.00055	0.000006	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00606	0.00607	0.157%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0060	0.0059	0.0001	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	4.58	4.61	0.772%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0843	0.0859	1.82%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00182	0.00182	0.442%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00090	0.00093	0.00003	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	1.54	1.57	2.09%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000672	0.000602	11.0%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	1.56	1.55	0.442%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	4.00	4.02	0.471%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.321	0.324	0.907%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	33.8	33.2	1.90%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000089	0.000092	0.000003	Diff <2x LOR	----		
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----		
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0049	0.0052	0.0002	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----		
<b>Dissolved Metals (QC Lot: 944322)</b>											
VA23B0426-020	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 944323)</b>											
VA23B0448-003	WG-051023-CS-03	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 937083)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 937084)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 942918)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 937075)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 937076)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 937078)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 937080)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 937081)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 944615)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 936306)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 936306) - continued</b>						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 944322)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 944323)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 937083)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.7	90.0	110	----
<b>Physical Tests (QCLot: 937084)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	107	85.0	115	----
<b>Physical Tests (QCLot: 942918)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
<b>Anions and Nutrients (QCLot: 937075)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	105	90.0	110	----
<b>Anions and Nutrients (QCLot: 937076)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 937078)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	107	90.0	110	----
<b>Anions and Nutrients (QCLot: 937080)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 937081)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	106	90.0	110	----
<b>Anions and Nutrients (QCLot: 944615)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.8	85.0	115	----
<b>Dissolved Metals (QCLot: 936306)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	108	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	110	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	109	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	110	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	115	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	109	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	111	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	106	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 936306) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	117	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	108	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	107	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	109	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	109	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	108	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	106	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	115	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	114	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	107	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	101	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	113	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	109	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	102	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	107	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	109	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	96.8	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	97.1	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 937075)</b>										
VA23B0267-001	Anonymous	Chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 937076)</b>										
VA23B0267-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.506 mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 937078)</b>										
VA23B0267-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 937080)</b>										
VA23B0489-002	Anonymous	Fluoride	16984-48-8	E235.F	1.04 mg/L	1 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 937081)</b>										
VA23B0489-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.61 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 944615)</b>										
VA23B0366-008	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0944 mg/L	0.1 mg/L	94.4	75.0	125	----
<b>Dissolved Metals (QCLot: 936306)</b>										
VA23B0403-049	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	97.3	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0194 mg/L	0.02 mg/L	96.9	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0178 mg/L	0.02 mg/L	88.9	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00921 mg/L	0.01 mg/L	92.1	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.103 mg/L	0.1 mg/L	103	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00389 mg/L	0.004 mg/L	97.2	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0387 mg/L	0.04 mg/L	96.8	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.90 mg/L	2 mg/L	95.0	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0974 mg/L	0.1 mg/L	97.4	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0191 mg/L	0.02 mg/L	95.5	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 936306) - continued</b>										
VA23B0403-049	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0386 mg/L	0.04 mg/L	96.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.36 mg/L	10 mg/L	93.6	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.82 mg/L	4 mg/L	95.6	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0420 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.24 mg/L	10 mg/L	92.4	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.94 mg/L	2 mg/L	97.0	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.3 mg/L	20 mg/L	96.5	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00394 mg/L	0.004 mg/L	98.5	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0371 mg/L	0.04 mg/L	92.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00395 mg/L	0.004 mg/L	98.8	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0972 mg/L	0.1 mg/L	97.2	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.376 mg/L	0.4 mg/L	94.1	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
<b>Dissolved Metals (QCLot: 944322)</b>										
VA23B0426-021	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000941 mg/L	0.0001 mg/L	94.1	70.0	130	----
<b>Dissolved Metals (QCLot: 944323)</b>										
VA23B0448-004	WG-051023-CS-04	Mercury, dissolved	7439-97-6	E509	0.0000942 mg/L	0.0001 mg/L	94.2	70.0	130	----



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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B0448</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 14</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 12-May-2023 12:15</p> <p><b>Issue Date</b> : 19-May-2023 16:04</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-01	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-02	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-03	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-04	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-05	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051023-CS-06	E298	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-051023-CS-01	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051023-CS-02	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051023-CS-03	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051023-CS-04	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051023-CS-05	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051023-CS-06	E235.Cl	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-01	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-02	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-03	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-04	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-05	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051023-CS-06	E235.F	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-01	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-02	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-03	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-04	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-05	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-06	E235.NO3-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-01	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-02	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-03	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-04	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-05	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051023-CS-06	E235.NO2-L	10-May-2023	13-May-2023	----	----		13-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051023-CS-01	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051023-CS-02	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051023-CS-03	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051023-CS-04	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-051023-CS-05	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-051023-CS-06	E235.SO4	10-May-2023	13-May-2023	----	----		13-May-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-01	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-02	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-03	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-04	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-05	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051023-CS-06	E509	10-May-2023	18-May-2023	----	----		18-May-2023	28 days	8 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-051023-CS-01	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051023-CS-02	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051023-CS-03	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051023-CS-04	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051023-CS-05	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051023-CS-06	E421	10-May-2023	14-May-2023	----	----		15-May-2023	180 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-01	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-02	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-03	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-04	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-05	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051023-CS-06	E290	10-May-2023	13-May-2023	----	----		15-May-2023	14 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-01	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-02	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-03	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-04	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-05	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051023-CS-06	E100	10-May-2023	13-May-2023	----	----		15-May-2023	28 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051023-CS-01	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051023-CS-02	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051023-CS-03	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051023-CS-04	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051023-CS-05	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051023-CS-06	E162	10-May-2023	----	----	----		17-May-2023	7 days	7 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	937084	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	944615	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	937075	1	18	5.5	5.0	✔
Conductivity in Water	E100	937083	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	944323	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	936306	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	937080	1	17	5.8	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	937081	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	937076	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	937078	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	942918	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	937084	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	944615	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	937075	1	18	5.5	5.0	✔
Conductivity in Water	E100	937083	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	944323	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	936306	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	937080	1	17	5.8	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	937081	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	937076	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	937078	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	942918	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	937084	1	18	5.5	5.0	✔
Ammonia by Fluorescence	E298	944615	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	937075	1	18	5.5	5.0	✔
Conductivity in Water	E100	937083	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	944323	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	936306	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	937080	1	17	5.8	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	937081	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	937076	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	937078	1	18	5.5	5.0	✔
TDS by Gravimetry	E162	942918	1	20	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	944615	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	937075	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	944323	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	936306	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	937080	1	17	5.8	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	937081	1	16	6.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	937076	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	937078	1	18	5.5	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Vancouver - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Vancouver - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																								
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																								
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (business days) 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/>		EMERGENCY 1 Business day [E1 - 100%] <input type="checkbox"/> Same Day, Weekend or Statutory holiday [E2 - 200%] (Laboratory opening fees may apply) <input type="checkbox"/>																						
Phone: 250-888-3722		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked																											
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			Date and Time Required for all E&P TATs: _____																								
Street: 770 Harmston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca			For tests that cannot be performed according to the service level selected, you will be contacted.																								
City/Province: Courtenay, BC		Email 2			<b>Analysis Request</b>																								
Postal Code: V9N 0G8		Email 3																											
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																								
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Alkalinity (spot/total)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Ammonia-N</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Ardenite (Cl, F, SO4, NO2, NO3) N+N</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Conductivity</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">TDS</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">Dissolved CSR Metals (including Hg, Hachina)</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">VOCs/APH</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">SAMPLES ON HOLD</td> <td style="writing-mode: vertical-rl; transform: rotate(180deg);">NUMBER OF CONTAINERS</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>							Alkalinity (spot/total)	Ammonia-N	Ardenite (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachina)	VOCs/APH	SAMPLES ON HOLD	NUMBER OF CONTAINERS									
Alkalinity (spot/total)	Ammonia-N	Ardenite (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS								Dissolved CSR Metals (including Hg, Hachina)	VOCs/APH	SAMPLES ON HOLD	NUMBER OF CONTAINERS														
Company:		Email 1 or Fax																											
Contact:		Email 2																											
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>																											
ALS Account # / Quote #: VA23-COVR100-001		AFECost Center:	PO#																										
Job #: 22		Major/Minor Code:	Routing Code:																										
PO / AFE: 23-015		Requisitioner:																											
LSD: CRWMC - Quarterly - GW		Location:																											
ALS Lab Work Order #: (lab use only): 448		ALS Contact: Selam W.	Sampler: C Stuart																										
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>			<b>Date (dd-mmm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>																							
	WG-051023-CS-01			10-May-23	10:15	Water	X	X	X	X	X	X																	
	↓ -02				11:30	↓	↓	↓	↓	↓	↓	↓																	
	↓ -03				12:25	↓	↓	↓	↓	↓	↓	↓																	
	↓ -04				13:40	↓	↓	↓	↓	↓	↓	↓																	
	↓ -05				13:45	↓	↓	↓	↓	↓	↓	↓																	
	WG-051023-CS-06			10-May-23	14:45	Water	X	X	X	X	X	X																	
<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																								
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																								
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																								
					Cooling Initiated <input type="checkbox"/>																								
					INITIAL COOLER TEMPERATURES °C _____																								
					FINAL COOLER TEMPERATURES °C _____																								
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																								
Released by: C Stuart		Received by: _____	Date: May 10 2023	Time: 1700	Received by: _____	Date: 12 May 23	Time: 12:50																						

Environmental Division  
Vancouver  
Work Order Reference  
**VA23B0448**



Telephone : + 1 604 253 4188

## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B0946</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC - Quarterly - SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 2</p> <p><b>No. of samples analysed</b> : 2</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-May-2023 09:50</p> <p><b>Date Analysis Commenced</b> : 19-May-2023</p> <p><b>Issue Date</b> : 25-May-2023 09:08</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Elke Tabora		Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia





## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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



## Analytical Results

Sub-Matrix: Surface Water

Client sample ID

					WS-051623-C5-01	WS-051623-C5-02	----	----	----
					16-May-2023 09:40	16-May-2023 10:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0946-001	VA23B0946-002	-----	-----	-----
					Result	Result	----	----	----
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	7.5	10.1	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	----	----	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	7.5	10.1	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm	30.7	35.6	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	8.79	11.3	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	28	33	----	----	----
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	0.0078	0.0624	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	3.52	3.62	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	0.0072	0.0259	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0072	0.0259	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	0.53	0.35	----	----	----
<b>Organic / Inorganic Carbon</b>									
Carbon, dissolved organic [DOC]	----	E358-L/CG	0.50	mg/L	5.86	6.33	----	----	----
<b>Total Metals</b>									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0502	0.159	----	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00018	0.00029	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.00147	0.00258	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	<0.000020	<0.000020	----	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	<0.010	----	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	<0.0000050	0.0000090	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	2.21	2.82	----	----	----



**Analytical Results**

Sub-Matrix: Surface Water

Client sample ID

(Matrix: Water)

					WS-051623-C5-01	WS-051623-C5-02	----	----	----
					16-May-2023 09:40	16-May-2023 10:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0946-001	VA23B0946-002	-----	-----	-----
					Result	Result	---	---	---
<b>Total Metals</b>									
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	---	---	---
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	0.00025	---	---	---
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	<0.00050	0.00059	---	---	---
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.101	0.401	---	---	---
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	0.000051	0.000252	---	---	---
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	<0.0010	<0.0010	---	---	---
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L	0.864	1.10	---	---	---
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00887	0.0751	---	---	---
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	<0.000050	<0.000050	---	---	---
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	0.00090	---	---	---
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	---	---	---
Potassium, total	7440-09-7	E420/VA	0.050	mg/L	0.144	0.177	---	---	---
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	0.00022	0.00024	---	---	---
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	0.000052	---	---	---
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	2.75	3.47	---	---	---
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	2.56	2.73	---	---	---
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.00962	0.0124	---	---	---
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	<0.50	<0.50	---	---	---
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L	<0.00020	<0.00020	---	---	---
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	0.00090	0.0103	---	---	---
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	<0.00050	0.00110	---	---	---
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	<0.0030	<0.0030	---	---	---



## Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	WS-051623-C5-01	WS-051623-C5-02	----	----	----
					Client sampling date / time	16-May-2023 09:40	16-May-2023 10:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0946-001	VA23B0946-002	-----	-----	-----	
					Result	Result	----	----	----	
<b>Total Metals</b>										
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0488	0.0806	----	----	----	
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00014	0.00024	----	----	----	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00151	0.00217	----	----	----	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	----	----	----	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	----	----	----	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000077	----	----	----	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	2.08	2.67	----	----	----	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	0.00012	----	----	----	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00028	0.00039	----	----	----	
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.098	0.263	----	----	----	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	0.000108	----	----	----	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	0.874	1.12	----	----	----	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00842	0.0493	----	----	----	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	----	----	----	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	----	----	----	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	----	----	----	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.150	0.178	----	----	----	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	2.93	3.50	----	----	----	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	2.65	2.91	----	----	----	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.00935	0.0127	----	----	----	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	<0.50	<0.50	----	----	----	



### Analytical Results

Sub-Matrix: Surface Water

(Matrix: Water)

					Client sample ID	WS-051623-C5-01	WS-051623-C5-02	----	----	----
					Client sampling date / time	16-May-2023 09:40	16-May-2023 10:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0946-001	VA23B0946-002	-----	-----	-----	
					Result	Result	---	---	---	
<b>Dissolved Metals</b>										
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	0.00080	0.00240	----	----	----	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	<0.000010	----	----	----	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	<0.00050	0.00078	----	----	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	0.0010	0.0012	----	----	----	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	----	----	----	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	----	----	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	----	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23B0946</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 22	<b>Date Samples Received</b>	: 18-May-2023 09:50
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 19-May-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 25-May-2023 09:08
<b>Sampler</b>	: ---- 250-898-3722		
<b>Site</b>	: CRWMC - Quarterly - SW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 2		
<b>No. of samples analysed</b>	: 2		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Elke Tabora		Calgary Inorganics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
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Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

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Work Order : VA23B0946  
Client : Comox Valley Regional District  
Project : 22



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 946670)</b>											
VA23B0796-002	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	59.6	60.1	0.835%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	59.6	60.1	0.835%	20%	----
<b>Physical Tests (QC Lot: 946671)</b>											
VA23B0796-002	Anonymous	Conductivity	----	E100	2.0	µS/cm	143	142	0.914%	10%	----
<b>Physical Tests (QC Lot: 950057)</b>											
VA23B0816-006	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	74	78	3	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946672)</b>											
VA23B0813-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	6.10	6.09	0.0567%	20%	----
<b>Anions and Nutrients (QC Lot: 946673)</b>											
VA23B0813-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0057	0.0064	0.0007	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946674)</b>											
VA23B0813-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.197	0.195	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946675)</b>											
VA23B0813-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	1.30	1.30	0.003	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946676)</b>											
VA23B0813-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	90.6	90.3	0.319%	20%	----
<b>Anions and Nutrients (QC Lot: 949276)</b>											
SK2302171-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.221	0.219	0.728%	20%	----
<b>Organic / Inorganic Carbon (QC Lot: 949309)</b>											
VA23B0946-001	WS-051623-C5-01	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.86	6.06	3.36%	20%	----
<b>Total Metals (QC Lot: 945337)</b>											
VA23B0861-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0437	0.0368	17.1%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00064	0.00062	0.00001	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00035	0.00032	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.268	0.266	0.584%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.010	0.010	0.00004	Diff <2x LOR	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 945337) - continued</b>											
VA23B0861-001	Anonymous	Cadmium, total	7440-43-9	E420	0.0000100	mg/L	<0.0000100	<0.0000100	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	106	104	1.70%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000393	0.000389	1.10%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00399	0.00407	0.00008	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.0121	0.0116	3.87%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.083	0.086	0.003	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000155	0.000156	0.000002	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0351	0.0343	2.22%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	0.492	0.480	2.45%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0112	0.0110	1.74%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.0257	0.0257	0.102%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00089	0.00090	0.000006	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	7.42	7.21	2.94%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0225	0.0222	1.20%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000934	0.000907	2.88%	20%	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.57	1.54	1.93%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	0.000011	0.000010	0.0000009	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	24.1	23.9	0.743%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	1.03	1.02	0.636%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	35.9	35.8	0.293%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	0.00015	0.00014	0.00001	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	0.00221	0.00185	0.00036	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.0189	0.0192	1.37%	20%	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000189	0.000195	3.09%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00072	0.00070	0.00002	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0033	0.0034	0.0001	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 950920)</b>											
VA23B0857-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000104	0.0000099	0.0000005	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 945297)</b>											
VA23B0853-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0023	0.0023	0.00005	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.120	0.123	2.60%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	33.2	33.9	2.21%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.11	5.09	0.440%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00018	0.00016	0.00002	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00204	0.00202	0.861%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.917	0.955	4.07%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.29	2.29	0.00177%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.737	0.735	0.221%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.273	0.277	1.46%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.33	1.43	0.10	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000369	0.000367	0.597%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

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 Work Order : VA23B0946  
 Client : Comox Valley Regional District  
 Project : 22



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 949348)</b>											
VA23B0937-007	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



**Method Blank (MB) Report**

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 946670)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 946671)</b>						
Conductivity	---	E100	1	µS/cm	1.1	---
<b>Physical Tests (QCLot: 950057)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 946672)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 946673)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 946674)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 946675)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 946676)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 949276)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Organic / Inorganic Carbon (QCLot: 949309)</b>						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 945337)</b>						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 945337) - continued</b>						
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 950920)</b>						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 945297)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>						
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 949348)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 946670)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 946671)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.0	90.0	110	----
<b>Physical Tests (QCLot: 950057)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	90.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 946672)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 946673)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 946674)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 946675)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 946676)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 949276)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.4	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 949309)</b>									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	100	80.0	120	----
<b>Total Metals (QCLot: 945337)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.2	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.7	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	109	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	97.0	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	109	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	104	80.0	120	----





Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Total Metals (QCLot: 945337) - continued</b>									
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	96.7	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	98.9	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	96.0	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	98.4	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	102	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	99.1	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	96.7	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	109	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	102	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	95.6	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	109	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	93.7	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	97.7	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	97.1	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	101	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	94.3	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.1	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	97.6	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	92.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	96.6	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	99.1	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	99.3	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	95.0	80.0	120	----
<b>Total Metals (QCLot: 950920)</b>									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
<b>Dissolved Metals (QCLot: 945297)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	95.0	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>									
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.5	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.6	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.0	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.6	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	95.6	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.2	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.2	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	93.8	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.6	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.2	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	95.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.1	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.7	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	93.1	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	107	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 946672)</b>										
VA23B0813-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 946673)</b>										
VA23B0813-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.506 mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 946674)</b>										
VA23B0813-002	Anonymous	Fluoride	16984-48-8	E235.F	1.01 mg/L	1 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 946675)</b>										
VA23B0813-002	Anonymous	Chloride	16887-00-6	E235.Cl	102 mg/L	100 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 946676)</b>										
VA23B0813-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 949276)</b>										
SK2302173-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.104 mg/L	0.1 mg/L	104	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 949309)</b>										
VA23B0946-001	WS-051623-C5-01	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 945337)</b>										
VA23B0861-002	Anonymous	Aluminum, total	7429-90-5	E420	0.186 mg/L	0.2 mg/L	92.8	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		Barium, total	7440-39-3	E420	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00976 mg/L	0.01 mg/L	97.6	70.0	130	----
		Boron, total	7440-42-8	E420	0.097 mg/L	0.1 mg/L	97.3	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00392 mg/L	0.004 mg/L	97.9	70.0	130	----
		Calcium, total	7440-70-2	E420	3.91 mg/L	4 mg/L	97.7	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00934 mg/L	0.01 mg/L	93.4	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Copper, total	7440-50-8	E420	0.0190 mg/L	0.02 mg/L	94.9	70.0	130	----
		Iron, total	7439-89-6	E420	1.87 mg/L	2 mg/L	93.4	70.0	130	----
		Lead, total	7439-92-1	E420	0.0189 mg/L	0.02 mg/L	94.4	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		Qualifier
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	
<b>Total Metals (QCLot: 945337) - continued</b>										
VA23B0861-002	Anonymous	Lithium, total	7439-93-2	E420	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Magnesium, total	7439-95-4	E420	0.938 mg/L	1 mg/L	93.8	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0195 mg/L	0.02 mg/L	97.4	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.27 mg/L	10 mg/L	92.7	70.0	130	----
		Potassium, total	7440-09-7	E420	3.85 mg/L	4 mg/L	96.3	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0183 mg/L	0.02 mg/L	91.3	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0359 mg/L	0.04 mg/L	89.7	70.0	130	----
		Silicon, total	7440-21-3	E420	9.69 mg/L	10 mg/L	96.9	70.0	130	----
		Silver, total	7440-22-4	E420	0.00383 mg/L	0.004 mg/L	95.9	70.0	130	----
		Sodium, total	7440-23-5	E420	1.90 mg/L	2 mg/L	95.2	70.0	130	----
		Strontium, total	7440-24-6	E420	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		Sulfur, total	7704-34-9	E420	18.9 mg/L	20 mg/L	94.6	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00375 mg/L	0.004 mg/L	93.8	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0197 mg/L	0.02 mg/L	98.7	70.0	130	----
		Tin, total	7440-31-5	E420	0.0189 mg/L	0.02 mg/L	94.5	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0177 mg/L	0.02 mg/L	88.4	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00369 mg/L	0.004 mg/L	92.3	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0943 mg/L	0.1 mg/L	94.3	70.0	130	----
		Zinc, total	7440-66-6	E420	0.383 mg/L	0.4 mg/L	95.7	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
<b>Total Metals (QCLot: 950920)</b>										
VA23B0934-001	Anonymous	Mercury, total	7439-97-6	E508	0.000105 mg/L	0.0001 mg/L	105	70.0	130	----
<b>Dissolved Metals (QCLot: 945297)</b>										
VA23B0853-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00894 mg/L	0.01 mg/L	89.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.4	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>										
VA23B0853-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.96 mg/L	2 mg/L	97.8	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0965 mg/L	0.1 mg/L	96.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0198 mg/L	0.02 mg/L	99.3	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.83 mg/L	10 mg/L	98.3	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.87 mg/L	4 mg/L	96.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.66 mg/L	10 mg/L	96.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00383 mg/L	0.004 mg/L	95.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.99 mg/L	2 mg/L	99.6	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00368 mg/L	0.004 mg/L	91.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00359 mg/L	0.004 mg/L	89.9	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0977 mg/L	0.1 mg/L	97.7	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.376 mg/L	0.4 mg/L	94.0	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0389 mg/L	0.04 mg/L	97.4	70.0	130	----
<b>Dissolved Metals (QCLot: 949348)</b>										
VA23B0937-008	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23B0946</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC - Quarterly - SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 2</p> <p><b>No. of samples analysed</b> : 2</p>	<p><b>Page</b> : 1 of 11</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-May-2023 09:50</p> <p><b>Issue Date</b> : 25-May-2023 09:08</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### Summary of Outliers

#### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WS-051623-C5-01	E298	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WS-051623-C5-02	E298	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS-051623-C5-01	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS-051623-C5-02	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> WS-051623-C5-01	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> WS-051623-C5-02	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> WS-051623-C5-01	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-051623-C5-02	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-051623-C5-01	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-051623-C5-02	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-051623-C5-01	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-051623-C5-02	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) WS-051623-C5-02	E509	16-May-2023	22-May-2023	0.02 hrs	6 hrs	* EHTR-FM	22-May-2023	-138.29 hrs	0.02 hrs	* EHTR-FM	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial total (hydrochloric acid) WS-051623-C5-01	E509	16-May-2023	22-May-2023	0.02 hrs	7 hrs	* EHTR-FM	22-May-2023	-138.29 hrs	0.02 hrs	* EHTR-FM	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WS-051623-C5-01	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WS-051623-C5-02	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> WS-051623-C5-01	E358-L	16-May-2023	22-May-2023	----	----		23-May-2023	28 days	7 days	✔	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>											
<b>Amber glass dissolved (sulfuric acid)</b> WS-051623-C5-02	E358-L	16-May-2023	22-May-2023	----	----		23-May-2023	28 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WS-051623-C5-01	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WS-051623-C5-02	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> WS-051623-C5-01	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
<b>HDPE</b> WS-051623-C5-02	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
<b>HDPE</b> WS-051623-C5-01	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
<b>HDPE</b> WS-051623-C5-02	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔	
<b>Total Metals : Total Mercury in Water by CVAAS</b>											
<b>Glass vial total (hydrochloric acid)</b> WS-051623-C5-01	E508	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
<b>Glass vial total (hydrochloric acid)</b> WS-051623-C5-02	E508	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WS-051623-C5-01	E420	16-May-2023	19-May-2023	----	----		21-May-2023	180 days	5 days	✔
<b>Total Metals : Total metals in Water by CRC ICPMS</b>										
<b>HDPE total (nitric acid)</b> WS-051623-C5-02	E420	16-May-2023	19-May-2023	----	----		21-May-2023	180 days	5 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	946670	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	949276	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	946675	1	9	11.1	5.0	✓
Conductivity in Water	E100	946671	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	949309	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	946674	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	946672	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	946673	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	946676	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	950920	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	945337	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	946670	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	949276	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	946675	1	9	11.1	5.0	✓
Conductivity in Water	E100	946671	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	949309	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	946674	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	946672	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	946673	1	10	10.0	5.0	✓
Sulfate in Water by IC	E235.SO4	946676	1	8	12.5	5.0	✓
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	950920	1	20	5.0	5.0	✓
Total metals in Water by CRC ICPMS	E420	945337	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	946670	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	949276	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	946675	1	9	11.1	5.0	✓
Conductivity in Water	E100	946671	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	949309	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	946674	1	8	12.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	946672	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	946673	1	10	10.0	5.0	✔
Sulfate in Water by IC	E235.SO4	946676	1	8	12.5	5.0	✔
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✔
Total Mercury in Water by CVAAS	E508	950920	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	945337	1	20	5.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	949276	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	946675	1	9	11.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	949309	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	946674	1	8	12.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	946672	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	946673	1	10	10.0	5.0	✔
Sulfate in Water by IC	E235.SO4	946676	1	8	12.5	5.0	✔
Total Mercury in Water by CVAAS	E508	950920	1	20	5.0	5.0	✔
Total metals in Water by CRC ICPMS	E420	945337	1	20	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Calgary - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total metals in Water by CRC ICPMS	E420 Vancouver - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 Vancouver - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Calgary - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	Vancouver - Environmental			
Dissolved Mercury Water Filtration	EP509	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
	Vancouver - Environmental			







Chain of Custody  
 Vancouver - Environmental  
 8081 Lougheed Highway  
 Burnaby BC Canada V5A 1W9

# PREVIEW COC

Destination Lab: **Calgary**

Address: 2559 29th Street NE Calgary AB Canada  
 T1Y 7B5

Client: Comox Valley Regional District

Work Order Number: **VA23B0946**

Original Receipt Date/Time: 18/05/2023 10:50  
 Instructions Received

Due Date: 26/05/2023

HT Expiry:

Consignment company and Number

Relinquished By

Date/Time

Received By

Date/Time

Receipt Temp

ALS Lab ID	Bottle Code	Matrix	Submatrix	Container Type	Test Codes	Task Remarks
VA23B0946	001-AB	Water	Surface Water	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0946	002-AB	Water	Surface Water	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0946	001-AC	Water	Surface Water	Amber glass dissolved (sulfuric acid)	E358-L, EP358	
VA23B0946	002-AC	Water	Surface Water	Amber glass dissolved (sulfuric acid)	E358-L, EP358	

www.alsglobal.com

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																											
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)		Regular (R) <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																											
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Frequency (Business Days) 4 day (P4-20%) <input type="checkbox"/> 3 day (P3-25%) <input type="checkbox"/> 2 day (P2-50%) <input type="checkbox"/>				Priority 1 Business day (E1 - 100%) <input type="checkbox"/> Same Day, Weekend or Statutory holiday (E2 - 200% (Laboratory opening fees may apply)) <input type="checkbox"/>																							
Phone: 250-898-3722		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX																													
Company address below will appear on the final report		Email 1 or Fax: cstuart@comoxvalleyrd.ca		Date and Time Required for all E&P TATs: dd-mm-yy hh:mm																											
Street: 770 Hamston Avenue		Email 2:		For tests that can not be performed according to the service level selected, you will be contacted.																											
City/Province: Courtenay, BC		Email 3:		<b>Analysis Request</b>																											
Postal Code: V9N 0G8		Invoice Distribution		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below																											
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Alkalinity (specified)</th> <th>Ammonia-N</th> <th>Artenes (Cl, F, SO4, NO2, NO3) N+N</th> <th>Conductivity</th> <th>TDS</th> <th>DOC</th> <th>Total CSR Metals - (including Hg, Hardness)</th> <th>Desolved CSR Metals (including Hg, Hardness)</th> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>								Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)	X	X	X	X	X	X	X	X				
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ALS Lab Work Order # (lab use only): B0946		ALS Contact: Selam W.		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Alkalinity (specified)</th> <th>Ammonia-N</th> <th>Artenes (Cl, F, SO4, NO2, NO3) N+N</th> <th>Conductivity</th> <th>TDS</th> <th>DOC</th> <th>Total CSR Metals - (including Hg, Hardness)</th> <th>Desolved CSR Metals (including Hg, Hardness)</th> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>								Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)	X	X	X	X	X	X	X	X				
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Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)																								
X	X	X	X	X	X	X	X																								
Environmental Division Vancouver Work Order Reference VA23B0946		Telephone: +1 604 253 4188		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Alkalinity (specified)</th> <th>Ammonia-N</th> <th>Artenes (Cl, F, SO4, NO2, NO3) N+N</th> <th>Conductivity</th> <th>TDS</th> <th>DOC</th> <th>Total CSR Metals - (including Hg, Hardness)</th> <th>Desolved CSR Metals (including Hg, Hardness)</th> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>								Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)	X	X	X	X	X	X	X	X				
Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity									TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)																
X	X	X	X	X	X	X	X																								
Barcode		Barcode		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Alkalinity (specified)</th> <th>Ammonia-N</th> <th>Artenes (Cl, F, SO4, NO2, NO3) N+N</th> <th>Conductivity</th> <th>TDS</th> <th>DOC</th> <th>Total CSR Metals - (including Hg, Hardness)</th> <th>Desolved CSR Metals (including Hg, Hardness)</th> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> </table>								Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)	X	X	X	X	X	X	X	X				
Alkalinity (specified)	Ammonia-N	Artenes (Cl, F, SO4, NO2, NO3) N+N	Conductivity									TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Desolved CSR Metals (including Hg, Hardness)																
X	X	X	X	X	X	X	X																								
Drinking Water (DW) Samples		Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b> Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Cooling Initiated <input type="checkbox"/>																											
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO		INITIAL COOLER TEMPERATURES °C: _____ FINAL COOLER TEMPERATURES °C: 25																											
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)																									
Released by: <i>Stuart</i> Date: May 16 2023 Time: 1000		Received by: _____ Date: _____ Time: _____				Received by: <i>IC</i> Date: MAY 18 2023 Time: 950am																									

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

SEPT 2011 PROCT

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

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



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B0953</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-May-2023 09:50</p> <p><b>Date Analysis Commenced</b> : 19-May-2023</p> <p><b>Issue Date</b> : 24-May-2023 17:18</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Harpreet Chawla	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					WG-051623 - CS - 07	WG-051623 - CS - 08	WG-051623 - CS - 09	WG-051623 - CS - 10	WG-051623 - CS - 11
Client sampling date / time					16-May-2023 10:40	16-May-2023 11:15	16-May-2023 13:05	16-May-2023 13:35	16-May-2023 14:40
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0953-001	VA23B0953-002	VA23B0953-003	VA23B0953-004	VA23B0953-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	93.6	67.7	49.2	68.6	226
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	93.6	67.7	49.2	68.6	226
Conductivity	----	E100/VA	2.0	µS/cm	184	135	100	138	478
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	88.0	60.8	44.8	65.2	230
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	98	76	59	79	272
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	2.73	1.26	1.07	1.35	23.4
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.104	0.141	0.0992	0.135	0.819
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.104	0.141	0.0992	0.135	0.819
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	1.85	1.96	1.85	1.95	6.25
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0034	0.0054	0.0053	0.0059	0.0198
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00025	0.00060	0.00040	0.00036	<0.00010
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00139	0.00159	0.00071	0.00200	0.00892
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.031	0.024	<0.010	0.013	0.014
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	29.6	21.4	15.3	23.2	72.6
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00200
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

(Matrix: Water)

					WG-051623 - CS - 07	WG-051623 - CS - 08	WG-051623 - CS - 09	WG-051623 - CS - 10	WG-051623 - CS - 11
Client sampling date / time					16-May-2023 10:40	16-May-2023 11:15	16-May-2023 13:05	16-May-2023 13:35	16-May-2023 14:40
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B0953-001	VA23B0953-002	VA23B0953-003	VA23B0953-004	VA23B0953-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00087	<0.00020	<0.00020	0.00024	<0.00020
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	0.026
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	3.42	1.80	1.61	1.76	11.9
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00050
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000060	0.000152	0.000116	0.000123	<0.000050
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.504	0.516	0.287	0.433	1.30
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000088	0.000142	0.000106	0.000114	0.000137
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.75	4.61	4.26	4.72	8.74
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	2.09	2.73	1.36	1.78	6.17
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0495	0.0362	0.0252	0.0384	0.180
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	1.13	1.06	0.89	0.82	2.73
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	0.00088
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000098	0.000044	0.000024	0.000039	0.000342
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00202	0.00280	0.00283	0.00255	0.00170
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

WG-051623 -  
CS - 12

(Matrix: Water)

Client sampling date / time

16-May-2023  
15:10

Analyte	CAS Number	Method/Lab	LOR	Unit	Result				
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	162	---	---	---	---
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	162	---	---	---	---
Conductivity	---	E100/VA	2.0	µS/cm	1020	---	---	---	---
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	339	---	---	---	---
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	748	---	---	---	---
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	---	---	---	---
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	152	---	---	---	---
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.100 <sup>DLDS</sup>	---	---	---	---
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	27.2	---	---	---	---
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	27.3	---	---	---	---
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	0.135	---	---	---	---
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	30.0	---	---	---	---
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0014	---	---	---	---
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00014	---	---	---	---
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.0152	---	---	---	---
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	---	---	---	---
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.145	---	---	---	---
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000316	---	---	---	---
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	101	---	---	---	---
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	---	---	---	---
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	0.00058	---	---	---	---
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00377	---	---	---	---





## Analytical Results

Sub-Matrix: Groundwater

Client sample ID

WG-051623 -  
CS - 12

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(Matrix: Water)

Client sampling date / time

16-May-2023  
15:10

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Analyte CAS Number Method/Lab LOR Unit

VA23B0953-006

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Result

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### Dissolved Metals

Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	----	----	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	----	----	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	----	----	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	21.0	----	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.193	----	----	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000067	----	----	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	0.00105	----	----	----	----
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	----	----	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	1.72	----	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000074	----	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	9.95	----	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	56.2	----	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.292	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	13.0	----	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	----	----	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	----	----	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	----	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000595	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00287	----	----	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	----	----	----	----
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	----	----	----	----
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	----	----	----	----
Dissolved metals filtration location	----	EP421/VA	-	-	Field	----	----	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23B0953</b>	<b>Page</b>	: 1 of 10
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 22	<b>Date Samples Received</b>	: 18-May-2023 09:50
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 19-May-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 24-May-2023 17:18
<b>Sampler</b>	: ---- 250-898-3722		
<b>Site</b>	: CRWMC - Quarterly - GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 6		
<b>No. of samples analysed</b>	: 6		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Harpreet Chawla	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Tracy Harley	Supervisor - Water Quality Instrumentation	Vancouver Inorganics, Burnaby, British Columbia

Page : 2 of 10  
Work Order : VA23B0953  
Client : Comox Valley Regional District  
Project : 22



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 946280)</b>											
VA23B0892-011	Anonymous	Conductivity	----	E100	2.0	µS/cm	606	606	0.00%	10%	----
<b>Physical Tests (QC Lot: 946281)</b>											
VA23B0892-011	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	103	104	0.970%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	103	104	0.970%	20%	----
<b>Physical Tests (QC Lot: 950057)</b>											
VA23B0816-006	Anonymous	Solids, total dissolved [TDS]	----	E162	13	mg/L	74	78	3	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946272)</b>											
VA23B0923-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0789	0.0804	1.93%	20%	----
<b>Anions and Nutrients (QC Lot: 946273)</b>											
KS2301607-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.61	0.61	0.0009	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946274)</b>											
KS2301607-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 946276)</b>											
KS2301607-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	5.55	5.48	1.23%	20%	----
<b>Anions and Nutrients (QC Lot: 946277)</b>											
VA23B0923-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.023	0.027	0.004	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 950201)</b>											
VA23B0953-001	WG-051623 - CS - 07	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 945297)</b>											
VA23B0853-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0023	0.0023	0.00005	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.120	0.123	2.60%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	33.2	33.9	2.21%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 945297) - continued</b>											
VA23B0853-001	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	5.11	5.09	0.440%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00018	0.00016	0.00002	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00204	0.00202	0.861%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.917	0.955	4.07%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.29	2.29	0.00177%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.737	0.735	0.221%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.273	0.277	1.46%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	1.33	1.43	0.10	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000369	0.000367	0.597%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 949348)</b>											
VA23B0937-007	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 946280)</b>						
Conductivity	---	E100	1	µS/cm	1.2	---
<b>Physical Tests (QCLot: 946281)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	1.0	---
<b>Physical Tests (QCLot: 950057)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 946272)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 946273)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 946274)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 946276)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 946277)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 950201)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 945297)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 949348)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 946280)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	94.6	90.0	110	----
<b>Physical Tests (QCLot: 946281)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 950057)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	90.9	85.0	115	----
<b>Anions and Nutrients (QCLot: 946272)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 946273)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 946274)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 946276)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 946277)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 950201)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100	85.0	115	----
<b>Dissolved Metals (QCLot: 945297)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	95.0	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.1	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	95.8	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.5	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	101	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	96.6	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.0	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.6	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.6	80.0	120	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	95.6	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.6	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	96.2	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.2	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	93.8	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.4	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	96.6	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.2	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	95.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.1	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	98.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	98.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.7	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	93.1	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	107	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 946272)</b>										
VA23B0923-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.44 mg/L	2.5 mg/L	97.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 946273)</b>										
VA23B0923-002	Anonymous	Chloride	16887-00-6	E235.Cl	112 mg/L	100 mg/L	112	75.0	125	----
<b>Anions and Nutrients (QCLot: 946274)</b>										
VA23B0923-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.494 mg/L	0.5 mg/L	98.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 946276)</b>										
VA23B0923-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	114 mg/L	100 mg/L	114	75.0	125	----
<b>Anions and Nutrients (QCLot: 946277)</b>										
VA23B0923-002	Anonymous	Fluoride	16984-48-8	E235.F	1.11 mg/L	1 mg/L	111	75.0	125	----
<b>Anions and Nutrients (QCLot: 950201)</b>										
VA23B0953-002	WG-051623 - CS - 08	Ammonia, total (as N)	7664-41-7	E298	0.108 mg/L	0.1 mg/L	108	75.0	125	----
<b>Dissolved Metals (QCLot: 945297)</b>										
VA23B0853-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.196 mg/L	0.2 mg/L	98.1	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0376 mg/L	0.04 mg/L	94.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00894 mg/L	0.01 mg/L	89.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.096 mg/L	0.1 mg/L	96.4	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0188 mg/L	0.02 mg/L	94.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.96 mg/L	2 mg/L	97.8	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0965 mg/L	0.1 mg/L	96.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0198 mg/L	0.02 mg/L	99.3	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 945297) - continued</b>										
VA23B0853-002	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.83 mg/L	10 mg/L	98.3	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.87 mg/L	4 mg/L	96.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.66 mg/L	10 mg/L	96.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00383 mg/L	0.004 mg/L	95.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.99 mg/L	2 mg/L	99.6	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.3 mg/L	20 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00368 mg/L	0.004 mg/L	91.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0190 mg/L	0.02 mg/L	95.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0395 mg/L	0.04 mg/L	98.8	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00359 mg/L	0.004 mg/L	89.9	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0977 mg/L	0.1 mg/L	97.7	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.376 mg/L	0.4 mg/L	94.0	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0389 mg/L	0.04 mg/L	97.4	70.0	130	----
<b>Dissolved Metals (QCLot: 949348)</b>										
VA23B0937-008	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B0953</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 14</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-May-2023 09:50</p> <p><b>Issue Date</b> : 24-May-2023 17:18</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 07	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 08	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 09	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 10	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 11	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-051623 - CS - 12	E298	16-May-2023	23-May-2023	----	----		23-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-051623 - CS - 07	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051623 - CS - 08	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051623 - CS - 09	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051623 - CS - 10	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051623 - CS - 11	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051623 - CS - 12	E235.Cl	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 07	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 08	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 09	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 10	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 11	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051623 - CS - 12	E235.F	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 07	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 08	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 09	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 10	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 11	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 12	E235.NO3-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 07	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 08	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 09	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 10	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 11	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051623 - CS - 12	E235.NO2-L	16-May-2023	19-May-2023	----	----		19-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051623 - CS - 07	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051623 - CS - 08	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051623 - CS - 09	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051623 - CS - 10	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-051623 - CS - 11	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
<b>HDPE</b> WG-051623 - CS - 12	E235.SO4	16-May-2023	19-May-2023	----	----		19-May-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051623 - CS - 07	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051623 - CS - 08	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051623 - CS - 09	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051623 - CS - 10	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051623 - CS - 11	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial - dissolved (lab preserved)</b> WG-051623 - CS - 12	E509	16-May-2023	22-May-2023	----	----		22-May-2023	28 days	6 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-051623 - CS - 07	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051623 - CS - 08	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051623 - CS - 09	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051623 - CS - 10	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051623 - CS - 11	E421	16-May-2023	20-May-2023	----	----		22-May-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
Glass vial dissolved (hydrochloric acid) WG-051623 - CS - 12	E421	16-May-2023	20-May-2023	51 hrs	1.83 hrs	* EHTR-FM	22-May-2023	-84.53 hrs	51 hrs	* EHTR-FM	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051623 - CS - 07	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051623 - CS - 08	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051623 - CS - 09	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051623 - CS - 10	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-051623 - CS - 11	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-051623 - CS - 12	E290	16-May-2023	19-May-2023	----	----		20-May-2023	14 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 07	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 08	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 09	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 10	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 11	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-051623 - CS - 12	E100	16-May-2023	19-May-2023	----	----		20-May-2023	28 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 07	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 08	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 09	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 10	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 11	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051623 - CS - 12	E162	16-May-2023	----	----	----		23-May-2023	7 days	7 days	✔

**Legend & Qualifier Definitions**

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended  
 Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	946281	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	950201	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	946273	1	18	5.5	5.0	✓
Conductivity in Water	E100	946280	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	946277	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	946272	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	946274	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	946276	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	946281	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	950201	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	946273	1	18	5.5	5.0	✓
Conductivity in Water	E100	946280	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	946277	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	946272	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	946274	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	946276	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	946281	1	18	5.5	5.0	✓
Ammonia by Fluorescence	E298	950201	1	10	10.0	5.0	✓
Chloride in Water by IC	E235.Cl	946273	1	18	5.5	5.0	✓
Conductivity in Water	E100	946280	1	18	5.5	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	946277	1	11	9.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	946272	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	946274	1	18	5.5	5.0	✓
Sulfate in Water by IC	E235.SO4	946276	1	18	5.5	5.0	✓
TDS by Gravimetry	E162	950057	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	950201	1	10	10.0	5.0	✔
Chloride in Water by IC	E235.Cl	946273	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949348	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	945297	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	946277	1	11	9.0	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	946272	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	946274	1	18	5.5	5.0	✔
Sulfate in Water by IC	E235.SO4	946276	1	18	5.5	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.





<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

**Affix ALS barcode label here**  
(lab use only)

COC Number: 17 -

Page **2** of **2**

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>	
<b>Company:</b> Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)		<b>Regular [R]</b> <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply	
<b>Contact:</b> Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>EMERGENCY</b>	
<b>Phone:</b> 250-898-3722		<input type="checkbox"/> Complete Results to Criteria on Report - provide details below if box checked		<b>4 day [P4-20%]</b> <input type="checkbox"/>	<b>1 Business day [E1 - 100%]</b> <input type="checkbox"/>
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		<b>3 day [P3-25%]</b> <input type="checkbox"/>	<b>Same Day, Weekend or Statutory holiday [E2-200%]</b> <input type="checkbox"/>
<b>Street:</b> 770 Harmston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca		<b>2 day [P2-50%]</b> <input type="checkbox"/>	<b>(Laboratory opening fees may apply)</b> <input type="checkbox"/>
<b>City/Province:</b> Courtenay, BC		Email 2		Date and Time Required for all E&P TATs: _____	
<b>Postal Code:</b> V8N 0G8		Email 3		For tests that can not be performed according to the service level selected, you will be contacted.	

<b>Invoice To</b>		<b>Invoice Distribution</b>		<b>Analysis Request</b>	
Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP) below	
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 1 or Fax			
<b>Company:</b>		Email 2			
<b>Contact:</b>		Email 3			
<b>Project Information</b>			Oil and Gas Required Fields (client use)		
ALS Account # / Quote #: VA23-COVR100-001	AFB/Cost Center:	PO#:			
Job #: 22	Major/Minor Code:	Routing Code:			
PO / AFE: 23-015	Requisitioner:				
LSD: CRWMC - Quarterly - GW	Location:				
ALS Lab Work Order #: (lab use only): B0953	ALS Contact: Selam W.	Sampler:			

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Alkalinity (speciated)	Ammonia-N	Arsonic (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne)	VOCs/PH	SAMPLES ON HOLD	NUMBER OF CONTAINERS
	WG-051623-CS-07	16 May 23	1040	Water	X	X	X	X	X	X			
	-08		1115										
	-09		1305										
	-10		1335										
	-11		1440										
	WG-051623-CS-12	16 May 23	1510	Water	X	X	X	X	X	X			

**Environmental Division**  
Vancouver  
Work Order Reference  
**VA23B0953**



Telephone: +1 604 263 4188

<b>Drinking Water (DW) Samples (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>			
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO				Frozen <input checked="" type="checkbox"/>	Ice Packs <input checked="" type="checkbox"/>	Cooling Initiated <input checked="" type="checkbox"/>	SIF Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				INITIAL COOLER TEMPERATURES: _____	FINAL COOLER TEMPERATURES: _____		
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>			
Released by:	Time:	Received by:	Date:	Received by:	Date:	Time:	Time:



Chain of Custody  
 Vancouver - Environmental  
 8081 Lougheed Highway  
 Burnaby BC Canada V5A 1W9

115487



Destination Lab: **Calgary**

Address: 2559 28th Street NE Calgary AB Canada  
 T1Y 7B5

Client: Comox Valley Regional District

Work Order Number: **VA23B0953**

Original Receipt Date/Time: 18/05/2023 10:50

Instructions Received

Due Date: 26/06/2023

HT Expiry:

Consignment company and Number

Relinquished By

Date/Time

Received By

Date/Time

Receipt Temp

ALS Lab ID	Bottle Code	Matrix	Submatrix	Container Type	Test Codes	Task Remarks
VA23B0953	001-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0953	002-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0953	003-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0953	004-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0953	005-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	
VA23B0953	006-AB	Water	Groundwater	Amber glass total (sulfuric acid)	E298, EP298	



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B1186</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CS</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 19-May-2023 09:30</p> <p><b>Date Analysis Commenced</b> : 19-May-2023</p> <p><b>Issue Date</b> : 29-May-2023 09:05</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Metals, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-051723-CS-13	WG-051723-CS-14	WG-051723-CS-15	WG-051723-CS-16	WG-051723-CS-17
Client sampling date / time					17-May-2023 09:50	17-May-2023 10:40	17-May-2023 10:45	17-May-2023 11:25	17-May-2023 12:30
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1186-001	VA23B1186-002	VA23B1186-003	VA23B1186-004	VA23B1186-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	55.3	53.2	52.0	65.2	<1.0
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	55.3	53.2	52.0	65.2	<1.0
Conductivity	----	E100/VA	2.0	µS/cm	118	118	120	210	<2.0
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	55.7	51.0	49.4	100	<0.60
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	81	77	84	151	<10
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.CI/VA	0.50	mg/L	3.74	4.95	4.95	26.0	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	0.280	0.245	0.246	0.0996	<0.0050
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.280	0.245	0.246	0.0996	<0.0051
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.40	1.75	1.75	1.43	<0.30
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0017	0.0033	0.0024	0.0024	<0.0010
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00020	0.00214	0.00216	0.00014	<0.00010
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00048	0.00148	0.00143	0.00313	<0.00010
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	18.0	15.9	15.4	30.6	<0.050
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	0.00197	0.00208	0.00070	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-051723-CS-13	WG-051723-CS-14	WG-051723-CS-15	WG-051723-CS-16	WG-051723-CS-17
Client sampling date / time					17-May-2023 09:50	17-May-2023 10:40	17-May-2023 10:45	17-May-2023 11:25	17-May-2023 12:30	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1186-001	VA23B1186-002	VA23B1186-003	VA23B1186-004	VA23B1186-005	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	0.00036	<0.00020	
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	2.62	2.75	2.65	5.87	<0.100	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000147	0.000109	0.000118	0.000080	<0.000050	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	0.050	0.053	<0.050	<0.050	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.312	0.815	0.788	0.365	<0.100	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000154	0.000280	0.000331	0.000185	<0.000050	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.71	6.24	6.22	5.18	<0.050	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	2.18	2.75	2.67	3.32	<0.050	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0322	0.0301	0.0293	0.0749	<0.00020	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.88	0.75	0.65	0.52	<0.50	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000037	0.000263	0.000262	0.000146	<0.000010	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00381	0.0177	0.0173	0.00324	<0.00050	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0022	<0.0010	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-051723-CS-18	WG-051723-CS-19	WG-051723-CS-20	WG-051723-CS-21	WG-051723-CS-22
Client sampling date / time					17-May-2023 12:55	17-May-2023 13:20	17-May-2023 14:10	17-May-2023 14:45	17-May-2023 16:10
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1186-006	VA23B1186-007	VA23B1186-008	VA23B1186-009	VA23B1186-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	42.8	75.9	283	323	238
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	42.8	75.9	283	323	238
Conductivity	---	E100/VA	2.0	µS/cm	86.7	161	780	623	593
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	38.0	73.5	348	343	223
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	56	108	525	416	355
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/CG	0.0050	mg/L	<0.0050	0.0165	0.0109	<0.0050	6.86
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	0.84	5.39	54.7	10.9	49.2
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.100 <sup>DLDS</sup>	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0490	0.239	15.6	3.37	0.0241
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	0.0490	0.239	15.6	3.37	0.0259
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0010	0.0018
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	1.90	4.54	11.2	14.2	3.16
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0047	0.0064	<0.0010	0.0011	0.0032
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00080	0.00022	0.00010	0.00011	0.00167
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00044	0.00438	0.0141	0.00865	0.0186
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	0.119	0.069	0.161
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000078	<0.0000050	0.0000387	0.0000108	0.0000603
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	12.4	19.3	101	103	74.9
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	0.00067	0.00748	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	0.00024	<0.00010	0.00020
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00145	<0.00020	0.00133	0.00090	0.00028





## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-051723-CS-18	WG-051723-CS-19	WG-051723-CS-20	WG-051723-CS-21	WG-051723-CS-22
Client sampling date / time					17-May-2023 12:55	17-May-2023 13:20	17-May-2023 14:10	17-May-2023 14:45	17-May-2023 16:10	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B1186-006	VA23B1186-007	VA23B1186-008	VA23B1186-009	VA23B1186-010	
					Result	Result	Result	Result	Result	
<b>Dissolved Metals</b>										
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.033	<0.010	<0.010	<0.010	0.389	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	0.000225	<0.000050	<0.000050	<0.000050	<0.000050	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.72	6.14	23.2	20.9	8.69	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00040	<0.00010	0.309	0.00016	1.34	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000168	0.000105	0.000110	<0.000050	0.000140	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	0.00075	<0.00050	0.00172	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.269	0.755	2.20	1.51	5.04	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000119	0.000252	<0.000050	<0.000050	<0.000050	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	5.19	7.83	12.8	12.9	8.86	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.30	4.07	22.8	7.37	27.3	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0201	0.0649	0.278	0.227	0.244	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.60	1.34	4.33	4.91	1.17	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000018	0.000221	0.000743	0.000330	0.000111	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00481	0.00450	0.00167	0.00170	<0.00050	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	0.0154	<0.0010	<0.0010	<0.0010	<0.0010	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23B1186</b>	<b>Page</b>	: 1 of 14
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: Vancouver - Environmental
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 22	<b>Date Samples Received</b>	: 19-May-2023 09:30
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 19-May-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 29-May-2023 09:05
<b>Sampler</b>	: CS                    250-898-3722		
<b>Site</b>	: CRWMC - Quarterly - GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 10		
<b>No. of samples analysed</b>	: 10		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Erin Sanchez		Vancouver Metals, Burnaby, British Columbia
Kevin Baxter	Team Leader - Inorganics	Calgary Inorganics, Calgary, Alberta
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia
Robin Weeks	Team Leader - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA23B1186  
Client : Comox Valley Regional District  
Project : 22



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 947696)</b>											
VA23B1186-001	WG-051723-CS-13	Conductivity	----	E100	2.0	µS/cm	118	119	0.758%	10%	----
<b>Physical Tests (QC Lot: 948320)</b>											
VA23B1186-004	WG-051723-CS-16	Conductivity	----	E100	2.0	µS/cm	210	209	0.477%	10%	----
<b>Physical Tests (QC Lot: 948321)</b>											
VA23B1186-004	WG-051723-CS-16	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	65.2	65.0	0.461%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	65.2	65.0	0.461%	20%	----
<b>Physical Tests (QC Lot: 948512)</b>											
FJ2301129-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	660	642	2.76%	10%	----
<b>Physical Tests (QC Lot: 948513)</b>											
FJ2301129-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	214	210	1.98%	20%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	214	210	1.98%	20%	----
<b>Physical Tests (QC Lot: 951213)</b>											
VA23B1179-011	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	781	805	3.09%	20%	----
<b>Physical Tests (QC Lot: 951913)</b>											
FJ2301101-002	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	155	166	10	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 947683)</b>											
VA23B1186-001	WG-051723-CS-13	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.280	0.282	0.713%	20%	----
<b>Anions and Nutrients (QC Lot: 947684)</b>											
VA23B0904-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0053	0.0053	0.00005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 947686)</b>											
VA23B1186-001	WG-051723-CS-13	Chloride	16887-00-6	E235.Cl	0.50	mg/L	3.74	3.76	0.02	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 947691)</b>											
VA23B1186-001	WG-051723-CS-13	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	2.40	2.41	0.006	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 947692)</b>											
VA23B1186-001	WG-051723-CS-13	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 948312)</b>											



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Anions and Nutrients (QC Lot: 948312) - continued</b>											
VA23B0819-006	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	0.0173	0.0174	0.813%	20%	----
<b>Anions and Nutrients (QC Lot: 948314)</b>											
VA23B1145-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.500	mg/L	<0.500	<0.500	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 948315)</b>											
VA23B1145-001	Anonymous	Fluoride	16984-48-8	E235.F	2.00	mg/L	<2.00	<2.00	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 948316)</b>											
VA23B1145-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	30.0	mg/L	1040	1040	0.0870%	20%	----
<b>Anions and Nutrients (QC Lot: 948317)</b>											
VA23B1145-001	Anonymous	Chloride	16887-00-6	E235.Cl	50.0	mg/L	8220	8250	0.378%	20%	----
<b>Anions and Nutrients (QC Lot: 948504)</b>											
VA23B1145-003	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	15.2	15.3	0.526%	20%	----
<b>Anions and Nutrients (QC Lot: 948505)</b>											
VA23B1145-003	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0061	0.0059	0.0002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 948506)</b>											
VA23B1145-003	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 948507)</b>											
VA23B1145-003	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	21.3	21.5	0.743%	20%	----
<b>Anions and Nutrients (QC Lot: 948509)</b>											
VA23B1145-003	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.089	0.088	0.0005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 952640)</b>											
FJ2301133-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0053	<0.0050	0.0003	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 947783)</b>											
VA23B1186-001	WG-051723-CS-13	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0017	0.0016	0.00002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00020	0.00019	0.000003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00048	0.00047	0.000006	Diff <2x LOR	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	18.0	17.6	2.20%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 947783) - continued</b>											
VA23B1186-001	WG-051723-CS-13	Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.62	2.61	0.616%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000147	0.000132	0.000015	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.312	0.312	0.00005	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000154	0.000184	0.000030	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.71	4.68	0.465%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.18	2.24	2.83%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0322	0.0317	1.72%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.88	0.81	0.08	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000037	0.000039	0.00001	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00381	0.00378	0.00003	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 949460)</b>											
VA23B1146-017	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 949461)</b>											
VA23B1186-008	WG-051723-CS-20	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 947695)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 947696)</b>						
Conductivity	---	E100	1	µS/cm	1.1	---
<b>Physical Tests (QCLot: 948320)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 948321)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 948512)</b>						
Conductivity	---	E100	1	µS/cm	1.0	---
<b>Physical Tests (QCLot: 948513)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 951213)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 951913)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 947683)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 947684)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 947686)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 947691)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Anions and Nutrients (QCLot: 947692)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 948312)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 948314)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 948315)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 948316)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 948317)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 948504)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
<b>Anions and Nutrients (QCLot: 948505)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
<b>Anions and Nutrients (QCLot: 948506)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
<b>Anions and Nutrients (QCLot: 948507)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
<b>Anions and Nutrients (QCLot: 948509)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
<b>Anions and Nutrients (QCLot: 952640)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
<b>Dissolved Metals (QCLot: 947783)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 947783) - continued</b>						
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 949460)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 949461)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



### Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 947695)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 947696)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.5	90.0	110	----
<b>Physical Tests (QCLot: 948320)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	104	90.0	110	----
<b>Physical Tests (QCLot: 948321)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	112	85.0	115	----
<b>Physical Tests (QCLot: 948512)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.5	90.0	110	----
<b>Physical Tests (QCLot: 948513)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	106	85.0	115	----
<b>Physical Tests (QCLot: 951213)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	99.5	85.0	115	----
<b>Physical Tests (QCLot: 951913)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.3	85.0	115	----
<b>Anions and Nutrients (QCLot: 947683)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 947684)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 947686)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 947691)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 947692)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.2	90.0	110	----
<b>Anions and Nutrients (QCLot: 948312)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.3	90.0	110	----
<b>Anions and Nutrients (QCLot: 948314)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 948315)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.9	90.0	110	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 948316)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 948317)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 948504)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 948505)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 948506)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 948507)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	104	90.0	110	----
<b>Anions and Nutrients (QCLot: 948509)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 952640)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.4	85.0	115	----
<b>Dissolved Metals (QCLot: 947783)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.3	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	103	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	95.9	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	93.6	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	90.5	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.2	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	97.3	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	95.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	100	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	93.6	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	96.0	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.9	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 947783) - continued</b>									
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.3	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	105	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	99.6	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	95.2	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	96.1	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	94.4	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	96.6	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.0	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.9	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	102	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	97.3	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	107	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	107	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 947683)</b>										
VA23B1186-001	WG-051723-CS-13	Nitrate (as N)	14797-55-8	E235.NO3-L	2.54 mg/L	2.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 947684)</b>										
VA23B0819-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.505 mg/L	0.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 947686)</b>										
VA23B1186-001	WG-051723-CS-13	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 947691)</b>										
VA23B1186-001	WG-051723-CS-13	Sulfate (as SO4)	14808-79-8	E235.SO4	99.6 mg/L	100 mg/L	99.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 948312)</b>										
VA23B0819-007	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.498 mg/L	0.5 mg/L	99.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 948314)</b>										
VA23B1145-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	252 mg/L	250 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 948315)</b>										
VA23B1145-001	Anonymous	Fluoride	16984-48-8	E235.F	102 mg/L	100 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 948316)</b>										
VA23B1145-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	10100 mg/L	10000 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 948317)</b>										
VA23B1145-001	Anonymous	Chloride	16887-00-6	E235.Cl	9900 mg/L	10000 mg/L	99.0	75.0	125	----
<b>Anions and Nutrients (QCLot: 948504)</b>										
VA23B1145-004	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 948505)</b>										
VA23B1145-004	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.64 mg/L	2.5 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 948506)</b>										
VA23B1145-004	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 948507)</b>										
VA23B1145-004	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	105 mg/L	100 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 948509)</b>										
VA23B1145-004	Anonymous	Fluoride	16984-48-8	E235.F	1.04 mg/L	1 mg/L	104	75.0	125	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 952640)</b>										
RG2300564-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	0.1 mg/L	ND	75.0	125	----
<b>Dissolved Metals (QCLot: 947783)</b>										
VA23B1186-002	WG-051723-CS-14	Aluminum, dissolved	7429-90-5	E421	0.200 mg/L	0.2 mg/L	99.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0200 mg/L	0.02 mg/L	99.8	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.4	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0381 mg/L	0.04 mg/L	95.3	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00853 mg/L	0.01 mg/L	85.3	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.089 mg/L	0.1 mg/L	89.2	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00399 mg/L	0.004 mg/L	99.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0194 mg/L	0.02 mg/L	97.0	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.92 mg/L	2 mg/L	95.9	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0186 mg/L	0.02 mg/L	92.9	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0914 mg/L	0.1 mg/L	91.4	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0196 mg/L	0.02 mg/L	97.8	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0391 mg/L	0.04 mg/L	97.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.4 mg/L	10 mg/L	104	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.02 mg/L	4 mg/L	100	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.77 mg/L	10 mg/L	97.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00423 mg/L	0.004 mg/L	106	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.1 mg/L	20 mg/L	101	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00371 mg/L	0.004 mg/L	92.8	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0391 mg/L	0.04 mg/L	97.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00360 mg/L	0.004 mg/L	89.9	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0988 mg/L	0.1 mg/L	98.8	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.415 mg/L	0.4 mg/L	104	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 947783) - continued</b>										
VA23B1186-002	WG-051723-CS-14	Zirconium, dissolved	7440-67-7	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
<b>Dissolved Metals (QCLot: 949460)</b>										
VA23B1146-018	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000104 mg/L	0.0001 mg/L	104	70.0	130	----
<b>Dissolved Metals (QCLot: 949461)</b>										
VA23B1186-009	WG-051723-CS-21	Mercury, dissolved	7439-97-6	E509	0.000108 mg/L	0.0001 mg/L	108	70.0	130	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B1186</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 22</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CS</p> <p><b>Site</b> : CRWMC - Quarterly - GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 19</p> <p><b>Laboratory</b> : Vancouver - Environmental</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 19-May-2023 09:30</p> <p><b>Issue Date</b> : 29-May-2023 09:06</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-13	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-14	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-15	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-16	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-17	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-18	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-051723-CS-19	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> WG-051723-CS-20	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> WG-051723-CS-21	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✔	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>											
<b>Amber glass total (sulfuric acid)</b> WG-051723-CS-22	E298	17-May-2023	24-May-2023	----	----		24-May-2023	28 days	7 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-13	E235.Cl	17-May-2023	19-May-2023	----	----		20-May-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-14	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-15	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-16	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-17	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
<b>HDPE</b> WG-051723-CS-18	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051723-CS-19	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051723-CS-20	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051723-CS-21	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-051723-CS-22	E235.Cl	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-13	E235.F	17-May-2023	19-May-2023	----	----		20-May-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-14	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-15	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-16	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-17	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-18	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-19	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-20	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-21	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-051723-CS-22	E235.F	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-13	E235.NO3-L	17-May-2023	19-May-2023	----	----		20-May-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-14	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-15	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-16	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-17	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-18	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-19	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-20	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-21	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-22	E235.NO3-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-13	E235.NO2-L	17-May-2023	19-May-2023	----	----		20-May-2023	3 days	2 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-14	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-15	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-16	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-17	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-18	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-19	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-20	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-21	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-051723-CS-22	E235.NO2-L	17-May-2023	20-May-2023	----	----		20-May-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-13	E235.SO4	17-May-2023	19-May-2023	----	----		20-May-2023	28 days	2 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-14	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-15	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-16	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-17	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-18	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-19	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-20	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-21	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-051723-CS-22	E235.SO4	17-May-2023	20-May-2023	----	----		20-May-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial dissolved (hydrochloric acid) WG-051723-CS-13	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-14	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-15	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-16	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-17	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-18	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-19	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-20	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-21	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
<b>Glass vial dissolved (hydrochloric acid)</b> WG-051723-CS-22	E509	17-May-2023	22-May-2023	----	----		22-May-2023	28 days	5 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-13	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-14	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-15	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-16	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-17	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-18	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-19	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-20	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE dissolved (nitric acid) WG-051723-CS-21	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE dissolved (nitric acid)</b> WG-051723-CS-22	E421	17-May-2023	23-May-2023	----	----		24-May-2023	180 days	7 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-13	E290	17-May-2023	19-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-14	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-15	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-16	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-17	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-18	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-19	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-051723-CS-20	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051723-CS-21	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-051723-CS-22	E290	17-May-2023	20-May-2023	----	----		21-May-2023	14 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-13	E100	17-May-2023	19-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-14	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-15	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-16	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-17	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-18	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-19	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-20	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-21	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-051723-CS-22	E100	17-May-2023	20-May-2023	----	----		21-May-2023	28 days	4 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-17	E162	17-May-2023	----	----	----		23-May-2023	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-18	E162	17-May-2023	----	----	----		23-May-2023	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-19	E162	17-May-2023	----	----	----		23-May-2023	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-20	E162	17-May-2023	----	----	----		23-May-2023	7 days	5 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-13	E162	17-May-2023	----	----	----		23-May-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-051723-CS-14	E162	17-May-2023	----	----	----		23-May-2023	7 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051723-CS-15	E162	17-May-2023	----	----	----		23-May-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051723-CS-16	E162	17-May-2023	----	----	----		23-May-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051723-CS-21	E162	17-May-2023	----	----	----		24-May-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-051723-CS-22	E162	17-May-2023	----	----	----		24-May-2023	7 days	7 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	947695	2	16	12.5	5.0	✔
Ammonia by Fluorescence	E298	952640	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	947686	3	22	13.6	5.0	✔
Conductivity in Water	E100	947696	3	15	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949460	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	947783	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	947692	3	19	15.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	947683	3	33	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	947684	3	47	6.3	5.0	✔
Sulfate in Water by IC	E235.SO4	947691	3	26	11.5	5.0	✔
TDS by Gravimetry	E162	951213	2	40	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	947695	3	16	18.7	5.0	✔
Ammonia by Fluorescence	E298	952640	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	947686	3	22	13.6	5.0	✔
Conductivity in Water	E100	947696	3	15	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949460	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	947783	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	947692	3	19	15.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	947683	3	33	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	947684	3	47	6.3	5.0	✔
Sulfate in Water by IC	E235.SO4	947691	3	26	11.5	5.0	✔
TDS by Gravimetry	E162	951213	2	40	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	947695	3	16	18.7	5.0	✔
Ammonia by Fluorescence	E298	952640	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	947686	3	22	13.6	5.0	✔
Conductivity in Water	E100	947696	3	15	20.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949460	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	947783	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	947692	3	19	15.7	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	947683	3	33	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	947684	3	47	6.3	5.0	✔
Sulfate in Water by IC	E235.SO4	947691	3	26	11.5	5.0	✔
TDS by Gravimetry	E162	951213	2	40	5.0	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	952640	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	947686	3	22	13.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	949460	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	947783	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	947692	2	19	10.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	947683	3	33	9.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	947684	3	47	6.3	5.0	✔
Sulfate in Water by IC	E235.SO4	947691	3	26	11.5	5.0	✔





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 Vancouver - Environmental	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 Vancouver - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Vancouver - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Vancouver - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 Calgary - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Dissolved Metals in Water by CRC ICPMS	E421 Vancouver - Environmental	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury in Water by CVAAS	E509 Vancouver - Environmental	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 Vancouver - Environmental	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N Vancouver - Environmental	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 Calgary - Environmental	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 Vancouver - Environmental	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

**Affix ALS barcode label here**  
(lab use only)

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>								
Company:	Comox Valley Regional District	Select Report Format:	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply									
Contact:	Crystal Stuart	Quality Control (QC) Report with Report	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Priority Business Day					4 day [P4-20%] <input type="checkbox"/>				
Phone:	250-898-3722	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		EMERGENCY					3 day [P3-25%] <input type="checkbox"/>				
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX						2 day [P2-50%] <input type="checkbox"/>				
Street:	770 Herriston Avenue	Email 1 or Fax	cstuart@comoxvalleyrd.ca	Date and Time Required for all E&P TATs:					1 Business day [E1 - 100%] <input type="checkbox"/>				
City/Province:	Courtenay, BC	Email 2		For tests that can not be performed according to the service level selected, you will be contacted.					Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>				
Postal Code:	V9N 0G8	Email 3		<b>Analysis Request</b>									
Invoice To	Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below								
	Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX										
Company:		Email 1 or Fax											
Contact:		Email 2											
<b>Project Information</b>		Oil and Gas Required Fields (client use)											
ALS Account # / Quote #:	VA23-COVR100-001	AFE/Coast Center:											
Job #:	22	Major/Minor Code:											
PO / AFE:	23-015	Requisitioner:											
LSD:	CRWMC - Quarterly - GW	Location:											
ALS Lab Work Order # (lab use only):		ALS Contact:	Selam W.	Sampler:									
B1186				C Stuart									
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type	Alkalinity (aspartated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N+N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachme)	VOCs/MPH	SAMPLES ON HOLD	NUMBER OF CONTAINERS
	WG-051723-C5 - 13	17-May-23	09:50	Water	X	X	X	X	X				
			10:40										
			10:45										
			11:25										
			12:30										
			12:55										
			13:20										
			14:10										
			14:45										
	WG-051723-C5 - 22	17-May-23	16:10	Water	✓	✓	X	X	X	X			

**Environmental Division**  
Vancouver  
Work Order Reference  
**VA23B1186**



Telephone: +1 604 253 4188

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>			
Are samples taken from a Regulated DW System?	<input type="checkbox"/> YES <input type="checkbox"/> NO			Frozen	<input type="checkbox"/>	SW Observations	Yes <input type="checkbox"/> No <input type="checkbox"/>
Are samples for human consumption/ use?	<input type="checkbox"/> YES <input type="checkbox"/> NO			Ice Packs	<input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/>	Custody seal intact	Yes <input type="checkbox"/> No <input type="checkbox"/>
				Cooling Initiated	<input type="checkbox"/>		
				INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
						7	2
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>			
Released by:	C Stuart	Time:	May 18 2023 0900	Received by:	JL	Date:	MAY 19 2023
				Time:		Time:	930am



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B8799</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 8</p> <p><b>No. of samples analysed</b> : 8</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 15-Aug-2023 09:35</p> <p><b>Date Analysis Commenced</b> : 16-Aug-2023</p> <p><b>Issue Date</b> : 24-Aug-2023 15:49</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Metals, Burnaby, British Columbia



### General Comments

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

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

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

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

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

Unit	Description
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

### Sample Comments

Sample	Client Id	Comment
VA23B8799-003	WG-081323-CS-03	VA23B8799-003 and -004: Low level DCM result; LOR raised to lowest BC CSR standard.
VA23B8799-004	WG-081323-CS-04	VA23B8799-003 and -004: Low level DCM result; LOR raised to lowest BC CSR standard.

### Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
RRR	Refer to report comments for issues regarding this analysis.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081323-CS-01	WG-081323-CS-02	WG-081323-CS-03	WG-081323-CS-04	WG-081323-CS-05
Client sampling date / time					13-Aug-2023 09:40	13-Aug-2023 10:40	13-Aug-2023 11:35	13-Aug-2023 11:40	13-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-001	VA23B8799-002	VA23B8799-003	VA23B8799-004	VA23B8799-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	35.8	106	53.9	54.0	57.4
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	35.8	106	53.9	54.0	57.4
Conductivity	----	E100/VA	2.0	µS/cm	75.9	207	114	114	131
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	34.0	99.2	50.6	49.8	54.8
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	57	130	80	85	90
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	0.88	2.48	1.94	1.94	3.01
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0686	0.187	0.106	0.105	0.534
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0686	0.187	0.106	0.105	0.534
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.12	2.44	2.29	2.29	4.34
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0085	0.0044	0.0014	0.0014	0.0089
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	<0.00010	0.00074	0.00021	0.00021	0.00168
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00111	0.00212	0.00042	0.00043	0.00167
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	11.0	31.7	16.2	15.8	16.6
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	0.00056	<0.00050	<0.00050	0.00075
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081323-CS-01	WG-081323-CS-02	WG-081323-CS-03	WG-081323-CS-04	WG-081323-CS-05
Client sampling date / time					13-Aug-2023 09:40	13-Aug-2023 10:40	13-Aug-2023 11:35	13-Aug-2023 11:40	13-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-001	VA23B8799-002	VA23B8799-003	VA23B8799-004	VA23B8799-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.018	<0.010	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.60	4.86	2.46	2.52	3.24
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00113	<0.00010	<0.00010	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000122	0.000138	0.000146	0.000158	0.000072
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.136	0.790	0.284	0.292	1.01
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000091	0.000089	0.000236	0.000180	0.000142
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	3.61	6.48	4.64	4.63	5.66
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.04	2.10	2.24	2.22	3.21
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0173	0.0532	0.0297	0.0297	0.0341
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.63	0.80	0.66	0.65	1.39
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	0.00049	<0.00030	<0.00030	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	0.000096	0.000035	0.000036	0.000328
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00109	0.00536	0.00378	0.00375	0.0147
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds</b>									
Chlorobenzene	108-90-7	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50
Chloromethane	74-87-3	E611C/VA	5.0	µg/L	<5.0	----	<5.0	<5.0	<5.0
Dichlorobenzene, 1,2-	95-50-1	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-081323-CS-01	WG-081323-CS-02	WG-081323-CS-03	WG-081323-CS-04	WG-081323-CS-05
Client sampling date / time					13-Aug-2023 09:40	13-Aug-2023 10:40	13-Aug-2023 11:35	13-Aug-2023 11:40	13-Aug-2023 12:12	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-001	VA23B8799-002	VA23B8799-003	VA23B8799-004	VA23B8799-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichlorobenzene, 1,3-	541-73-1	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichlorobenzene, 1,4-	106-46-7	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloropropane, 1,2-	78-87-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C/VA	0.75	µg/L	<0.75	----	<0.75	<0.75	<0.75	
Dichloropropylene, cis-1,3-	10061-01-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C/VA	0.20	µg/L	<0.20	----	<0.20	<0.20	<0.20	
Trichloroethane, 1,1,2-	79-00-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Trichlorofluoromethane	75-69-4	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Chloroethane	75-00-3	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloroethane, 1,1-	75-34-3	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloroethane, 1,2-	107-06-2	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloroethylene, 1,1-	75-35-4	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloroethylene, cis-1,2-	156-59-2	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloroethylene, trans-1,2-	156-60-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Dichloromethane	75-09-2	E611C/VA	1.0	µg/L	<1.0	----	<50.0 <sup>RRR</sup>	<50.0 <sup>RRR</sup>	<1.0	
Dichloropropylene, trans-1,3-	10061-02-6	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Tetrachloroethylene	127-18-4	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Trichloroethane, 1,1,1-	71-55-6	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Trichloroethylene	79-01-6	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Vinyl chloride	75-01-4	E611C/VA	0.40	µg/L	<0.40	----	<0.40	<0.40	<0.40	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Ethylbenzene	100-41-4	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Styrene	100-42-5	E611C/VA	0.50	µg/L	<0.50	----	<0.50	<0.50	<0.50	
Toluene	108-88-3	E611C/VA	0.40	µg/L	<0.40	----	<0.40	<0.40	<0.40	
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L	<0.40	----	<0.40	<0.40	<0.40	





## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081323-CS-01	WG-081323-CS-02	WG-081323-CS-03	WG-081323-CS-04	WG-081323-CS-05
(Matrix: Water)					Client sampling date / time	13-Aug-2023 09:40	13-Aug-2023 10:40	13-Aug-2023 11:35	13-Aug-2023 11:40	13-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-001	VA23B8799-002	VA23B8799-003	VA23B8799-004	VA23B8799-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [Fuels]</b>										
Xylene, o-	95-47-6	E611C/VA	0.30	µg/L	<0.30	---	<0.30	<0.30	<0.30	
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	<0.50	---	<0.50	<0.50	<0.50	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C/VA	0.50	µg/L	<0.50	---	<0.50	<0.50	<0.50	
Bromoform	75-25-2	E611C/VA	0.50	µg/L	<0.50	---	<0.50	<0.50	<0.50	
Chloroform	67-66-3	E611C/VA	0.50	µg/L	<0.50	---	<0.50	<0.50	<0.50	
Dibromochloromethane	124-48-1	E611C/VA	0.50	µg/L	<0.50	---	<0.50	<0.50	<0.50	
<b>Hydrocarbons</b>										
VHw (C6-C10)	---	E581.VH+F1/ VA	100	µg/L	<100	---	<100	<100	<100	
VPHw	---	EC580A/VA	100	µg/L	<100	---	<100	<100	<100	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/ VA	1.0	%	100	---	91.5	107	110	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	88.6	---	87.2	88.9	89.5	
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	104	---	103	103	104	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081323-CS-06	WG-081323-CS-07	WG-081323-CS-08	----	----
Client sampling date / time					13-Aug-2023 12:50	13-Aug-2023 13:50	13-Aug-2023 14:20	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-006	VA23B8799-007	VA23B8799-008	-----	-----
					Result	Result	Result	----	----
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	77.9	313	317	----	----
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	----	----
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	----	----
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	77.9	313	317	----	----
Conductivity	---	E100/VA	2.0	µS/cm	167	862	640	----	----
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	82.4	371	316	----	----
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	106	568	391	----	----
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	0.0110	<0.0050	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	4.47	61.9	10.2	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.100 <sup>DLDS</sup>	<0.020	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.269	12.4	4.88	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.269	12.4	4.88	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0050 <sup>DLDS</sup>	<0.0010	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.62	10.1	13.6	----	----
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0036	0.0016	<0.0010	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00016	0.00012	0.00011	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00050	0.0144	0.00785	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	0.152	0.127	----	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000429	0.0000102	----	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	24.8	111	95.2	----	----
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	0.00093	<0.00050	<0.00050	----	----
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	0.00026	<0.00010	----	----
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00021	0.00148	0.00084	----	----



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081323-CS-06	WG-081323-CS-07	WG-081323-CS-08	----	----
(Matrix: Water)					Client sampling date / time	13-Aug-2023 12:50	13-Aug-2023 13:50	13-Aug-2023 14:20	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-006	VA23B8799-007	VA23B8799-008	-----	-----	
					Result	Result	Result	----	----	
<b>Dissolved Metals</b>										
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	----	----	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	0.0011	<0.0010	----	----	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	4.96	22.8	18.9	----	----	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00023	0.403	0.00027	----	----	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000093	0.000111	<0.000050	----	----	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	0.00084	<0.00050	----	----	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	----	----	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.331	2.15	1.44	----	----	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000127	<0.000050	<0.000050	----	----	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	5.13	13.5	13.4	----	----	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	3.26	27.9	8.03	----	----	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0613	0.286	0.216	----	----	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	1.07	4.98	5.23	----	----	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000217	0.000624	0.000302	----	----	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00365	0.00158	0.00162	----	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	----	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	----	----	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Chloromethane	74-87-3	E611C/VA	5.0	µg/L	<5.0	<5.0	----	----	----	
Dichlorobenzene, 1,2-	95-50-1	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichlorobenzene, 1,3-	541-73-1	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081323-CS-06	WG-081323-CS-07	WG-081323-CS-08	----	----
(Matrix: Water)					Client sampling date / time	13-Aug-2023 12:50	13-Aug-2023 13:50	13-Aug-2023 14:20	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-006	VA23B8799-007	VA23B8799-008	-----	-----	
					Result	Result	Result	----	----	
<b>Volatile Organic Compounds</b>										
Dichlorobenzene, 1,4-	106-46-7	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloropropane, 1,2-	78-87-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C/VA	0.75	µg/L	<0.75	<0.75	----	----	----	
Dichloropropylene, cis-1,3-	10061-01-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C/VA	0.20	µg/L	<0.20	<0.20	----	----	----	
Trichloroethane, 1,1,2-	79-00-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Trichlorofluoromethane	75-69-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Chloroethane	75-00-3	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloroethane, 1,1-	75-34-3	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloroethane, 1,2-	107-06-2	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloroethylene, 1,1-	75-35-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloroethylene, cis-1,2-	156-59-2	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloroethylene, trans-1,2-	156-60-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dichloromethane	75-09-2	E611C/VA	1.0	µg/L	<1.0	<1.0	----	----	----	
Dichloropropylene, trans-1,3-	10061-02-6	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Tetrachloroethylene	127-18-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Trichloroethane, 1,1,1-	71-55-6	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Trichloroethylene	79-01-6	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Vinyl chloride	75-01-4	E611C/VA	0.40	µg/L	<0.40	<0.40	----	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Ethylbenzene	100-41-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Styrene	100-42-5	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Toluene	108-88-3	E611C/VA	0.40	µg/L	<0.40	<0.40	----	----	----	
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L	<0.40	<0.40	----	----	----	
Xylene, o-	95-47-6	E611C/VA	0.30	µg/L	<0.30	<0.30	----	----	----	



**Analytical Results**

Sub-Matrix: Water					Client sample ID	WG-081323-CS-06	WG-081323-CS-07	WG-081323-CS-08	----	----
(Matrix: Water)					Client sampling date / time	13-Aug-2023 12:50	13-Aug-2023 13:50	13-Aug-2023 14:20	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B8799-006	VA23B8799-007	VA23B8799-008	-----	-----	
					Result	Result	Result	----	----	
<b>Volatile Organic Compounds [Fuels]</b>										
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Bromoform	75-25-2	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Chloroform	67-66-3	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
Dibromochloromethane	124-48-1	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----	
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1/ VA	100	µg/L	<100	<100	----	----	----	
VPHw	----	EC580A/VA	100	µg/L	<100	<100	----	----	----	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/ VA	1.0	%	104	104	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	88.6	88.8	----	----	----	
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	104	103	----	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23B8799</b></p> <p>Client : Comox Valley Regional District</p> <p>Contact : Crystal Stuart</p> <p>Address : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p>Telephone :</p> <p>Project : 3-2</p> <p>PO : 23-015</p> <p>C-O-C number : ----</p> <p>Sampler : C.Stuart 250-898-3722</p> <p>Site : CRWMC-Quarterly-GW</p> <p>Quote number : VA23-COVR100-001</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 14</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Thomas Chang</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 15-Aug-2023 09:35</p> <p>Date Analysis Commenced : 16-Aug-2023</p> <p>Issue Date : 24-Aug-2023 15:50</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
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Work Order : VA23B8799  
Client : Comox Valley Regional District  
Project : 3-2



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1088859)</b>											
WR2300868-007	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	34.2	34.3	0.294%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	34.2	34.3	0.294%	20%	----
<b>Physical Tests (QC Lot: 1088860)</b>											
WR2300868-007	Anonymous	Conductivity	----	E100	2.0	µS/cm	2140	2140	0.00%	10%	----
<b>Physical Tests (QC Lot: 1091270)</b>											
FJ2302008-003	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	394	388	1.66%	20%	----
<b>Anions and Nutrients (QC Lot: 1088862)</b>											
WR2300868-007	Anonymous	Fluoride	16984-48-8	E235.F	0.400	mg/L	<0.400	<0.400	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1088863)</b>											
WR2300868-007	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	6.00	mg/L	1400	1400	0.696%	20%	----
<b>Anions and Nutrients (QC Lot: 1088864)</b>											
WR2300868-007	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	0.224	0.216	0.0071	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1088865)</b>											
WR2300868-007	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1088866)</b>											
WR2300868-007	Anonymous	Chloride	16887-00-6	E235.Cl	10.0	mg/L	<10.0	<10.0	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1091089)</b>											
VA23B8799-001	WG-081323-CS-01	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1086460)</b>											
VA23B8739-021	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	0.0012	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00025	0.00025	0.0000002	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.0102	0.0101	1.11%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0291	0.0289	0.608%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000478	0.0000459	0.0000018	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	73.7	72.2	2.00%	20%	----





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1086460) - continued</b>											
VA23B8739-021	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00162	0.00161	0.990%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.013	0.013	0.0001	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0013	0.0013	0.000007	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	13.0	13.2	1.73%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.226	0.225	0.350%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000765	0.000765	0.0734%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00604	0.00613	1.57%	20%	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.14	1.13	0.801%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000631	0.000682	7.70%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.93	2.93	0.194%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.38	1.37	0.805%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.214	0.211	1.28%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	19.4	19.5	0.488%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000016	0.000016	0.0000002	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.00120	0.00120	0.764%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1093267)</b>											
VA23B8747-004	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 1096040)</b>											
VA23B8777-001	Anonymous	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 1096040) - continued</b>											
VA23B8777-001	Anonymous	Chloroform	67-66-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 1096039)</b>											
VA23B8777-001	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1088859)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1088860)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 1091270)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1088862)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1088863)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1088864)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1088865)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1088866)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1091089)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1086460)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1086460) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1093267)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 1096040)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 1096040) - continued</b>						
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 1096039)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1088859)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	111	85.0	115	----
<b>Physical Tests (QCLot: 1088860)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	100	90.0	110	----
<b>Physical Tests (QCLot: 1091270)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	101	85.0	115	----
<b>Anions and Nutrients (QCLot: 1088862)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 1088863)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1088864)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1088865)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1088866)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1091089)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	96.2	85.0	115	----
<b>Dissolved Metals (QCLot: 1086460)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	107	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	108	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	108	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	107	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	104	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	105	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	103	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1086460) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	119	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	104	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	113	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	110	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	114	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	106	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	111	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	101	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	114	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	98.8	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	103	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	102	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	105	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	105	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	104	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 1096040)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	99.0	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	86.6	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	92.2	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	105	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	89.0	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	83.0	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	88.0	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 1096040) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	79.7	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	95.8	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	96.0	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	90.4	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	93.0	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	94.6	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	95.9	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	87.8	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	111	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	98.3	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	96.9	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	84.6	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	110	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	72.6	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	90.2	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	109	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 1096039)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	95.8	70.0	130	----





### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1088862)</b>										
WR2300868-008	Anonymous	Fluoride	16984-48-8	E235.F	1.03 mg/L	1 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1088863)</b>										
WR2300868-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 1088864)</b>										
WR2300868-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.58 mg/L	2.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1088865)</b>										
WR2300868-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.513 mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1088866)</b>										
WR2300868-008	Anonymous	Chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1091089)</b>										
VA23B8799-002	WG-081323-CS-02	Ammonia, total (as N)	7664-41-7	E298	0.101 mg/L	0.1 mg/L	101	75.0	125	----
<b>Dissolved Metals (QCLot: 1086460)</b>										
VA23B8739-022	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	98.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0208 mg/L	0.02 mg/L	104	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0199 mg/L	0.02 mg/L	99.5	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0390 mg/L	0.04 mg/L	97.5	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00866 mg/L	0.01 mg/L	86.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.098 mg/L	0.1 mg/L	98.4	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00377 mg/L	0.004 mg/L	94.2	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0384 mg/L	0.04 mg/L	96.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0178 mg/L	0.02 mg/L	89.1	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.80 mg/L	2 mg/L	90.2	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0185 mg/L	0.02 mg/L	92.6	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0975 mg/L	0.1 mg/L	97.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1086460) - continued</b>										
VA23B8739-022	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0364 mg/L	0.04 mg/L	91.1	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.7 mg/L	10 mg/L	107	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.00 mg/L	4 mg/L	99.9	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0448 mg/L	0.04 mg/L	112	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.04 mg/L	10 mg/L	90.4	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	2.04 mg/L	2 mg/L	102	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00369 mg/L	0.004 mg/L	92.3	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0379 mg/L	0.04 mg/L	94.8	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0966 mg/L	0.1 mg/L	96.6	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.368 mg/L	0.4 mg/L	92.1	70.0	130	----
Zirconium, dissolved	7440-67-7	E421	0.0396 mg/L	0.04 mg/L	99.1	70.0	130	----		
<b>Dissolved Metals (QCLot: 1093267)</b>										
VA23B8747-005	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000102 mg/L	0.0001 mg/L	102	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 1096040)</b>										
VA23B8777-002	Anonymous	Benzene	71-43-2	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	97.9 µg/L	100 µg/L	97.9	60.0	140	----
		Bromoform	75-25-2	E611C	97.7 µg/L	100 µg/L	97.7	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Chlorobenzene	108-90-7	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Chloroethane	75-00-3	E611C	110 µg/L	100 µg/L	110	50.0	150	----
		Chloroform	67-66-3	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Chloromethane	74-87-3	E611C	88.4 µg/L	100 µg/L	88.4	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	96.6 µg/L	100 µg/L	96.6	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	92.6 µg/L	100 µg/L	92.6	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	106 µg/L	100 µg/L	106	60.0	140	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 1096040) - continued</b>										
VA23B8777-002	Anonymous	Dichloroethylene, trans-1,2-	156-60-5	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		Dichloromethane	75-09-2	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Ethylbenzene	100-41-4	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Styrene	100-42-5	E611C	97.1 µg/L	100 µg/L	97.1	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	99.8 µg/L	100 µg/L	99.8	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	94.2 µg/L	100 µg/L	94.2	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Toluene	108-88-3	E611C	98.6 µg/L	100 µg/L	98.6	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	99.7 µg/L	100 µg/L	99.7	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	93.0 µg/L	100 µg/L	93.0	60.0	140	----
		Trichloroethylene	79-01-6	E611C	116 µg/L	100 µg/L	116	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	137 µg/L	100 µg/L	137	50.0	150	----
		Vinyl chloride	75-01-4	E611C	93.7 µg/L	100 µg/L	93.7	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	216 µg/L	200 µg/L	108	60.0	140	----
		Xylene, o-	95-47-6	E611C	103 µg/L	100 µg/L	103	60.0	140	----
<b>Hydrocarbons (QCLot: 1096039)</b>										
VA23B8777-003	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5470 µg/L	6310 µg/L	86.7	60.0	140	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B8799</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 8</p> <p><b>No. of samples analysed</b> : 8</p>	<p><b>Page</b> : 1 of 21</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 15-Aug-2023 09:35</p> <p><b>Issue Date</b> : 24-Aug-2023 15:50</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-01	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-02	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-03	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-04	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-05	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-06	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081323-CS-07	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✔	20-Aug-2023	28 days	7 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-081323-CS-08	E298	13-Aug-2023	17-Aug-2023	28 days	4 days	✓	20-Aug-2023	28 days	7 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-07	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-08	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-03	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-04	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-05	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-06	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-01	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081323-CS-02	E235.Cl	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	17-Aug-2023	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-07	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-08	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-03	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-04	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-05	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-06	E235.F	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-01	E235.F	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081323-CS-02	E235.F	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	17-Aug-2023	28 days	4 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-081323-CS-07	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-08	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-03	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-04	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-05	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-06	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-01	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	4 days	*	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-02	E235.NO3-L	13-Aug-2023	16-Aug-2023	3 days	4 days	*	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-07	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-08	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-03	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-04	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	4 days	*	EHT
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<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
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<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-01	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	4 days	*	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081323-CS-02	E235.NO2-L	13-Aug-2023	16-Aug-2023	3 days	4 days	*	17-Aug-2023	3 days	4 days	*	EHT
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-07	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-08	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-03	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

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			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-04	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-05	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-06	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	4 days	✓	
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<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081323-CS-02	E235.SO4	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	17-Aug-2023	28 days	4 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081323-CS-07	E509	13-Aug-2023	19-Aug-2023	28 days	5 days	✓	19-Aug-2023	28 days	5 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081323-CS-08	E509	13-Aug-2023	19-Aug-2023	28 days	5 days	✓	19-Aug-2023	28 days	5 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081323-CS-01	E509	13-Aug-2023	19-Aug-2023	28 days	6 days	✓	19-Aug-2023	28 days	6 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081323-CS-02	E509	13-Aug-2023	19-Aug-2023	28 days	6 days	✓	19-Aug-2023	28 days	6 days	✓	



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Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081323-CS-03	E509	13-Aug-2023	19-Aug-2023	28 days	6 days	✓	19-Aug-2023	28 days	6 days	✓
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<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081323-CS-06	E509	13-Aug-2023	19-Aug-2023	28 days	6 days	✓	19-Aug-2023	28 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081323-CS-01	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081323-CS-02	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
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HDPE - dissolved (lab preserved) WG-081323-CS-04	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓
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HDPE - dissolved (lab preserved) WG-081323-CS-05	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-081323-CS-06	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
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HDPE - dissolved (lab preserved) WG-081323-CS-08	E421	13-Aug-2023	16-Aug-2023	180 days	3 days	✓	17-Aug-2023	180 days	4 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-03	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-04	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-05	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-06	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-07	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081323-CS-01	E581.VH+F1	13-Aug-2023	21-Aug-2023	14 days	9 days	✓	22-Aug-2023	14 days	9 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-02	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-03	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-04	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-05	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-06	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-07	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-08	E290	13-Aug-2023	16-Aug-2023	14 days	3 days	✓	16-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081323-CS-01	E290	13-Aug-2023	16-Aug-2023	14 days	4 days	✓	16-Aug-2023	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-02	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-03	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-04	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-05	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-06	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-07	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-08	E100	13-Aug-2023	16-Aug-2023	28 days	3 days	✓	16-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081323-CS-01	E100	13-Aug-2023	16-Aug-2023	28 days	4 days	✓	16-Aug-2023	28 days	4 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-05	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	4 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-06	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-07	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-08	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	4 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-01	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-02	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-03	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081323-CS-04	E162	13-Aug-2023	----	----	----		18-Aug-2023	7 days	5 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-03	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-04	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-05	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-06	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-07	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-01	E611C	13-Aug-2023	21-Aug-2023	14 days	9 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-03	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-04	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-05	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-06	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-07	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	9 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-01	E611C	13-Aug-2023	21-Aug-2023	14 days	9 days	✓	22-Aug-2023	14 days	9 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-03	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-04	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-05	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-06	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-07	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-01	E611C	13-Aug-2023	21-Aug-2023	14 days	9 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-03	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-04	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-05	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-06	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-07	E611C	13-Aug-2023	21-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	9 days	✔
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081323-CS-01	E611C	13-Aug-2023	21-Aug-2023	14 days	9 days	✔	22-Aug-2023	14 days	9 days	✔

**Legend & Qualifier Definitions**

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1088859	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1091089	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1088866	1	14	7.1	5.0	✔
Conductivity in Water	E100	1088860	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1093267	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1086460	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1088862	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1088864	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1088865	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1088863	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	1091270	1	16	6.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096039	1	11	9.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096040	1	11	9.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1088859	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1091089	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1088866	1	14	7.1	5.0	✔
Conductivity in Water	E100	1088860	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1093267	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1086460	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1088862	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1088864	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1088865	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1088863	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	1091270	1	16	6.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096039	1	11	9.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096040	1	11	9.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1088859	1	14	7.1	5.0	✔
Ammonia by Fluorescence	E298	1091089	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1088866	1	14	7.1	5.0	✔
Conductivity in Water	E100	1088860	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1093267	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1086460	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1088862	1	14	7.1	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	1088864	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1088865	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1088863	1	14	7.1	5.0	✔
TDS by Gravimetry	E162	1091270	1	16	6.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096039	1	11	9.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096040	1	11	9.0	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1091089	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1088866	1	14	7.1	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1093267	1	18	5.5	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1086460	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1088862	1	14	7.1	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1088864	1	14	7.1	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1088865	1	14	7.1	5.0	✔
Sulfate in Water by IC	E235.SO4	1088863	1	14	7.1	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096039	1	11	9.0	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096040	1	11	9.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 ALS Environmental - Vancouver	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
VOCs (BC List) by Headspace GC-MS	E611C ALS Environmental - Vancouver	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A ALS Environmental - Vancouver	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Vancouver	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.







## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B9056</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 8</p> <p><b>No. of samples analysed</b> : 8</p>	<p><b>Page</b> : 1 of 8</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 16-Aug-2023 12:20</p> <p><b>Date Analysis Commenced</b> : 17-Aug-2023</p> <p><b>Issue Date</b> : 23-Aug-2023 13:08</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Delson Resende	Lab Assistant	Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081423-C5-09	WG-081423-C5-10	WG-081423-C5-11	WG-081423-C5-12	WG-081423-C5-13
Client sampling date / time					14-Aug-2023 09:25	14-Aug-2023 10:00	14-Aug-2023 11:10	14-Aug-2023 12:10	14-Aug-2023 13:35
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-001	VA23B9056-002	VA23B9056-003	VA23B9056-004	VA23B9056-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	192	162	91.9	78.8	354
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	192	162	91.9	78.8	354
Conductivity	----	E100/VA	2.0	µS/cm	393	964	181	156	800
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	223	361	94.4	83.8	292
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	279	696	118	121	421
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	19.9
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	15.1	131	2.58	1.72	56.5
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.100 <sup>DLDS</sup>	0.026	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	1.14	26.9	0.610	0.209	<0.0050
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	1.14	27.0	0.610	0.209	<0.0051
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	0.0672	<0.0010	<0.0010	0.0023
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	6.15	35.4	2.10	3.05	3.54
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0066	0.0011	0.147	0.0060	<0.0010
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	<0.00010	0.00013	0.00029	0.00196	0.00021
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00744	0.0146	0.00848	0.00366	0.0461
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.014	0.148	<0.010	<0.010	0.208
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000363	<0.0000050	<0.0000050	0.0000989
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	70.9	109	27.2	26.2	88.0
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	0.00200	<0.00050	0.00273	0.00055	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	0.00061	0.00016	<0.00010	0.00154



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081423-C5-09	WG-081423-C5-10	WG-081423-C5-11	WG-081423-C5-12	WG-081423-C5-13
Client sampling date / time					14-Aug-2023 09:25	14-Aug-2023 10:00	14-Aug-2023 11:10	14-Aug-2023 12:10	14-Aug-2023 13:35
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-001	VA23B9056-002	VA23B9056-003	VA23B9056-004	VA23B9056-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	0.00359	0.00093	<0.00020	0.00925
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	0.201	<0.010	0.026
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	11.2	21.6	6.42	4.47	17.5
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00010	0.279	0.00754	<0.00010	2.95
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	<0.000050	0.000070	0.000153	0.000132	0.000632
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	0.00106	<0.00050	<0.00050	0.00199
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	1.20	1.74	0.510	1.05	12.4
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000186	0.000072	0.000101	0.000200	<0.000050
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	8.29	9.83	6.74	5.68	14.8
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	5.78	59.6	2.50	1.53	30.3
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.167	0.302	0.0468	0.0328	0.411
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	2.01	13.0	<0.50	0.62	1.26
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	0.0110	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000320	0.000506	0.000265	0.000108	0.000479
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00167	0.00308	0.00666	0.0190	0.00172
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds</b>									
Chlorobenzene	108-90-7	E611C/VA	0.50	µg/L	----	<0.50	----	----	<0.50
Chloromethane	74-87-3	E611C/VA	5.0	µg/L	----	<5.0	----	----	<5.0
Dichlorobenzene, 1,2-	95-50-1	E611C/VA	0.50	µg/L	----	<0.50	----	----	<0.50



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-081423-C5-09	WG-081423-C5-10	WG-081423-C5-11	WG-081423-C5-12	WG-081423-C5-13
Client sampling date / time					14-Aug-2023 09:25	14-Aug-2023 10:00	14-Aug-2023 11:10	14-Aug-2023 12:10	14-Aug-2023 13:35	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-001	VA23B9056-002	VA23B9056-003	VA23B9056-004	VA23B9056-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichlorobenzene, 1,3-	541-73-1	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichlorobenzene, 1,4-	106-46-7	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloropropane, 1,2-	78-87-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C/VA	0.75	µg/L	---	<0.75	---	---	<0.75	
Dichloropropylene, cis-1,3-	10061-01-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C/VA	0.20	µg/L	---	<0.20	---	---	<0.20	
Trichloroethane, 1,1,2-	79-00-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Trichlorofluoromethane	75-69-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Chloroethane	75-00-3	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloroethane, 1,1-	75-34-3	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloroethane, 1,2-	107-06-2	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloroethylene, 1,1-	75-35-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloroethylene, cis-1,2-	156-59-2	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloroethylene, trans-1,2-	156-60-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dichloromethane	75-09-2	E611C/VA	1.0	µg/L	---	<1.0	---	---	<1.0	
Dichloropropylene, trans-1,3-	10061-02-6	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Tetrachloroethylene	127-18-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Trichloroethane, 1,1,1-	71-55-6	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Trichloroethylene	79-01-6	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Vinyl chloride	75-01-4	E611C/VA	0.40	µg/L	---	<0.40	---	---	<0.40	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Ethylbenzene	100-41-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	0.94	
Styrene	100-42-5	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Toluene	108-88-3	E611C/VA	0.40	µg/L	---	<0.40	---	---	<0.40	
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L	---	<0.40	---	---	<0.40	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081423-C5-09	WG-081423-C5-10	WG-081423-C5-11	WG-081423-C5-12	WG-081423-C5-13
(Matrix: Water)					Client sampling date / time	14-Aug-2023 09:25	14-Aug-2023 10:00	14-Aug-2023 11:10	14-Aug-2023 12:10	14-Aug-2023 13:35
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-001	VA23B9056-002	VA23B9056-003	VA23B9056-004	VA23B9056-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [Fuels]</b>										
Xylene, o-	95-47-6	E611C/VA	0.30	µg/L	---	<0.30	---	---	<0.30	
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Bromoform	75-25-2	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Chloroform	67-66-3	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
Dibromochloromethane	124-48-1	E611C/VA	0.50	µg/L	---	<0.50	---	---	<0.50	
<b>Hydrocarbons</b>										
VHw (C6-C10)	---	E581.VH+F1/ VA	100	µg/L	---	<100	---	---	<100	
VPHw	---	EC580A/VA	100	µg/L	---	<100	---	---	<100	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/ VA	1.0	%	---	101	---	---	98.8	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	---	91.2	---	---	89.8	
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	---	99.0	---	---	99.0	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-081423-C5-14	WG-081423-C5-15	WG-081423-C5-16	----	----
Client sampling date / time					14-Aug-2023 14:55	14-Aug-2023 15:00	14-Aug-2023 15:15	----	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-006	VA23B9056-007	VA23B9056-008	-----	-----	
					Result	Result	Result	----	----	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	52.8	52.3	86.0	----	----	
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	----	----	
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	----	----	
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	52.8	52.3	86.0	----	----	
Conductivity	---	E100/VA	2.0	µS/cm	107	106	168	----	----	
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	55.1	53.2	89.1	----	----	
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	82	75	109	----	----	
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	----	----	
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	1.23	1.22	1.77	----	----	
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	----	----	
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.124	0.122	0.159	----	----	
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	0.124	0.122	0.159	----	----	
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----	
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.48	2.44	2.48	----	----	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0048	0.0045	0.0073	----	----	
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00036	0.00037	0.00032	----	----	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00071	0.00070	0.00248	----	----	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	----	----	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	0.011	----	----	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	19.3	18.6	32.1	----	----	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	0.00072	----	----	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	<0.00020	0.00052	----	----	





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081423-C5-14	WG-081423-C5-15	WG-081423-C5-16	----	----
Client sampling date / time					14-Aug-2023 14:55	14-Aug-2023 15:00	14-Aug-2023 15:15	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9056-006	VA23B9056-007	VA23B9056-008	-----	-----
					Result	Result	Result	----	----
<b>Dissolved Metals</b>									
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	0.014	----	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	----	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.68	1.64	2.18	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	0.00033	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000108	0.000099	0.000130	----	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	----	----
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	----	----
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.258	0.254	0.466	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000089	0.000078	0.000132	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	3.95	3.95	4.53	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.32	1.33	2.28	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0280	0.0290	0.0507	----	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.50	0.56	1.09	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	----	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	----	----
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000026	0.000025	0.000053	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00272	0.00269	0.00235	----	----
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	----	----
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	----	----
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	----	----
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	----	----

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23B9056</b></p> <p>Client : Comox Valley Regional District</p> <p>Contact : Crystal Stuart</p> <p>Address : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p>Telephone :</p> <p>Project : 3-2</p> <p>PO : 23-015</p> <p>C-O-C number : ----</p> <p>Sampler : C.Stuart 250-898-3722</p> <p>Site : CRWMC-Quaterly-GW</p> <p>Quote number : VA23-COVR100-001</p> <p>No. of samples received : 8</p> <p>No. of samples analysed : 8</p>	<p>Page : 1 of 14</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Thomas Chang</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 16-Aug-2023 12:20</p> <p>Date Analysis Commenced : 17-Aug-2023</p> <p>Issue Date : 23-Aug-2023 13:08</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Brianna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Delson Resende	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA23B9056  
Client : Comox Valley Regional District  
Project : 3-2



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "--" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1090462)</b>											
WR2300874-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	297	293	1.36%	10%	----
<b>Physical Tests (QC Lot: 1090463)</b>											
WR2300874-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	137	136	0.367%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	4.4	4.4	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	141	140	0.355%	20%	----
<b>Physical Tests (QC Lot: 1096069)</b>											
VA23B9015-004	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	384	380	1.18%	20%	----
<b>Anions and Nutrients (QC Lot: 1090454)</b>											
VA23B9060-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	431	428	0.475%	20%	----
<b>Anions and Nutrients (QC Lot: 1090455)</b>											
VA23B9060-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1090456)</b>											
VA23B9060-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.0477	0.0499	0.0022	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1090457)</b>											
VA23B9060-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1090458)</b>											
VA23B9060-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.214	0.218	0.005	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1093312)</b>											
VA23B9056-001	WG-081423-C5-09	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1090617)</b>											
KS2303039-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0020	0.0022	0.0002	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.104	0.104	0.293%	20%	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00103	0.00101	2.04%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0268	0.0274	1.96%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.014	0.014	0.0002	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0130	0.0129	0.162%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	97.0	96.9	0.0242%	20%	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1090617) - continued</b>											
KS2303039-001	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00015	0.00015	0.0000004	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00037	0.00036	0.00001	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	0.00731	0.00732	0.0802%	20%	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0072	0.0072	0.00002	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	26.8	26.9	0.0455%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.127	0.128	0.792%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000248	0.000270	0.000022	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00278	0.00286	0.00008	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.23	1.23	0.614%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.65	3.58	1.99%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	3.02	2.98	1.28%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.476	0.471	1.13%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	63.9	62.9	1.59%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000123	0.000126	2.38%	20%	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000278	0.000279	0.186%	20%	----		
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----		
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	1.59	1.58	0.618%	20%	----		
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----		

**Dissolved Metals (QC Lot: 1095947)**

VA23B9024-005	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
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**Volatile Organic Compounds (QC Lot: 1096538)**

KS2303089-002	Anonymous	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 1096538) - continued</b>											
KS2303089-002	Anonymous	Chloroform	67-66-3	E611C	0.50	µg/L	7.76	6.96	10.9%	30%	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----		
<b>Hydrocarbons (QC Lot: 1096539)</b>											
KS2303089-002	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1090462)</b>						
Conductivity	---	E100	1	µS/cm	1.0	---
<b>Physical Tests (QCLot: 1090463)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1096069)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1090454)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1090455)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1090456)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1090457)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1090458)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1093312)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1090617)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1090617) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1095947)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 1096538)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 1096538) - continued</b>						
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 1096539)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1090462)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	97.6	90.0	110	----
<b>Physical Tests (QCLot: 1090463)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
<b>Physical Tests (QCLot: 1096069)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
<b>Anions and Nutrients (QCLot: 1090454)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 1090455)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1090456)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1090457)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 1090458)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 1093312)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	94.4	85.0	115	----
<b>Dissolved Metals (QCLot: 1090617)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	109	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.6	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	87.6	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.4	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	99.4	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	98.4	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	94.1	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1090617) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	94.7	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	98.9	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	97.7	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.6	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.3	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.0	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	103	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	91.9	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	109	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.2	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	93.6	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	100	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	96.3	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	100	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	93.6	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 1096538)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	99.1	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	96.4	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	94.4	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	94.6	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	97.7	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	85.8	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	94.0	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 1096538) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	99.3	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	92.4	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	99.8	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	97.9	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	95.8	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	98.4	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	95.6	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	96.2	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	105	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	99.3	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	98.4	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	93.0	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	93.4	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	109	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	90.7	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	108	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	103	70.0	130	----
<b>Hydrocarbons (QCLot: 1096539)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	97.1	70.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1090454)</b>										
VA23B9060-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	107 mg/L	100 mg/L	107	75.0	125	----
<b>Anions and Nutrients (QCLot: 1090455)</b>										
VA23B9060-002	Anonymous	Chloride	16887-00-6	E235.Cl	105 mg/L	100 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 1090456)</b>										
VA23B9060-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.66 mg/L	2.5 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1090457)</b>										
VA23B9060-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.512 mg/L	0.5 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 1090458)</b>										
VA23B9060-002	Anonymous	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 1093312)</b>										
VA23B9056-002	WG-081423-C5-10	Ammonia, total (as N)	7664-41-7	E298	0.100 mg/L	0.1 mg/L	100	75.0	125	----
<b>Dissolved Metals (QCLot: 1090617)</b>										
KS2303039-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.179 mg/L	0.2 mg/L	89.4	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0183 mg/L	0.02 mg/L	91.4	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00868 mg/L	0.01 mg/L	86.8	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.092 mg/L	0.1 mg/L	92.3	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0379 mg/L	0.04 mg/L	94.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0188 mg/L	0.02 mg/L	93.8	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0182 mg/L	0.02 mg/L	90.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.82 mg/L	2 mg/L	91.2	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0184 mg/L	0.02 mg/L	92.2	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----		
Molybdenum, dissolved	7439-98-7	E421	0.0185 mg/L	0.02 mg/L	92.5	70.0	130	----		



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1090617) - continued</b>										
KS2303039-002	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.15 mg/L	10 mg/L	91.5	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.78 mg/L	4 mg/L	94.4	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0395 mg/L	0.04 mg/L	98.7	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.36 mg/L	10 mg/L	93.6	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00368 mg/L	0.004 mg/L	92.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	2.06 mg/L	2 mg/L	103	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.8 mg/L	20 mg/L	99.1	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00350 mg/L	0.004 mg/L	87.6	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00362 mg/L	0.004 mg/L	90.5	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0929 mg/L	0.1 mg/L	92.9	70.0	130	----
Zinc, dissolved	7440-66-6	E421	0.366 mg/L	0.4 mg/L	91.4	70.0	130	----		
Zirconium, dissolved	7440-67-7	E421	0.0405 mg/L	0.04 mg/L	101	70.0	130	----		
<b>Dissolved Metals (QCLot: 1095947)</b>										
VA23B9024-006	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000104 mg/L	0.0001 mg/L	104	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 1096538)</b>										
KS2303089-002	Anonymous	Benzene	71-43-2	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Bromoform	75-25-2	E611C	96.2 µg/L	100 µg/L	96.2	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Chlorobenzene	108-90-7	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Chloroethane	75-00-3	E611C	102 µg/L	100 µg/L	102	50.0	150	----
		Chloroform	67-66-3	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Chloromethane	74-87-3	E611C	91.2 µg/L	100 µg/L	91.2	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	95.9 µg/L	100 µg/L	95.9	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	97.4 µg/L	100 µg/L	97.4	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	103 µg/L	100 µg/L	103	60.0	140	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 1096538) - continued</b>										
KS2303089-002	Anonymous	Dichloroethylene, trans-1,2-	156-60-5	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Dichloromethane	75-09-2	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	97.0 µg/L	100 µg/L	97.0	60.0	140	----
		Ethylbenzene	100-41-4	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Styrene	100-42-5	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	93.1 µg/L	100 µg/L	93.1	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Toluene	108-88-3	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		Trichloroethylene	79-01-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	130 µg/L	100 µg/L	130	50.0	150	----
		Vinyl chloride	75-01-4	E611C	97.8 µg/L	100 µg/L	97.8	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	220 µg/L	200 µg/L	110	60.0	140	----
		Xylene, o-	95-47-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
<b>Hydrocarbons (QCLot: 1096539)</b>										
KS2303089-003	Anonymous	VHw (C6-C10)	----	E581.VH+F1	5600 µg/L	6310 µg/L	88.8	60.0	140	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B9056</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 8</p> <p><b>No. of samples analysed</b> : 8</p>	<p><b>Page</b> : 1 of 19</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 16-Aug-2023 12:20</p> <p><b>Issue Date</b> : 23-Aug-2023 13:08</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.



### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-09	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-10	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-11	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-12	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-13	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-14	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081423-C5-15	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✔	22-Aug-2023	28 days	8 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-081423-C5-16	E298	14-Aug-2023	19-Aug-2023	28 days	5 days	✓	22-Aug-2023	28 days	8 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-09	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-10	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-11	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-12	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-13	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-14	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-15	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-081423-C5-16	E235.Cl	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-09	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-10	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-11	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-12	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-13	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-14	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-15	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081423-C5-16	E235.F	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-09	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-10	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-11	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-12	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-13	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-14	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-15	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-16	E235.NO3-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-09	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-10	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✔	17-Aug-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-11	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-12	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-13	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-14	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-15	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081423-C5-16	E235.NO2-L	14-Aug-2023	17-Aug-2023	3 days	3 days	✓	17-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-09	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-10	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-11	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-12	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-13	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-14	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-15	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081423-C5-16	E235.SO4	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	17-Aug-2023	28 days	3 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081423-C5-09	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✓	21-Aug-2023	28 days	7 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081423-C5-10	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✓	21-Aug-2023	28 days	7 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081423-C5-11	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✓	21-Aug-2023	28 days	7 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081423-C5-12	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✓	21-Aug-2023	28 days	7 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081423-C5-13	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✔	21-Aug-2023	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081423-C5-14	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✔	21-Aug-2023	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081423-C5-15	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✔	21-Aug-2023	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081423-C5-16	E509	14-Aug-2023	21-Aug-2023	28 days	7 days	✔	21-Aug-2023	28 days	7 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081423-C5-09	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✔	19-Aug-2023	180 days	5 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081423-C5-10	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✔	19-Aug-2023	180 days	5 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081423-C5-11	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✔	19-Aug-2023	180 days	5 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081423-C5-12	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✔	19-Aug-2023	180 days	5 days	✔
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081423-C5-13	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✔	19-Aug-2023	180 days	5 days	✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-081423-C5-14	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✓	19-Aug-2023	180 days	5 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-081423-C5-15	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✓	19-Aug-2023	180 days	5 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-081423-C5-16	E421	14-Aug-2023	19-Aug-2023	180 days	5 days	✓	19-Aug-2023	180 days	5 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081423-C5-10	E581.VH+F1	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓	
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>											
Glass vial (sodium bisulfate) WG-081423-C5-13	E581.VH+F1	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-081423-C5-09	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-081423-C5-10	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-081423-C5-11	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓	
<b>Physical Tests : Alkalinity Species by Titration</b>											
HDPE WG-081423-C5-12	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081423-C5-13	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081423-C5-14	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081423-C5-15	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081423-C5-16	E290	14-Aug-2023	17-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081423-C5-09	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081423-C5-10	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081423-C5-11	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081423-C5-12	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081423-C5-13	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-081423-C5-14	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-081423-C5-15	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-081423-C5-16	E100	14-Aug-2023	17-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	4 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-09	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-10	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-11	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-12	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-13	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-081423-C5-14	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081423-C5-15	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081423-C5-16	E162	14-Aug-2023	----	----	----		21-Aug-2023	7 days	7 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-10	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-13	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-10	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-13	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-10	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-13	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081423-C5-10	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✓	22-Aug-2023	14 days	8 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>										
<b>Glass vial (sodium bisulfate)</b> WG-081423-C5-13	E611C	14-Aug-2023	22-Aug-2023	14 days	8 days	✔	22-Aug-2023	14 days	8 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1090463	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	1093312	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1090455	1	19	5.2	5.0	✔
Conductivity in Water	E100	1090462	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1090617	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1090458	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1090456	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1090457	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1090454	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1096069	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096539	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096538	1	16	6.2	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1090463	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	1093312	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1090455	1	19	5.2	5.0	✔
Conductivity in Water	E100	1090462	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1090617	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1090458	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1090456	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1090457	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1090454	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1096069	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096539	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096538	1	16	6.2	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1090463	1	11	9.0	5.0	✔
Ammonia by Fluorescence	E298	1093312	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1090455	1	19	5.2	5.0	✔
Conductivity in Water	E100	1090462	1	18	5.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1090617	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1090458	1	19	5.2	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	1090456	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1090457	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1090454	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1096069	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096539	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096538	1	16	6.2	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1093312	1	18	5.5	5.0	✔
Chloride in Water by IC	E235.Cl	1090455	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1090617	1	19	5.2	5.0	✔
Fluoride in Water by IC	E235.F	1090458	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1090456	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1090457	1	19	5.2	5.0	✔
Sulfate in Water by IC	E235.SO4	1090454	1	19	5.2	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1096539	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1096538	1	16	6.2	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)






Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 ALS Environmental - Vancouver	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
VOCs (BC List) by Headspace GC-MS	E611C ALS Environmental - Vancouver	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A ALS Environmental - Vancouver	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Vancouver	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.

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<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>																																																																										
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																																																																										
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business only)	4 day [P4-20%] <input type="checkbox"/>		EMERGENCY	1 Business day [E1 - 100%] <input type="checkbox"/>																																																																						
Phone: 250-898-3722		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>			Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/>																																																																						
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-50%] <input type="checkbox"/>																																																																									
Street: 770 Harmston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm																																																																										
City/Province: Courtenay, BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.																																																																										
Postal Code: V9N 0G8		Email 3			<b>Analysis Request</b>																																																																										
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Company:		Email 1 or Fax:			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Alkalinity (as reported)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3) N-N</td> <td>Conductivity</td> <td>TDS</td> <td>Dissolved CSR Metals (including Hg, Hardne</td> <td>VOCs/VPH</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					Alkalinity (as reported)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hardne	VOCs/VPH																																																															
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Contact:		Email 2:			<div style="text-align: center;"> <p><b>Environmental Division</b> Vancouver Work Order Reference <b>VA23B9056</b></p>  <p>Telephone: +1 804 253 4188</p> </div>																																																																										
<b>Project Information</b>		<b>Oil and Gas Required Fields (Client use)</b>								<div style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">                 Sample is hazardous (please provide further detail)                   NUMBER OF CONTAINERS             </div>																																																																					
ALS Account # / Quote #: VA23-COVR100-001		AFS/Cost Center: PO#																																																																													
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ALS Lab Work Order # (lab use only):		ALS Contact: Selam W. Sampler: <i>C Stuart</i>																																																																													
<b>ALS Sample # (lab use only)</b>		<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>													<b>Date (dd-mmm-yy)</b>		<b>Time (hh:mm)</b>		<b>Sample Type</b>																																																												
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<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>																																																																										
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> Observations: Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																										
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact: Yes <input type="checkbox"/> No <input type="checkbox"/>																																																																										
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<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>																																																																										
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Time: 1730		Time: _____			Time: 12:20 PM																																																																										



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B9075</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-SW+GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 4</p> <p><b>No. of samples analysed</b> : 4</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Aug-2023 10:10</p> <p><b>Date Analysis Commenced</b> : 18-Aug-2023</p> <p><b>Issue Date</b> : 24-Aug-2023 10:25</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

Amendment (24/08/2023): This report has been amended as a result of misinterpretation of sample identification numbers (IDs). All analysis results are as per the previous report.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081523-CS-17	WG-081523-CS-18	WS-081523-CS-01	WG-081523-CS-19	----
Client sampling date / time					15-Aug-2023 10:00	15-Aug-2023 10:40	15-Aug-2023 12:49	15-Aug-2023 17:10	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9075-001	VA23B9075-002	VA23B9075-003	VA23B9075-004	-----
					Result	Result	Result	Result	----
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	62.4	66.2	8.3	<1.0	----
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	----
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	62.4	66.2	8.3	<1.0	----
Conductivity	----	E100/VA	2.0	µS/cm	123	129	33.7	<2.0	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	60.3	60.8	9.56	<0.60	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L	----	----	9.36	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	76	80	34	<10	----
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	1.16	1.29	4.10	<0.50	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	----
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	0.0730	0.114	<0.0050	<0.0050	----
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0730	0.114	<0.0051	<0.0051	----
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.00	1.99	0.78	<0.30	----
<b>Organic / Inorganic Carbon</b>									
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	----	----	5.80	----	----
<b>Total Metals</b>									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	----	----	0.0229	----	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	----	----	<0.00010	----	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	----	----	0.00018	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	----	----	0.00150	----	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	----	----	<0.000020	----	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	----	----	<0.000050	----	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	----	----	<0.010	----	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	----	----	<0.0000050	----	----



### Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081523-CS-17	WG-081523-CS-18	WS-081523-CS-01	WG-081523-CS-19	----
(Matrix: Water)					Client sampling date / time	15-Aug-2023 10:00	15-Aug-2023 10:40	15-Aug-2023 12:49	15-Aug-2023 17:10	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9075-001	VA23B9075-002	VA23B9075-003	VA23B9075-004	-----	
					Result	Result	Result	Result	---	
<b>Total Metals</b>										
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	---	---	2.16	---	---	
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	---	---	<0.00010	---	---	
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	---	---	<0.00050	---	---	
Iron, total	7439-89-6	E420/VA	0.010	mg/L	---	---	0.046	---	---	
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	---	---	<0.000050	---	---	
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	---	---	<0.0010	---	---	
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L	---	---	0.964	---	---	
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	---	---	0.00420	---	---	
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	---	---	<0.0000050	---	---	
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	---	---	<0.000050	---	---	
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	---	---	<0.00050	---	---	
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	---	---	<0.050	---	---	
Potassium, total	7440-09-7	E420/VA	0.100	mg/L	---	---	0.154	---	---	
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	---	---	<0.000050	---	---	
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	---	---	1.74	---	---	
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	---	---	<0.000010	---	---	
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	---	---	2.83	---	---	
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	---	---	0.0102	---	---	
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	---	---	<0.50	---	---	
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	---	---	<0.000010	---	---	
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	---	---	<0.00010	---	---	
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	---	---	0.00038	---	---	
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	---	---	<0.000010	---	---	
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	---	---	<0.00050	---	---	
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	---	---	<0.0030	---	---	
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	---	---	<0.00020	---	---	
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	---	---	<0.00050	---	---	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0054	0.0050	0.0177	<0.0010	---	
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081523-CS-17	WG-081523-CS-18	WS-081523-CS-01	WG-081523-CS-19	----
(Matrix: Water)										
Client sampling date / time					15-Aug-2023 10:00	15-Aug-2023 10:40	15-Aug-2023 12:49	15-Aug-2023 17:10	----	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9075-001	VA23B9075-002	VA23B9075-003	VA23B9075-004	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00025	0.00063	0.00017	<0.00010	----	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00095	0.00166	0.00144	<0.00010	----	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	----	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.026	0.016	<0.010	<0.010	----	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	20.5	21.6	2.25	<0.050	----	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00041	<0.00020	0.00024	<0.00020	----	
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	0.042	<0.010	----	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	2.21	1.67	0.958	<0.100	----	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	0.00306	<0.00010	----	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	----	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000128	0.000154	<0.000050	<0.000050	----	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	----	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	----	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.425	0.526	0.153	<0.100	----	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000098	0.000125	<0.000050	<0.000050	----	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.26	4.30	1.70	<0.050	----	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.78	2.88	2.82	<0.050	----	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0307	0.0334	0.00985	<0.00020	----	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.74	0.64	<0.50	<0.50	----	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	----	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	----	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	----	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000048	0.000041	<0.000010	<0.000010	----	





## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081523-CS-17	WG-081523-CS-18	WS-081523-CS-01	WG-081523-CS-19	----
(Matrix: Water)					Client sampling date / time	15-Aug-2023 10:00	15-Aug-2023 10:40	15-Aug-2023 12:49	15-Aug-2023 17:10	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9075-001	VA23B9075-002	VA23B9075-003	VA23B9075-004	-----	
					Result	Result	Result	Result	----	
<b>Dissolved Metals</b>										
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00226	0.00313	<0.00050	<0.00050	----	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	----	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	----	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	----	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	: <b>VA23B9075</b>	<b>Page</b>	: 1 of 15
<b>Amendment</b>	: <b>1</b>		
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 3-2	<b>Date Samples Received</b>	: 17-Aug-2023 10:10
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 18-Aug-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 24-Aug-2023 10:25
<b>Sampler</b>	: C.Stuart      250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-SW+GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 4		
<b>No. of samples analysed</b>	: 4		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Lindsay Gung	Supervisor - Water Chemistry	Vancouver Inorganics, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

### Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1091199)</b>											
VA23B8982-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	115	116	0.173%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	115	116	0.173%	20%	----
<b>Physical Tests (QC Lot: 1091200)</b>											
VA23B8982-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	7380	7280	1.36%	10%	----
<b>Physical Tests (QC Lot: 1096479)</b>											
KS2303018-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	814	829	1.82%	20%	----
<b>Anions and Nutrients (QC Lot: 1091202)</b>											
VA23B8982-001	Anonymous	Fluoride	16984-48-8	E235.F	1.00	mg/L	1.08	1.04	0.041	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1091203)</b>											
VA23B8982-001	Anonymous	Chloride	16887-00-6	E235.Cl	25.0	mg/L	69.4	68.4	1.07	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1091205)</b>											
VA23B8982-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.250	mg/L	0.358	0.355	0.0033	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1091206)</b>											
VA23B8982-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0500	mg/L	<0.0500	<0.0500	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1091207)</b>											
VA23B8982-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	15.0	mg/L	4060	4040	0.638%	20%	----
<b>Anions and Nutrients (QC Lot: 1094366)</b>											
VA23B8724-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0162	0.0157	0.0004	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 1094370)</b>											
VA23B9075-003	WS-081523-CS-01	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	5.80	6.07	4.48%	20%	----
<b>Total Metals (QC Lot: 1090986)</b>											
VA23B8995-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0121	0.0117	3.09%	20%	----
		Beryllium, total	7440-41-7	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 1090986) - continued</b>											
VA23B8995-001	Anonymous	Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000060	0.0000057	0.0000003	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	10.7	10.7	0.0586%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.0721	0.0711	1.49%	20%	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000939	0.000964	2.59%	20%	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	0.383	0.385	0.572%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000288	0.000280	0.000008	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	0.540	0.532	1.49%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000076	0.000112	0.000037	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	2.56	2.53	1.07%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	1.55	1.55	0.106%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.0590	0.0587	0.499%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	3.79	3.80	0.01	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0074	0.0075	0.0001	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 1095545)</b>											
VA23B8982-003	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1091114)</b>											
VA23B9075-001	WG-081523-CS-17	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0054	0.0051	0.0003	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00025	0.00027	0.00002	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00095	0.00095	0.000001	Diff <2x LOR	----



Sub-Matrix: **Water**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1091114) - continued</b>											
VA23B9075-001	WG-081523-CS-17	Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.026	0.026	0.0007	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	20.5	20.6	0.278%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00041	0.00040	0.000010	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	2.21	2.12	4.18%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000128	0.000134	0.000007	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.425	0.423	0.002	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000098	0.000126	0.000029	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.26	4.26	0.165%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.78	1.67	6.58%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0307	0.0320	4.38%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.74	0.80	0.06	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000048	0.000049	0.000001	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00226	0.00222	0.00004	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1095947)</b>											
VA23B9024-005	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1095948)</b>											
VA23B9075-004	WG-081523-CS-19	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1091199)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1091200)</b>						
Conductivity	---	E100	1	µS/cm	1.2	---
<b>Physical Tests (QCLot: 1096479)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1091202)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1091203)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1091205)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1091206)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1091207)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1094366)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Organic / Inorganic Carbon (QCLot: 1094370)</b>						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 1090986)</b>						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	---
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	---
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 1090986) - continued</b>						
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 1095545)</b>						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 1091114)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----





Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1091114) - continued</b>						
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1095947)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 1095948)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1091199)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
<b>Physical Tests (QCLot: 1091200)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.2	90.0	110	----
<b>Physical Tests (QCLot: 1096479)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	109	85.0	115	----
<b>Anions and Nutrients (QCLot: 1091202)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1091203)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1091205)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1091206)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	96.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 1091207)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 1094366)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	98.0	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 1094370)</b>									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	97.6	80.0	120	----
<b>Total Metals (QCLot: 1090986)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.2	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	102	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	99.9	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	97.4	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	102	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	95.5	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	102	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 1090986) - continued</b>									
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	97.6	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	94.8	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	92.8	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	98.6	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	100.0	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	97.4	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.0	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	102	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	96.0	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	106	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	100.0	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	108	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	94.6	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	98.5	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	101	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	97.1	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	100	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	98.4	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.2	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	97.6	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	96.7	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	92.0	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
<b>Total Metals (QCLot: 1095545)</b>									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	99.8	80.0	120	----
<b>Dissolved Metals (QCLot: 1091114)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	101	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	101	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	99.3	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	103	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1091114) - continued</b>									
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.8	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.3	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	93.3	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	106	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	101	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	104	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	99.8	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	97.1	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	96.6	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	94.3	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	98.6	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	98.9	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	104	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	90.5	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.0	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	94.5	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.5	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.8	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	93.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	98.6	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	102	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	100	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	97.9	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.0	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	97.9	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1091202)</b>										
VA23B8982-002	Anonymous	Fluoride	16984-48-8	E235.F	52.9 mg/L	50 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1091203)</b>										
VA23B8982-002	Anonymous	Chloride	16887-00-6	E235.Cl	5160 mg/L	5000 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1091205)</b>										
VA23B8982-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	130 mg/L	125 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 1091206)</b>										
VA23B8982-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	24.9 mg/L	25 mg/L	99.7	75.0	125	----
<b>Anions and Nutrients (QCLot: 1091207)</b>										
VA23B8982-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	5140 mg/L	5000 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1094366)</b>										
VA23B8894-040	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0950 mg/L	0.1 mg/L	95.0	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 1094370)</b>										
VA23B9083-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 1090986)</b>										
VA23B8995-002	Anonymous	Aluminum, total	7429-90-5	E420	0.196 mg/L	0.2 mg/L	98.3	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0188 mg/L	0.02 mg/L	94.2	70.0	130	----
		Barium, total	7440-39-3	E420	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0396 mg/L	0.04 mg/L	98.9	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00958 mg/L	0.01 mg/L	95.8	70.0	130	----
		Boron, total	7440-42-8	E420	0.100 mg/L	0.1 mg/L	99.7	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00381 mg/L	0.004 mg/L	95.2	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0390 mg/L	0.04 mg/L	97.4	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0192 mg/L	0.02 mg/L	96.1	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Iron, total	7439-89-6	E420	1.91 mg/L	2 mg/L	95.4	70.0	130	----
		Lead, total	7439-92-1	E420	0.0195 mg/L	0.02 mg/L	97.3	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0982 mg/L	0.1 mg/L	98.2	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 1090986) - continued</b>										
VA23B8995-002	Anonymous	Magnesium, total	7439-95-4	E420	0.965 mg/L	1 mg/L	96.5	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0188 mg/L	0.02 mg/L	93.9	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Phosphorus, total	7723-14-0	E420	9.46 mg/L	10 mg/L	94.6	70.0	130	----
		Potassium, total	7440-09-7	E420	3.99 mg/L	4 mg/L	99.7	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0406 mg/L	0.04 mg/L	101	70.0	130	----
		Silicon, total	7440-21-3	E420	9.57 mg/L	10 mg/L	95.7	70.0	130	----
		Silver, total	7440-22-4	E420	0.00381 mg/L	0.004 mg/L	95.3	70.0	130	----
		Sodium, total	7440-23-5	E420	1.87 mg/L	2 mg/L	93.5	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	19.7 mg/L	20 mg/L	98.7	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00391 mg/L	0.004 mg/L	97.9	70.0	130	----
		Tin, total	7440-31-5	E420	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0379 mg/L	0.04 mg/L	94.7	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00386 mg/L	0.004 mg/L	96.4	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0952 mg/L	0.1 mg/L	95.2	70.0	130	----
		Zinc, total	7440-66-6	E420	0.367 mg/L	0.4 mg/L	91.8	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0404 mg/L	0.04 mg/L	101	70.0	130	----
<b>Total Metals (QCLot: 1095545)</b>										
VA23B9024-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000974 mg/L	0.0001 mg/L	97.4	70.0	130	----
<b>Dissolved Metals (QCLot: 1091114)</b>										
VA23B9075-002	WG-081523-CS-18	Aluminum, dissolved	7429-90-5	E421	0.195 mg/L	0.2 mg/L	97.4	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0191 mg/L	0.02 mg/L	95.6	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0388 mg/L	0.04 mg/L	97.0	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00959 mg/L	0.01 mg/L	95.9	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.093 mg/L	0.1 mg/L	92.8	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00395 mg/L	0.004 mg/L	98.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0184 mg/L	0.02 mg/L	92.0	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.94 mg/L	2 mg/L	97.2	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1091114) - continued</b>										
VA23B9075-002	WG-081523-CS-18	Lead, dissolved	7439-92-1	E421	0.0193 mg/L	0.02 mg/L	96.5	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0968 mg/L	0.1 mg/L	96.8	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0195 mg/L	0.02 mg/L	97.7	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0193 mg/L	0.02 mg/L	96.3	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.35 mg/L	10 mg/L	93.5	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.76 mg/L	4 mg/L	93.9	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.44 mg/L	10 mg/L	94.4	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00388 mg/L	0.004 mg/L	97.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.9 mg/L	20 mg/L	94.3	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00388 mg/L	0.004 mg/L	97.0	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00380 mg/L	0.004 mg/L	95.1	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0971 mg/L	0.1 mg/L	97.1	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.389 mg/L	0.4 mg/L	97.3	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0382 mg/L	0.04 mg/L	95.6	70.0	130	----
<b>Dissolved Metals (QCLot: 1095947)</b>										
VA23B9024-006	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000104 mg/L	0.0001 mg/L	104	70.0	130	----
<b>Dissolved Metals (QCLot: 1095948)</b>										
VA23B9084-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000983 mg/L	0.0001 mg/L	98.3	70.0	130	----



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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B9075</b></p> <p><b>Amendment</b> : <b>1</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : C.Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-SW+GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 4</p> <p><b>No. of samples analysed</b> : 4</p>	<p><b>Page</b> : 1 of 13</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Aug-2023 10:10</p> <p><b>Issue Date</b> : 24-Aug-2023 10:25</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081523-CS-17	E298	15-Aug-2023	20-Aug-2023	28 days	5 days	✔	21-Aug-2023	28 days	6 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081523-CS-18	E298	15-Aug-2023	20-Aug-2023	28 days	5 days	✔	21-Aug-2023	28 days	6 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081523-CS-19	E298	15-Aug-2023	20-Aug-2023	28 days	5 days	✔	21-Aug-2023	28 days	6 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WS-081523-CS-01	E298	15-Aug-2023	20-Aug-2023	28 days	5 days	✔	21-Aug-2023	28 days	6 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081523-CS-19	E235.Cl	15-Aug-2023	18-Aug-2023	28 days	2 days	✔	18-Aug-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WS-081523-CS-01	E235.Cl	15-Aug-2023	18-Aug-2023	28 days	2 days	✔	18-Aug-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081523-CS-17	E235.Cl	15-Aug-2023	18-Aug-2023	28 days	3 days	✔	18-Aug-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-081523-CS-18	E235.Cl	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081523-CS-19	E235.F	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS-081523-CS-01	E235.F	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081523-CS-17	E235.F	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-081523-CS-18	E235.F	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-19	E235.NO3-L	15-Aug-2023	18-Aug-2023	3 days	2 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-081523-CS-01	E235.NO3-L	15-Aug-2023	18-Aug-2023	3 days	2 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-17	E235.NO3-L	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-18	E235.NO3-L	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	18-Aug-2023	3 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-19	E235.NO2-L	15-Aug-2023	18-Aug-2023	3 days	2 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-081523-CS-01	E235.NO2-L	15-Aug-2023	18-Aug-2023	3 days	2 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-17	E235.NO2-L	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081523-CS-18	E235.NO2-L	15-Aug-2023	18-Aug-2023	3 days	3 days	✓	18-Aug-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081523-CS-19	E235.SO4	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-081523-CS-01	E235.SO4	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081523-CS-17	E235.SO4	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081523-CS-18	E235.SO4	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081523-CS-17	E509	15-Aug-2023	21-Aug-2023	28 days	6 days	✓	21-Aug-2023	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial - dissolved (lab preserved)</b> WG-081523-CS-18	E509	15-Aug-2023	21-Aug-2023	28 days	6 days	✓	21-Aug-2023	28 days	6 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial - dissolved (lab preserved)</b> WG-081523-CS-19	E509	15-Aug-2023	21-Aug-2023	28 days	6 days	✓	21-Aug-2023	28 days	6 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial - dissolved (lab preserved)</b> WS-081523-CS-01	E509	15-Aug-2023	21-Aug-2023	28 days	6 days	✓	21-Aug-2023	28 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-081523-CS-17	E421	15-Aug-2023	20-Aug-2023	180 days	5 days	✓	22-Aug-2023	180 days	7 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-081523-CS-18	E421	15-Aug-2023	20-Aug-2023	180 days	5 days	✓	22-Aug-2023	180 days	7 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-081523-CS-19	E421	15-Aug-2023	20-Aug-2023	180 days	5 days	✓	22-Aug-2023	180 days	7 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WS-081523-CS-01	E421	15-Aug-2023	20-Aug-2023	180 days	5 days	✓	22-Aug-2023	180 days	7 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> WS-081523-CS-01	E358-L	15-Aug-2023	20-Aug-2023	28 days	5 days	✓	21-Aug-2023	28 days	6 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-081523-CS-19	E290	15-Aug-2023	18-Aug-2023	14 days	2 days	✓	18-Aug-2023	14 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WS-081523-CS-01	E290	15-Aug-2023	18-Aug-2023	14 days	2 days	✓	18-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081523-CS-17	E290	15-Aug-2023	18-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081523-CS-18	E290	15-Aug-2023	18-Aug-2023	14 days	3 days	✓	18-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081523-CS-19	E100	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WS-081523-CS-01	E100	15-Aug-2023	18-Aug-2023	28 days	2 days	✓	18-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081523-CS-17	E100	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081523-CS-18	E100	15-Aug-2023	18-Aug-2023	28 days	3 days	✓	18-Aug-2023	28 days	3 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081523-CS-19	E162	15-Aug-2023	----	----	----		22-Aug-2023	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081523-CS-17	E162	15-Aug-2023	----	----	----		22-Aug-2023	7 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081523-CS-18	E162	15-Aug-2023	----	----	----		22-Aug-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WS-081523-CS-01	E162	15-Aug-2023	----	----	----		22-Aug-2023	7 days	7 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial - total (lab preserved) WS-081523-CS-01	E508	15-Aug-2023	21-Aug-2023	28 days	6 days	✔	21-Aug-2023	28 days	6 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) WS-081523-CS-01	E420	15-Aug-2023	18-Aug-2023	180 days	3 days	✔	19-Aug-2023	180 days	4 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		Evaluation
			QC	Regular	Actual	Expected	
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1091199	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1094366	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1091203	1	15	6.6	5.0	✔
Conductivity in Water	E100	1091200	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1091114	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1094370	1	15	6.6	5.0	✔
Fluoride in Water by IC	E235.F	1091202	1	8	12.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1091205	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1091206	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1091207	1	15	6.6	5.0	✔
TDS by Gravimetry	E162	1096479	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	1095545	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1090986	1	20	5.0	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1091199	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1094366	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1091203	1	15	6.6	5.0	✔
Conductivity in Water	E100	1091200	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	2	40	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1091114	1	19	5.2	5.0	✔
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1094370	1	15	6.6	5.0	✔
Fluoride in Water by IC	E235.F	1091202	1	8	12.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1091205	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1091206	1	15	6.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1091207	1	15	6.6	5.0	✔
TDS by Gravimetry	E162	1096479	1	19	5.2	5.0	✔
Total Mercury in Water by CVAAS	E508	1095545	1	20	5.0	5.0	✔
Total Metals in Water by CRC ICPMS	E420	1090986	1	20	5.0	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1091199	1	20	5.0	5.0	✔
Ammonia by Fluorescence	E298	1094366	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1091203	1	15	6.6	5.0	✔
Conductivity in Water	E100	1091200	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1095947	2	40	5.0	5.0	✔



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Metals in Water by CRC ICPMS	E421	1091114	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1094370	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1091202	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1091205	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1091206	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1091207	1	15	6.6	5.0	✓
TDS by Gravimetry	E162	1096479	1	19	5.2	5.0	✓
Total Mercury in Water by CVAAS	E508	1095545	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1090986	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1094366	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1091203	1	15	6.6	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1095947	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1091114	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1094370	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1091202	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1091205	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1091206	1	15	6.6	5.0	✓
Sulfate in Water by IC	E235.SO4	1091207	1	15	6.6	5.0	✓
Total Mercury in Water by CVAAS	E508	1095545	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1090986	1	20	5.0	5.0	✓



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	ALS Environmental - Vancouver			
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>			<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>								
Company: Comox Valley Regional District		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply								
Contact: Crystal Stuart		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>		1 Business day [E1 - 100%] <input type="checkbox"/>					
Phone: 250-898-3722		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked				3 day [P3-25%] <input type="checkbox"/>		Same Day, Weekend or Statutory holiday [E2 - 200%] (Laboratory opening fees may apply) <input type="checkbox"/>					
Company address below will appear on the final report		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				2 day [P2-60%] <input type="checkbox"/>							
Street: 770 Hamston Avenue		Email 1 or Fax: cstuart@comoxvalleyrd.ca			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm								
City/Province: Courtenay, BC		Email 2			For tests that can not be performed according to the service level selected, you will be contacted.								
Postal Code: V9N 0G8		Email 3			<b>Analysis Request</b>								
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		<b>Invoice Distribution</b>			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below								
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input checked="" type="checkbox"/> FAX											
Company:		Email 1 or Fax											
Contact:		Email 2											
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>											
ALS Account # / Quote #: VA23-COVR100-001		AFE/Cost Center: PO#:											
Job #: 3-2		Major/Minor Code: Routing Code:											
PO / AFE: 23-015		Requisitioner:											
LSD: CRWMC - Quarterly - SW + GW		Location:											
ALS Lab Work Order # (lab use only):		ALS Contact: Selam W. Sampler: C. Stuart											
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Alkalinity (spaciated)	Ammonia-N	Arsenic (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	DOC	Total CSR Metals - (including Hg, Hardness)	Dissolved CSR Metals (including Hg, Hardness)	NUMBER OF CONTAINERS
	WG - 081523 - CS - 17	15-Aug-23	1000	Water	X	X	X	X	X			X	
	WG - - - - 18	15	1040										
	WS - - - - 01		12:49							X	X		
	WG - 081523 - CS - 19	15-Aug-23	1710	Water	X	X	X	X	X			X	
<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>			<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>								
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>								
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO					Ice Packs <input type="checkbox"/> Ice Cubes <input checked="" type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>								
					Cooling Initiated: <input type="checkbox"/>								
					INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C				
									6				
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>			<b>FINAL SHIPMENT RECEPTION (lab use only)</b>								
Released by: C. Stuart		Received by:			Received by: JC								
Time: Aug 15 2023 1700		Date:			Date: 17/7/23								
					Time: 10:10am								

Environmental Division  
Vancouver  
Work Order Reference  
**VA23B9075**



Telephone: +1 604 253 4188



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23B9297</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 8</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-Aug-2023 11:45</p> <p><b>Date Analysis Commenced</b> : 19-Aug-2023</p> <p><b>Issue Date</b> : 25-Aug-2023 09:41</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Tony Nguyen	Analyst	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Workorder Comments

VA23B9297-005,-006 Low level DCM result; LOR raised to lowest BC CSR standard.

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLCI	Detection Limit Raised: Chromatographic interference due to co-elution.
RRR	Refer to report comments for issues regarding this analysis.





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081623-C5-20	WG-081623-C5-21	WG-081623-C5-22	WG-081623-C5-23	WG-081623-C5-24
Client sampling date / time					16-Aug-2023 08:50	16-Aug-2023 08:55	16-Aug-2023 09:49	16-Aug-2023 11:40	16-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-001	VA23B9297-002	VA23B9297-003	VA23B9297-004	VA23B9297-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	43.8	43.8	63.4	205	53.1
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	43.8	43.8	63.4	205	53.1
Conductivity	----	E100/VA	2.0	µS/cm	85.6	84.9	134	464	103
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	43.8	42.9	65.6	179	54.6
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	69	59	102	273	72
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	5.76	<0.0050
Chloride	16987-00-6	E235.Cl/VA	0.50	mg/L	0.84	0.83	4.33	35.1	0.75
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.040 <sup>DLCL</sup>	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	0.0673	0.0666	0.221	<0.0050	0.0592
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0673	0.0666	0.221	<0.0051	0.0592
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0035	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.00	2.00	3.27	1.84	1.97
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0053	0.0048	0.0177	0.0038	0.0106
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00028	0.00027	0.00031	0.00148	0.00058
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00046	0.00049	0.00307	0.0127	0.00139
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	0.187	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000063	0.0000072	<0.0000050	0.0000405	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	14.7	14.4	17.8	60.7	18.9
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	0.00675	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00017	<0.00010



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-081623-C5-20	WG-081623-C5-21	WG-081623-C5-22	WG-081623-C5-23	WG-081623-C5-24
Client sampling date / time					16-Aug-2023 08:50	16-Aug-2023 08:55	16-Aug-2023 09:49	16-Aug-2023 11:40	16-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-001	VA23B9297-002	VA23B9297-003	VA23B9297-004	VA23B9297-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00188	0.00183	<0.00020	0.00022	<0.00020
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.012	0.011	<0.010	0.278	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	0.000121	0.000115	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.72	1.69	5.13	6.63	1.81
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00024	0.00022	0.00015	1.16	0.00012
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000197	0.000161	0.000125	0.000125	0.000161
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00087	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.231	0.217	0.681	4.43	0.341
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000092	0.000104	0.000288	<0.000050	0.000111
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	3.64	3.71	7.86	8.72	3.69
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.11	1.10	3.94	23.4	1.16
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0222	0.0211	0.0604	0.182	0.0258
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	1.01	1.00	1.58	1.28	1.05
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	0.00034	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000012	0.000011	0.000144	0.000069	0.000035
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00225	0.00220	0.00536	<0.00050	0.00303
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	0.0150	0.0146	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	---	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	---	EP421/VA	-	-	Field	Field	Field	Field	Field
<b>Volatile Organic Compounds</b>									
Chlorobenzene	108-90-7	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50
Chloromethane	74-87-3	E611C/VA	5.0	µg/L	---	---	---	<5.0	<5.0
Dichlorobenzene, 1,2-	95-50-1	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	WG-081623-C5-20	WG-081623-C5-21	WG-081623-C5-22	WG-081623-C5-23	WG-081623-C5-24
Client sampling date / time					16-Aug-2023 08:50	16-Aug-2023 08:55	16-Aug-2023 09:49	16-Aug-2023 11:40	16-Aug-2023 12:12	
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-001	VA23B9297-002	VA23B9297-003	VA23B9297-004	VA23B9297-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds</b>										
Dichlorobenzene, 1,3-	541-73-1	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichlorobenzene, 1,4-	106-46-7	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloropropane, 1,2-	78-87-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C/VA	0.75	µg/L	---	---	---	<0.75	<0.75	
Dichloropropylene, cis-1,3-	10061-01-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C/VA	0.20	µg/L	---	---	---	<0.20	<0.20	
Trichloroethane, 1,1,2-	79-00-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichlorofluoromethane	75-69-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Chloroethane	75-00-3	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethane, 1,1-	75-34-3	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethane, 1,2-	107-06-2	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, 1,1-	75-35-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, cis-1,2-	156-59-2	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloroethylene, trans-1,2-	156-60-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dichloromethane	75-09-2	E611C/VA	1.0	µg/L	---	---	---	<1.0	<50.0 <sup>RRR</sup>	
Dichloropropylene, trans-1,3-	10061-02-6	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Tetrachloroethylene	127-18-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichloroethane, 1,1,1-	71-55-6	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Trichloroethylene	79-01-6	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Vinyl chloride	75-01-4	E611C/VA	0.40	µg/L	---	---	---	<0.40	<0.40	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Ethylbenzene	100-41-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Styrene	100-42-5	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Toluene	108-88-3	E611C/VA	0.40	µg/L	---	---	---	<0.40	<0.40	
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L	---	---	---	<0.40	<0.40	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-081623-C5-20	WG-081623-C5-21	WG-081623-C5-22	WG-081623-C5-23	WG-081623-C5-24
(Matrix: Water)					Client sampling date / time	16-Aug-2023 08:50	16-Aug-2023 08:55	16-Aug-2023 09:49	16-Aug-2023 11:40	16-Aug-2023 12:12
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-001	VA23B9297-002	VA23B9297-003	VA23B9297-004	VA23B9297-005	
					Result	Result	Result	Result	Result	
<b>Volatile Organic Compounds [Fuels]</b>										
Xylene, o-	95-47-6	E611C/VA	0.30	µg/L	---	---	---	<0.30	<0.30	
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Bromoform	75-25-2	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Chloroform	67-66-3	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
Dibromochloromethane	124-48-1	E611C/VA	0.50	µg/L	---	---	---	<0.50	<0.50	
<b>Hydrocarbons</b>										
VHw (C6-C10)	---	E581.VH+F1/ VA	100	µg/L	---	---	---	<100	<100	
VPHw	---	EC580A/VA	100	µg/L	---	---	---	<100	<100	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/ VA	1.0	%	---	---	---	70.0	117	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	---	---	---	90.4	92.4	
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	---	---	---	103	105	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Water					Client sample ID	Trip Blank	----	----	----	----
(Matrix: Water)					Client sampling date / time	16-Aug-2023 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-006	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Volatile Organic Compounds</b>										
Chlorobenzene	108-90-7	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Chloromethane	74-87-3	E611C/VA	5.0	µg/L	<5.0	---	---	---	---	
Dichlorobenzene, 1,2-	95-50-1	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,3-	541-73-1	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichlorobenzene, 1,4-	106-46-7	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloropropane, 1,2-	78-87-5	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloropropylene, cis+trans-1,3-	542-75-6	E611C/VA	0.75	µg/L	<0.75	---	---	---	---	
Dichloropropylene, cis-1,3-	10061-01-5	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C/VA	0.20	µg/L	<0.20	---	---	---	---	
Trichloroethane, 1,1,2-	79-00-5	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Trichlorofluoromethane	75-69-4	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
<b>Volatile Organic Compounds [Drycleaning]</b>										
Carbon tetrachloride	56-23-5	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Chloroethane	75-00-3	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,1-	75-34-3	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethane, 1,2-	107-06-2	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, 1,1-	75-35-4	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, cis-1,2-	156-59-2	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloroethylene, trans-1,2-	156-60-5	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Dichloromethane	75-09-2	E611C/VA	1.0	µg/L	<50.0 <sup>RRR</sup>	---	---	---	---	
Dichloropropylene, trans-1,3-	10061-02-6	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Tetrachloroethylene	127-18-4	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethane, 1,1,1-	71-55-6	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Trichloroethylene	79-01-6	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Vinyl chloride	75-01-4	E611C/VA	0.40	µg/L	<0.40	---	---	---	---	
<b>Volatile Organic Compounds [Fuels]</b>										
Benzene	71-43-2	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Ethylbenzene	100-41-4	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C/VA	0.50	µg/L	<0.50	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	Trip Blank	----	----	----	----
(Matrix: Water)					Client sampling date / time	16-Aug-2023 00:00	----	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23B9297-006	-----	-----	-----	-----	
						Result	----	----	----	----
<b>Volatile Organic Compounds [Fuels]</b>										
Styrene	100-42-5	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
Toluene	108-88-3	E611C/VA	0.40	µg/L	<0.40	----	----	----	----	
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L	<0.40	----	----	----	----	
Xylene, o-	95-47-6	E611C/VA	0.30	µg/L	<0.30	----	----	----	----	
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
<b>Volatile Organic Compounds [THMs]</b>										
Bromodichloromethane	75-27-4	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
Bromoform	75-25-2	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
Chloroform	67-66-3	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
Dibromochloromethane	124-48-1	E611C/VA	0.50	µg/L	<0.50	----	----	----	----	
<b>Hydrocarbons</b>										
VHw (C6-C10)	----	E581.VH+F1/ VA	100	µg/L	<100	----	----	----	----	
VPHw	----	EC580A/VA	100	µg/L	<100	----	----	----	----	
<b>Hydrocarbons Surrogates</b>										
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/ VA	1.0	%	118	----	----	----	----	
<b>Volatile Organic Compounds Surrogates</b>										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	93.2	----	----	----	----	
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	103	----	----	----	----	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23B9297</b></p> <p>Client : Comox Valley Regional District</p> <p>Contact : Crystal Stuart</p> <p>Address : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p>Telephone :</p> <p>Project : 3-2</p> <p>PO : 23-015</p> <p>C-O-C number : ----</p> <p>Sampler : Crystal Stuart, 250-898-3722</p> <p>Site : CRWMC-Quarterly-GW</p> <p>Quote number : VA23-COVR100-001</p> <p>No. of samples received : 6</p> <p>No. of samples analysed : 6</p>	<p>Page : 1 of 14</p> <p>Laboratory : ALS Environmental - Vancouver</p> <p>Account Manager : Thomas Chang</p> <p>Address : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p>Telephone : +1 604 253 4188</p> <p>Date Samples Received : 18-Aug-2023 11:45</p> <p>Date Analysis Commenced : 19-Aug-2023</p> <p>Issue Date : 25-Aug-2023 09:41</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Inorganics, Burnaby, British Columbia
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Tony Nguyen	Analyst	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA23B9297  
Client : Comox Valley Regional District  
Project : 3-2



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1093336)</b>											
VA23B9236-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	14.0	13.9	0.717%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	14.0	13.9	0.717%	20%	----
<b>Physical Tests (QC Lot: 1093337)</b>											
VA23B9236-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	1170	1170	0.171%	10%	----
<b>Physical Tests (QC Lot: 1099790)</b>											
VA23B9102-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	2600	2570	1.39%	20%	----
<b>Anions and Nutrients (QC Lot: 1093338)</b>											
VA23B9236-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.857	0.867	0.010	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1093339)</b>											
VA23B9236-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	23.8	24.0	0.23	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1093340)</b>											
VA23B9236-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	3.56	3.61	1.41%	20%	----
<b>Anions and Nutrients (QC Lot: 1093341)</b>											
VA23B9236-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	0.0754	0.0789	4.55%	20%	----
<b>Anions and Nutrients (QC Lot: 1093342)</b>											
VA23B9236-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	493	494	0.107%	20%	----
<b>Anions and Nutrients (QC Lot: 1098556)</b>											
VA23B9297-001	WG-081623-C5-20	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1093125)</b>											
FJ2302063-007	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0030	mg/L	0.0056	0.0056	0.00001	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00394	0.00402	2.05%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.109	0.107	1.75%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.122	0.125	2.62%	20%	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	115	123	6.55%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1093125) - continued</b>											
FJ2302063-007	Anonymous	Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	4.14	4.20	1.55%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.112	0.119	5.80%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	142	140	1.24%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.122	0.119	2.78%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00107	0.00109	1.74%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	0.818	0.798	2.43%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	2.61	2.62	0.440%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000641	0.000627	2.28%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.40	4.34	1.35%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	15.8	15.6	0.948%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.637	0.670	5.01%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	130	127	2.59%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
Titanium, dissolved	7440-32-6	E421	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----		
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000371	0.000390	5.16%	20%	----		
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00163	0.00158	0.00005	Diff <2x LOR	----		
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0027	0.0027	0.00008	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	0.00041	0.00044	0.00003	Diff <2x LOR	----		
<b>Dissolved Metals (QC Lot: 1096922)</b>											
VA23B9277-005	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
<b>Volatile Organic Compounds (QC Lot: 1101517)</b>											
VA23B8675-010	Anonymous	Benzene	71-43-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromodichloromethane	75-27-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Bromoform	75-25-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Carbon tetrachloride	56-23-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chlorobenzene	108-90-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Chloroethane	75-00-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Volatile Organic Compounds (QC Lot: 1101517) - continued</b>											
VA23B8675-010	Anonymous	Chloroform	67-66-3	E611C	0.50	µg/L	2.11	2.00	0.11	Diff <2x LOR	----
		Chloromethane	74-87-3	E611C	5.0	µg/L	<5.0	<5.0	0	Diff <2x LOR	----
		Dibromochloromethane	124-48-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,1-	75-34-3	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethane, 1,2-	107-06-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, 1,1-	75-35-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloromethane	75-09-2	E611C	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		Dichloropropane, 1,2-	78-87-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Ethylbenzene	100-41-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Styrene	100-42-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Tetrachloroethane, 1,1,1,2,2-	79-34-5	E611C	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		Tetrachloroethylene	127-18-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Toluene	108-88-3	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichloroethylene	79-01-6	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Trichlorofluoromethane	75-69-4	E611C	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Vinyl chloride	75-01-4	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, m+p-	179601-23-1	E611C	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		Xylene, o-	95-47-6	E611C	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Hydrocarbons (QC Lot: 1101518)</b>											
VA23B8675-010	Anonymous	VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	<100	0.0%	30%	----



### Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1093336)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	1.1	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	1.1	---
<b>Physical Tests (QCLot: 1093337)</b>						
Conductivity	---	E100	1	µS/cm	1.1	---
<b>Physical Tests (QCLot: 1099790)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1093338)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1093339)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1093340)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1093341)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1093342)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1098556)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1093125)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1093125) - continued</b>						
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1096922)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
<b>Volatile Organic Compounds (QCLot: 1101517)</b>						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	<0.50	----
Bromoform	75-25-2	E611C	0.5	µg/L	<0.50	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	<0.50	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	<0.50	----
Chloroethane	75-00-3	E611C	0.5	µg/L	<0.50	----
Chloroform	67-66-3	E611C	0.5	µg/L	<0.50	----
Chloromethane	74-87-3	E611C	5	µg/L	<5.0	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Volatile Organic Compounds (QCLot: 1101517) - continued</b>						
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	<0.50	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	<0.50	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	<0.50	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	<0.50	----
Dichloromethane	75-09-2	E611C	1	µg/L	<1.0	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	<0.50	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	<0.50	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	<0.50	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	<0.50	----
Styrene	100-42-5	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	<0.50	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	<0.20	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	<0.50	----
Toluene	108-88-3	E611C	0.4	µg/L	<0.40	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	<0.50	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	<0.50	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	<0.50	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	<0.50	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	<0.40	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	<0.40	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	<0.30	----
<b>Hydrocarbons (QCLot: 1101518)</b>						
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	<100	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1093336)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	111	85.0	115	----
<b>Physical Tests (QCLot: 1093337)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.7	90.0	110	----
<b>Physical Tests (QCLot: 1099790)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	102	85.0	115	----
<b>Anions and Nutrients (QCLot: 1093338)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1093339)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1093340)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1093341)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 1093342)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
<b>Anions and Nutrients (QCLot: 1098556)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	100.0	85.0	115	----
<b>Dissolved Metals (QCLot: 1093125)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	100.0	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	97.8	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	93.1	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	94.3	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	99.4	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	99.7	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.0	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	103	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	97.5	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1093125) - continued</b>									
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	93.8	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	94.6	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.0	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.0	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	105	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	111	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.3	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	118	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	97.6	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	98.6	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.8	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.7	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	101	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	98.4	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	95.0	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	106	80.0	120	----
<b>Volatile Organic Compounds (QCLot: 1101517)</b>									
Benzene	71-43-2	E611C	0.5	µg/L	100 µg/L	98.7	70.0	130	----
Bromodichloromethane	75-27-4	E611C	0.5	µg/L	100 µg/L	92.8	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	89.6	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Chlorobenzene	108-90-7	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Chloroethane	75-00-3	E611C	0.5	µg/L	100 µg/L	99.8	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	97.1	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	99.2	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	91.1	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----





Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Volatile Organic Compounds (QCLot: 1101517) - continued</b>									
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	107	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	96.5	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	89.3	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	103	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	96.9	70.0	130	----
Dichloroethylene, trans-1,2-	156-60-5	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Dichloromethane	75-09-2	E611C	1	µg/L	100 µg/L	93.5	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	95.5	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	95.2	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	93.6	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	0.5	µg/L	100 µg/L	105	70.0	130	----
Styrene	100-42-5	E611C	0.5	µg/L	100 µg/L	100	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	94.6	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	87.8	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,1-	71-55-6	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Trichloroethane, 1,1,2-	79-00-5	E611C	0.5	µg/L	100 µg/L	88.6	70.0	130	----
Trichloroethylene	79-01-6	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Trichlorofluoromethane	75-69-4	E611C	0.5	µg/L	100 µg/L	102	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	104	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	106	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	102	70.0	130	----
<b>Hydrocarbons (QCLot: 1101518)</b>									
VHw (C6-C10)	----	E581.VH+F1	100	µg/L	6310 µg/L	82.2	70.0	130	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1093338)</b>										
VA23B9236-002	Anonymous	Fluoride	16984-48-8	E235.F	5.06 mg/L	5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 1093339)</b>										
VA23B9236-002	Anonymous	Chloride	16887-00-6	E235.Cl	490 mg/L	500 mg/L	98.0	75.0	125	----
<b>Anions and Nutrients (QCLot: 1093340)</b>										
VA23B9236-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	12.2 mg/L	12.5 mg/L	97.3	75.0	125	----
<b>Anions and Nutrients (QCLot: 1093341)</b>										
VA23B9236-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	2.38 mg/L	2.5 mg/L	95.4	75.0	125	----
<b>Anions and Nutrients (QCLot: 1093342)</b>										
VA23B9236-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	500 mg/L	ND	75.0	125	----
<b>Anions and Nutrients (QCLot: 1098556)</b>										
VA23B9297-002	WG-081623-C5-21	Ammonia, total (as N)	7664-41-7	E298	0.102 mg/L	0.1 mg/L	102	75.0	125	----
<b>Dissolved Metals (QCLot: 1093125)</b>										
FJ2302063-008	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	96.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0193 mg/L	0.02 mg/L	96.6	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0371 mg/L	0.04 mg/L	92.7	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00861 mg/L	0.01 mg/L	86.1	70.0	130	----
		Boron, dissolved	7440-42-8	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00391 mg/L	0.004 mg/L	97.8	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0187 mg/L	0.02 mg/L	93.4	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0163 mg/L	0.02 mg/L	81.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0171 mg/L	0.02 mg/L	85.3	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	ND mg/L	0.1 mg/L	ND	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0198 mg/L	0.02 mg/L	99.1	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1093125) - continued</b>										
FJ2302063-008	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0365 mg/L	0.04 mg/L	91.3	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.9 mg/L	10 mg/L	109	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.86 mg/L	4 mg/L	96.4	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0442 mg/L	0.04 mg/L	110	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.63 mg/L	10 mg/L	96.3	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00377 mg/L	0.004 mg/L	94.3	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	ND mg/L	20 mg/L	ND	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00353 mg/L	0.004 mg/L	88.3	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00366 mg/L	0.004 mg/L	91.4	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0979 mg/L	0.1 mg/L	97.9	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.361 mg/L	0.4 mg/L	90.3	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0413 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 1096922)</b>										
VA23B9277-006	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000969 mg/L	0.0001 mg/L	96.9	70.0	130	----
<b>Volatile Organic Compounds (QCLot: 1101517)</b>										
VA23B9297-004	WG-081623-C5-23	Benzene	71-43-2	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	94.4 µg/L	100 µg/L	94.4	60.0	140	----
		Bromoform	75-25-2	E611C	82.8 µg/L	100 µg/L	82.8	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Chlorobenzene	108-90-7	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Chloroethane	75-00-3	E611C	104 µg/L	100 µg/L	104	50.0	150	----
		Chloroform	67-66-3	E611C	100 µg/L	100 µg/L	100	60.0	140	----
		Chloromethane	74-87-3	E611C	104 µg/L	100 µg/L	104	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	88.8 µg/L	100 µg/L	88.8	60.0	140	----
		Dichlorobenzene, 1,2-	95-50-1	E611C	97.4 µg/L	100 µg/L	97.4	60.0	140	----
		Dichlorobenzene, 1,3-	541-73-1	E611C	103 µg/L	100 µg/L	103	60.0	140	----
		Dichlorobenzene, 1,4-	106-46-7	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	101 µg/L	100 µg/L	101	60.0	140	----
		Dichloroethane, 1,2-	107-06-2	E611C	89.0 µg/L	100 µg/L	89.0	60.0	140	----
		Dichloroethylene, 1,1-	75-35-4	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	99.8 µg/L	100 µg/L	99.8	60.0	140	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Volatile Organic Compounds (QCLot: 1101517) - continued</b>										
VA23B9297-004	WG-081623-C5-23	Dichloroethylene, trans-1,2-	156-60-5	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Dichloromethane	75-09-2	E611C	95.1 µg/L	100 µg/L	95.1	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	96.9 µg/L	100 µg/L	96.9	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	95.3 µg/L	100 µg/L	95.3	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	88.9 µg/L	100 µg/L	88.9	60.0	140	----
		Ethylbenzene	100-41-4	E611C	105 µg/L	100 µg/L	105	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Styrene	100-42-5	E611C	98.6 µg/L	100 µg/L	98.6	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	94.1 µg/L	100 µg/L	94.1	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	83.2 µg/L	100 µg/L	83.2	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	112 µg/L	100 µg/L	112	60.0	140	----
		Toluene	108-88-3	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	106 µg/L	100 µg/L	106	60.0	140	----
		Trichloroethane, 1,1,2-	79-00-5	E611C	85.5 µg/L	100 µg/L	85.5	60.0	140	----
		Trichloroethylene	79-01-6	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	107 µg/L	100 µg/L	107	50.0	150	----
		Vinyl chloride	75-01-4	E611C	110 µg/L	100 µg/L	110	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	215 µg/L	200 µg/L	108	60.0	140	----
		Xylene, o-	95-47-6	E611C	102 µg/L	100 µg/L	102	60.0	140	----
<b>Hydrocarbons (QCLot: 1101518)</b>										
VA23B9474-022	Anonymous	VHw (C6-C10)	----	E581.VH+F1	4810 µg/L	6310 µg/L	76.3	60.0	140	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23B9297</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 3-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 6</p> <p><b>No. of samples analysed</b> : 6</p>	<p><b>Page</b> : 1 of 16</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 18-Aug-2023 11:45</p> <p><b>Issue Date</b> : 25-Aug-2023 09:41</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081623-C5-20	E298	16-Aug-2023	23-Aug-2023	28 days	7 days	✔	23-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081623-C5-21	E298	16-Aug-2023	23-Aug-2023	28 days	7 days	✔	23-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081623-C5-22	E298	16-Aug-2023	23-Aug-2023	28 days	7 days	✔	23-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081623-C5-23	E298	16-Aug-2023	23-Aug-2023	28 days	7 days	✔	23-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-081623-C5-24	E298	16-Aug-2023	23-Aug-2023	28 days	7 days	✔	23-Aug-2023	28 days	7 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081623-C5-20	E235.Cl	16-Aug-2023	19-Aug-2023	28 days	3 days	✔	19-Aug-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081623-C5-21	E235.Cl	16-Aug-2023	19-Aug-2023	28 days	3 days	✔	19-Aug-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081623-C5-22	E235.Cl	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081623-C5-23	E235.Cl	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-081623-C5-24	E235.Cl	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081623-C5-20	E235.F	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081623-C5-21	E235.F	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081623-C5-22	E235.F	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081623-C5-23	E235.F	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-081623-C5-24	E235.F	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
HDPE WG-081623-C5-20	E235.NO3-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✓	19-Aug-2023	3 days	3 days	✓





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-21	E235.NO3-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-22	E235.NO3-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-23	E235.NO3-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-24	E235.NO3-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-20	E235.NO2-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-21	E235.NO2-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-22	E235.NO2-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-23	E235.NO2-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-081623-C5-24	E235.NO2-L	16-Aug-2023	19-Aug-2023	3 days	3 days	✔	19-Aug-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081623-C5-20	E235.SO4	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081623-C5-21	E235.SO4	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081623-C5-22	E235.SO4	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081623-C5-23	E235.SO4	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-081623-C5-24	E235.SO4	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081623-C5-20	E509	16-Aug-2023	22-Aug-2023	28 days	6 days	✓	22-Aug-2023	28 days	6 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081623-C5-21	E509	16-Aug-2023	22-Aug-2023	28 days	6 days	✓	22-Aug-2023	28 days	6 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081623-C5-22	E509	16-Aug-2023	22-Aug-2023	28 days	6 days	✓	22-Aug-2023	28 days	6 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-081623-C5-23	E509	16-Aug-2023	22-Aug-2023	28 days	6 days	✓	22-Aug-2023	28 days	6 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-081623-C5-24	E509	16-Aug-2023	22-Aug-2023	28 days	6 days	✓	22-Aug-2023	28 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081623-C5-20	E421	16-Aug-2023	20-Aug-2023	180 days	4 days	✓	22-Aug-2023	180 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081623-C5-21	E421	16-Aug-2023	20-Aug-2023	180 days	4 days	✓	22-Aug-2023	180 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081623-C5-22	E421	16-Aug-2023	20-Aug-2023	180 days	4 days	✓	22-Aug-2023	180 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081623-C5-23	E421	16-Aug-2023	20-Aug-2023	180 days	4 days	✓	22-Aug-2023	180 days	6 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-081623-C5-24	E421	16-Aug-2023	20-Aug-2023	180 days	4 days	✓	22-Aug-2023	180 days	6 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
Glass vial (sodium bisulfate) Trip Blank	E581.VH+F1	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
Glass vial (sodium bisulfate) WG-081623-C5-23	E581.VH+F1	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓
<b>Hydrocarbons : VH and F1 by Headspace GC-FID</b>										
Glass vial (sodium bisulfate) WG-081623-C5-24	E581.VH+F1	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081623-C5-20	E290	16-Aug-2023	19-Aug-2023	14 days	3 days	✓	19-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081623-C5-21	E290	16-Aug-2023	19-Aug-2023	14 days	3 days	✓	19-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081623-C5-22	E290	16-Aug-2023	19-Aug-2023	14 days	3 days	✓	19-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081623-C5-23	E290	16-Aug-2023	19-Aug-2023	14 days	3 days	✓	19-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-081623-C5-24	E290	16-Aug-2023	19-Aug-2023	14 days	3 days	✓	19-Aug-2023	14 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081623-C5-20	E100	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081623-C5-21	E100	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081623-C5-22	E100	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081623-C5-23	E100	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-081623-C5-24	E100	16-Aug-2023	19-Aug-2023	28 days	3 days	✓	19-Aug-2023	28 days	3 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081623-C5-20	E162	16-Aug-2023	----	----	----		23-Aug-2023	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081623-C5-21	E162	16-Aug-2023	----	----	----		23-Aug-2023	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081623-C5-22	E162	16-Aug-2023	----	----	----		23-Aug-2023	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081623-C5-23	E162	16-Aug-2023	----	----	----		23-Aug-2023	7 days	7 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-081623-C5-24	E162	16-Aug-2023	----	----	----		23-Aug-2023	7 days	7 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) Trip Blank	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081623-C5-23	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓
<b>Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS</b>										
Glass vial (sodium bisulfate) WG-081623-C5-24	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✓	24-Aug-2023	14 days	8 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) Trip Blank	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-23	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [Drycleaning] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-24	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) Trip Blank	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-23	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [Fuels] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-24	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) Trip Blank	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-23	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	
<b>Volatile Organic Compounds [THMs] : VOCs (BC List) by Headspace GC-MS</b>											
Glass vial (sodium bisulfate) WG-081623-C5-24	E611C	16-Aug-2023	24-Aug-2023	14 days	8 days	✔	24-Aug-2023	14 days	8 days	✔	

Legend & Qualifier Definitions

Page : 11 of 16  
Work Order : VA23B9297  
Client : Comox Valley Regional District  
Project : 3-2

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Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1093336	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1098556	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1093339	1	13	7.6	5.0	✔
Conductivity in Water	E100	1093337	1	13	7.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1096922	1	16	6.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1093125	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1093338	1	13	7.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1093340	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1093341	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1093342	1	13	7.6	5.0	✔
TDS by Gravimetry	E162	1099790	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1101518	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1101517	1	8	12.5	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1093336	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1098556	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1093339	1	13	7.6	5.0	✔
Conductivity in Water	E100	1093337	1	13	7.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1096922	1	16	6.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1093125	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1093338	1	13	7.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1093340	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1093341	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1093342	1	13	7.6	5.0	✔
TDS by Gravimetry	E162	1099790	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1101518	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1101517	1	8	12.5	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1093336	1	13	7.6	5.0	✔
Ammonia by Fluorescence	E298	1098556	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1093339	1	13	7.6	5.0	✔
Conductivity in Water	E100	1093337	1	13	7.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1096922	1	16	6.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1093125	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1093338	1	13	7.6	5.0	✔





Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Method Blanks (MB) - Continued</b>							
Nitrate in Water by IC (Low Level)	E235.NO3-L	1093340	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1093341	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1093342	1	13	7.6	5.0	✔
TDS by Gravimetry	E162	1099790	1	20	5.0	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1101518	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1101517	1	8	12.5	5.0	✔
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1098556	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1093339	1	13	7.6	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1096922	1	16	6.2	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1093125	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1093338	1	13	7.6	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1093340	1	13	7.6	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1093341	1	13	7.6	5.0	✔
Sulfate in Water by IC	E235.SO4	1093342	1	13	7.6	5.0	✔
VH and F1 by Headspace GC-FID	E581.VH+F1	1101518	1	15	6.6	5.0	✔
VOCs (BC List) by Headspace GC-MS	E611C	1101517	1	8	12.5	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
VH and F1 by Headspace GC-FID	E581.VH+F1 ALS Environmental - Vancouver	Water	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.  Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.
VOCs (BC List) by Headspace GC-MS	E611C ALS Environmental - Vancouver	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> , dissolved)" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
VPH: VH-BTEX-Styrene	EC580A ALS Environmental - Vancouver	Water	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VPHw = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.
VOCs Preparation for Headspace Analysis	EP581 ALS Environmental - Vancouver	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page 1 of 1

www.alsglobal.com

<b>Report To</b> Contact and company name below will appear on the final report		<b>Report Format / Distribution</b>		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P TATs (surcharges may apply)</b>		
Company:	Comox Valley Regional District	Select Report Format:	<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)	Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply		
Contact:	Crystal Stuart	Quality Control (QC) Report with Report:	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	PRIORITY (Business Days)	4 day [P4-20%] <input type="checkbox"/>	
Phone:	250-898-3722	<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked			3 day [P3-25%] <input type="checkbox"/>	1 Business day [E1 - 100%] <input type="checkbox"/>
Company address below will appear on the final report		Select Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		2 day [P2-50%] <input type="checkbox"/>	Same Day, Weekend or Statutory holiday [E2 - 200% (Laboratory opening fees may apply)] <input type="checkbox"/>
Street:	770 Hamston Avenue	Email 1 or Fax:	cstuart@comoxvalleyrd.ca	Date and Time Received for all E&P TATs:		
City/Province:	Courtenay, BC	Email 2:		For tests that can not be performed according to the service level selected, you will be contacted.		
Postal Code:	V8N 0G8	Email 3:		<b>Analysis Request</b>		

<b>Invoice To</b>		<b>Invoice Distribution</b>		<b>Indicate Filtered (F), Preserved (P) or Filtered and Preserved (FP)</b>	
Same as Report To	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Select Invoice Distribution:	<input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		
Copy of Invoice with Report	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Email 1 or Fax:			
Company:		Email 2:			
Contact:		Email 3:			
<b>Project Information</b>		<b>Oil and Gas Required Fields (client use)</b>			
ALS Account # / Quote #:	VA23-COVR100-001	AFE/Cost Center:	PO#		
Job #:	3-2	Major/Minor Code:	Routing Code:		
PO / AFE:	23-015	Requisitioner:			
LSD:	CRWMC - Quarterly - GW	Location:			

ALS Lab Work Order # (lab use only)	ALS Contact:	Selam W.	Sampler:	Alkalinity (Speciated)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachue)	VOCs/PH
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)			Date (dd-mmm-yy)	Time (hh:mm)	Sample Type				
	WG-081623-CS-20			16-Aug-23	0850	Water	X	X	X	X
	↓									
	↓									
	↓									
	WG-081623-CS-24			16-Aug-23	1212	Water	X	X	X	X
	Trip Blank									X

<b>Drinking Water (DW) Samples<sup>1</sup> (client use)</b>		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b>		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b>			
Are samples taken from a Regulated DW System?	<input type="checkbox"/> YES <input type="checkbox"/> NO			Frozen?	<input type="checkbox"/> YES <input type="checkbox"/> NO	SIF Observations	<input type="checkbox"/> YES <input type="checkbox"/> NO
Are samples for human consumption use?	<input type="checkbox"/> YES <input type="checkbox"/> NO			Ice Packs?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Ice Cubes?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
				Cooling Initiated?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Custody seal intact?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
				INITIAL COOLER TEMPERATURES (C)	FINAL COOLER TEMPERATURES (C)		
					6.5		
<b>SHIPMENT RELEASE (client use)</b>		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b>		<b>FINAL SHIPMENT RECEPTION (lab use only)</b>			
Released by:	C Stuart	Received by:	RD	Date:	Aug 15, 23	Date:	Aug 15, 23
Time:	1600	Time:		Time:		Time:	1045 AM

Environmental Division  
Vancouver  
Work Order Reference  
**VA23B9297**

Telephone: - 1 604 253 4199



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23C7475</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-1</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 6</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 15-Nov-2023 12:00</p> <p><b>Date Analysis Commenced</b> : 15-Nov-2023</p> <p><b>Issue Date</b> : 23-Nov-2023 14:54</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Inorganics, Burnaby, British Columbia
Robert Nguyen	Analyt	Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111323-CS-01	WG-111323-CS-02	WG-111323-CS-03	WG-111323-CS-04	WG-111323-CS-05
Client sampling date / time					13-Nov-2023 09:30	13-Nov-2023 10:25	13-Nov-2023 11:10	13-Nov-2023 11:40	13-Nov-2023 11:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7475-001	VA23C7475-002	VA23C7475-003	VA23C7475-004	VA23C7475-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	44.9	108	54.4	61.3	61.4
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	44.9	108	54.4	61.3	61.4
Conductivity	----	E100/VA	2.0	µS/cm	91.8	207	110	140	140
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	43.6	109	51.2	63.4	63.4
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	58	133	68	93	93
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	0.78	1.99	1.41	2.84	2.84
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.126	0.198	0.0480	0.471	0.468
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.126	0.198	0.0480	0.471	0.468
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.68	3.07	2.49	6.13	6.14
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0028	0.0041	0.0039	0.0055	0.0031
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	<0.00010	0.00082	0.00020	0.00157	0.00154
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00133	0.00233	0.00041	0.00178	0.00187
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000053	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	14.3	35.7	16.6	19.7	19.7
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	0.00056	<0.00050	0.00073	0.00076
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111323-CS-01	WG-111323-CS-02	WG-111323-CS-03	WG-111323-CS-04	WG-111323-CS-05
Client sampling date / time					13-Nov-2023 09:30	13-Nov-2023 10:25	13-Nov-2023 11:10	13-Nov-2023 11:40	13-Nov-2023 11:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7475-001	VA23C7475-002	VA23C7475-003	VA23C7475-004	VA23C7475-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	<0.00020	0.00027	0.00024	0.00026	0.00029
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.93	4.90	2.36	3.45	3.45
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00014	<0.00010	0.00010	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000137	0.000137	0.000132	0.000061	0.000065
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.179	0.795	0.300	1.20	1.20
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000113	0.000131	0.000102	0.000151	0.000129
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	3.87	5.88	4.83	5.14	5.17
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.19	1.86	2.50	3.15	3.20
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0200	0.0548	0.0267	0.0324	0.0328
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	1.00	1.17	1.00	2.20	2.06
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	0.000107	0.000032	0.000383	0.000397
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00135	0.00557	0.00411	0.0144	0.0144
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID				
					WG-111323-CS-06	WG-111323-CS-07	WG-111323-CS-08	WG-111323-CS-09	WG-111323-CS-10
Client sampling date / time					13-Nov-2023 12:20	13-Nov-2023 14:30	13-Nov-2023 15:00	13-Nov-2023 15:40	13-Nov-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7475-006	VA23C7475-007	VA23C7475-008	VA23C7475-009	VA23C7475-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	44.3	216	107	315	<1.0
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	44.3	216	107	315	<1.0
Conductivity	---	E100/VA	2.0	µS/cm	94.7	458	722	566	<2.0
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	45.8	243	240	327	<0.60
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	60	282	498	352	<10
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	2.34	18.4	98.4	3.79	<0.50
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	0.021	<0.020	<0.100 <sup>DLDS</sup>	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.261	1.23	16.8	2.14	<0.0050
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	0.261	1.23	16.8	2.14	<0.0051
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	0.0434	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	1.71	8.25	35.4	3.82	<0.30
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0038	0.0042	0.0076	0.0012	<0.0010
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00022	<0.00010	0.00015	0.00013	<0.00010
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00028	0.00847	0.00936	0.00745	<0.00010
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	0.015	0.107	0.073	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	0.0000051	0.0000193	0.0000064	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	14.2	77.5	71.7	99.6	<0.050
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	0.00064	0.00184	<0.00050	0.00127	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	0.00044	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00028	0.00020	0.00329	0.00032	<0.00020



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111323-CS-06	WG-111323-CS-07	WG-111323-CS-08	WG-111323-CS-09	WG-111323-CS-10
Client sampling date / time					13-Nov-2023 12:20	13-Nov-2023 14:30	13-Nov-2023 15:00	13-Nov-2023 15:40	13-Nov-2023 17:00
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7475-006	VA23C7475-007	VA23C7475-008	VA23C7475-009	VA23C7475-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	<0.010	0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	2.50	12.1	14.9	19.0	<0.100
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00017	<0.00010	0.150	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000099	<0.000050	0.000088	<0.000050	<0.000050
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	0.00066	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.246	1.27	1.32	1.46	<0.100
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000097	0.000092	0.000066	<0.000050	<0.000050
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.72	7.96	9.03	12.3	<0.050
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	2.22	6.17	47.1	8.28	<0.050
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0314	0.171	0.189	0.203	<0.00020
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.85	2.88	12.8	1.47	<0.50
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	<0.00030	0.00037	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000068	0.000358	0.000381	0.000242	<0.000010
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00426	0.00171	0.00326	0.00176	<0.00050
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23C7475</b>	<b>Page</b>	: 1 of 14
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 4-2-1	<b>Date Samples Received</b>	: 15-Nov-2023 12:00
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 15-Nov-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 23-Nov-2023 14:55
<b>Sampler</b>	: Crystal Stuart, 250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 10		
<b>No. of samples analysed</b>	: 10		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Alex Thornton	Analyst	Vancouver Metals, Burnaby, British Columbia
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Brieanna Allen	Production/Validation Manager	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Miles Gropen	Department Manager - Inorganics	Vancouver Inorganics, Burnaby, British Columbia
Robert Nguyen	Analyst	Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 14  
Work Order : VA23C7475  
Client : Comox Valley Regional District  
Project : 4-2-1



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1238936)</b>											
FJ2303033-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	273	272	0.367%	10%	----
<b>Physical Tests (QC Lot: 1238937)</b>											
FJ2303033-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	121	120	0.663%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	2.6	3.0	14.3%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	124	123	0.324%	20%	----
<b>Physical Tests (QC Lot: 1243903)</b>											
VA23C7419-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	281	247	12.7%	20%	----
<b>Anions and Nutrients (QC Lot: 1238939)</b>											
VA23C7451-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1238940)</b>											
VA23C7451-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0211	0.0200	0.0011	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1238941)</b>											
VA23C7451-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1238942)</b>											
VA23C7451-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.86	0.85	0.002	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1238943)</b>											
VA23C7451-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1245595)</b>											
VA23C7475-001	WG-111323-CS-01	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1245626)</b>											
VA23C7475-008	WG-111323-CS-08	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1239675)</b>											
VA23C7461-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	<0.0010	0.0014	0.0004	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00200	0.00208	3.78%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1239675) - continued</b>											
VA23C7461-001	Anonymous	Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	7.20	7.36	2.21%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00030	0.00036	0.00006	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	0.000064	0.000014	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.596	0.599	0.403%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00620	0.00634	2.15%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.183	0.189	0.006	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.43	2.40	1.33%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.40	1.43	1.52%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0148	0.0153	2.92%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.60	0.55	0.05	Diff <2x LOR	----
Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----		
Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----		
Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----		
Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----		
Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----		
Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----		
Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----		
<b>Dissolved Metals (QC Lot: 1240556)</b>											
VA23C7405-022	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0089	0.0092	0.0003	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	0.00018	0.00017	0.00001	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0304	0.0299	1.84%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	0.000021	<0.000020	0.0000008	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1240556) - continued</b>											
VA23C7405-022	Anonymous	Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.00402	0.00401	0.321%	20%	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	67.6	66.2	2.09%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00863	0.00851	1.40%	20%	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00689	0.00675	2.03%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	1.47	1.46	0.736%	20%	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	0.0040	0.0040	0.000009	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	7.52	7.53	0.0757%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.659	0.656	0.582%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00119	0.00116	2.01%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00408	0.00406	0.00002	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.856	0.866	0.011	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.00352	0.00333	5.50%	20%	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	3.08	3.08	0.134%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	3.14	3.12	0.580%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.372	0.375	0.788%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	62.0	61.9	0.225%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	0.000020	0.000022	0.000002	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000044	0.000043	0.000001	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.297	0.296	0.241%	20%	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1247177)</b>											
VA23C7429-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----





## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1238936)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 1238937)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1243903)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1238939)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1238940)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1238941)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1238942)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1238943)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1245595)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1245626)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1239675)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1239675) - continued</b>						
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1240556)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1240556) - continued</b>						
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1247177)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1238936)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	95.4	90.0	110	----
<b>Physical Tests (QCLot: 1238937)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	109	85.0	115	----
<b>Physical Tests (QCLot: 1243903)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	92.7	85.0	115	----
<b>Anions and Nutrients (QCLot: 1238939)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 1238940)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.8	90.0	110	----
<b>Anions and Nutrients (QCLot: 1238941)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	99.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 1238942)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 1238943)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	102	90.0	110	----
<b>Anions and Nutrients (QCLot: 1245595)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.8	85.0	115	----
<b>Anions and Nutrients (QCLot: 1245626)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.5	85.0	115	----
<b>Dissolved Metals (QCLot: 1239675)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	103	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	101	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.7	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	104	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	104	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	100	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	104	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	103	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1239675) - continued</b>									
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.1	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	96.7	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	102	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	101	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	100	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	99.1	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	104	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.3	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	99.9	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	101	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	97.5	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	99.8	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.5	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	99.0	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	101	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	93.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.7	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	99.5	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	103	80.0	120	----
<b>Dissolved Metals (QCLot: 1240556)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	102	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.6	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	100	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	97.9	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	98.6	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	99.7	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.6	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	99.8	80.0	120	----



Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1240556) - continued</b>									
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.8	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.2	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	99.0	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.7	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	98.5	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	101	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	99.6	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	107	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	100	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	94.6	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	105	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	98.8	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	97.5	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	99.9	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	101	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	97.4	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	96.1	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.7	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	110	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1238939)</b>										
VA23C7451-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	104 mg/L	100 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 1238940)</b>										
VA23C7451-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.59 mg/L	2.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 1238941)</b>										
VA23C7451-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.514 mg/L	0.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1238942)</b>										
VA23C7451-002	Anonymous	Chloride	16887-00-6	E235.Cl	104 mg/L	100 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 1238943)</b>										
VA23C7451-002	Anonymous	Fluoride	16984-48-8	E235.F	1.06 mg/L	1 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1245595)</b>										
VA23C7475-002	WG-111323-CS-02	Ammonia, total (as N)	7664-41-7	E298	0.0921 mg/L	0.1 mg/L	92.1	75.0	125	----
<b>Anions and Nutrients (QCLot: 1245626)</b>										
VA23C7475-009	WG-111323-CS-09	Ammonia, total (as N)	7664-41-7	E298	0.0930 mg/L	0.1 mg/L	93.0	75.0	125	----
<b>Dissolved Metals (QCLot: 1239675)</b>										
VA23C7461-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	96.9	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0195 mg/L	0.02 mg/L	97.6	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.3	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00929 mg/L	0.01 mg/L	92.9	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.094 mg/L	0.1 mg/L	94.3	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00397 mg/L	0.004 mg/L	99.3	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0398 mg/L	0.04 mg/L	99.4	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.83 mg/L	2 mg/L	91.6	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0956 mg/L	0.1 mg/L	95.6	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1239675) - continued</b>										
VA23C7461-002	Anonymous	Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.83 mg/L	4 mg/L	95.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0389 mg/L	0.04 mg/L	97.3	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	8.85 mg/L	10 mg/L	88.5	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00349 mg/L	0.004 mg/L	87.3	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.5 mg/L	20 mg/L	97.7	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00369 mg/L	0.004 mg/L	92.3	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	ND mg/L	0.004 mg/L	ND	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0999 mg/L	0.1 mg/L	99.9	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.393 mg/L	0.4 mg/L	98.3	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
<b>Dissolved Metals (QCLot: 1240556)</b>										
VA23C7405-023	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.194 mg/L	0.2 mg/L	96.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0188 mg/L	0.02 mg/L	94.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0194 mg/L	0.02 mg/L	97.3	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0194 mg/L	0.02 mg/L	97.1	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00914 mg/L	0.01 mg/L	91.4	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00390 mg/L	0.004 mg/L	97.4	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0380 mg/L	0.04 mg/L	95.0	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0196 mg/L	0.02 mg/L	98.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.87 mg/L	2 mg/L	93.5	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0192 mg/L	0.02 mg/L	96.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0974 mg/L	0.1 mg/L	97.4	70.0	130	----





Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1240556) - continued</b>										
VA23C7405-023	Anonymous	Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0191 mg/L	0.02 mg/L	95.4	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0196 mg/L	0.02 mg/L	98.1	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.5 mg/L	10 mg/L	105	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.91 mg/L	4 mg/L	97.9	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0394 mg/L	0.04 mg/L	98.6	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.50 mg/L	10 mg/L	95.0	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00387 mg/L	0.004 mg/L	96.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.88 mg/L	2 mg/L	94.2	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.9 mg/L	20 mg/L	94.7	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00377 mg/L	0.004 mg/L	94.2	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0193 mg/L	0.02 mg/L	96.4	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00384 mg/L	0.004 mg/L	95.9	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.100 mg/L	0.1 mg/L	100	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.402 mg/L	0.4 mg/L	100	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0386 mg/L	0.04 mg/L	96.5	70.0	130	----
<b>Dissolved Metals (QCLot: 1247177)</b>										
VA23C7429-003	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000113 mg/L	0.0001 mg/L	113	70.0	130	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23C7475</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-1</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 10</p> <p><b>No. of samples analysed</b> : 10</p>	<p><b>Page</b> : 1 of 19</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 15-Nov-2023 12:00</p> <p><b>Issue Date</b> : 23-Nov-2023 14:55</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-02	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	10 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-03	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	10 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-04	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	10 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-05	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	10 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-06	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	10 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-07	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111323-CS-08	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	9 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111323-CS-09	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✓	23-Nov-2023	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111323-CS-10	E298	13-Nov-2023	20-Nov-2023	28 days	7 days	✓	23-Nov-2023	28 days	9 days	✓
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111323-CS-01	E298	13-Nov-2023	20-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	10 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-07	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-08	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-09	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-10	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-01	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111323-CS-02	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-111323-CS-03	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-111323-CS-04	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-111323-CS-05	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-111323-CS-06	E235.Cl	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-111323-CS-07	E235.F	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-111323-CS-08	E235.F	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-111323-CS-09	E235.F	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-111323-CS-10	E235.F	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
HDPE WG-111323-CS-01	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111323-CS-02	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111323-CS-03	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111323-CS-04	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111323-CS-05	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111323-CS-06	E235.F	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-07	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✓	16-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-08	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✓	16-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-09	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✓	16-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-10	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✓	16-Nov-2023	3 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-01	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-02	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-03	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-04	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-05	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-06	E235.NO3-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-07	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-08	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-09	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✔	16-Nov-2023	3 days	3 days	✔	





Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-10	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	2 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-01	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-02	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-03	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-04	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-05	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111323-CS-06	E235.NO2-L	13-Nov-2023	16-Nov-2023	3 days	3 days	✔	16-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-07	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-08	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-09	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-10	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	2 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-01	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-02	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-03	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-04	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-05	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111323-CS-06	E235.SO4	13-Nov-2023	16-Nov-2023	28 days	3 days	✓	16-Nov-2023	28 days	3 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111323-CS-01	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-02	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-03	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-04	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-05	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-06	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-07	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-08	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-09	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111323-CS-10	E509	13-Nov-2023	21-Nov-2023	28 days	8 days	✓	21-Nov-2023	28 days	0 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-01	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-02	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-03	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-04	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-05	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-06	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-07	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-08	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111323-CS-09	E421	13-Nov-2023	16-Nov-2023	180 days	3 days	✓	17-Nov-2023	180 days	4 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
<b>HDPE - dissolved (lab preserved)</b> WG-111323-CS-10	E421	13-Nov-2023	20-Nov-2023	180 days	7 days	✔	21-Nov-2023	180 days	8 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-07	E290	13-Nov-2023	16-Nov-2023	14 days	2 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-08	E290	13-Nov-2023	16-Nov-2023	14 days	2 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-09	E290	13-Nov-2023	16-Nov-2023	14 days	2 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-10	E290	13-Nov-2023	16-Nov-2023	14 days	2 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-01	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-02	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-03	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔	
<b>Physical Tests : Alkalinity Species by Titration</b>											
<b>HDPE</b> WG-111323-CS-04	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111323-CS-05	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111323-CS-06	E290	13-Nov-2023	16-Nov-2023	14 days	3 days	✔	16-Nov-2023	14 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-07	E100	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-08	E100	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-09	E100	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-10	E100	13-Nov-2023	16-Nov-2023	28 days	2 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-01	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-02	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111323-CS-03	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-111323-CS-04	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-111323-CS-05	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔	
<b>Physical Tests : Conductivity in Water</b>											
HDPE WG-111323-CS-06	E100	13-Nov-2023	16-Nov-2023	28 days	3 days	✔	16-Nov-2023	28 days	3 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-01	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-02	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-03	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-04	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-05	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	
<b>Physical Tests : TDS by Gravimetry</b>											
HDPE WG-111323-CS-06	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111323-CS-07	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111323-CS-08	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111323-CS-09	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111323-CS-10	E162	13-Nov-2023	----	----	----		19-Nov-2023	7 days	6 days	✔

**Legend & Qualifier Definitions**

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1238937	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1245626	2	38	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	1238942	1	20	5.0	5.0	✔
Conductivity in Water	E100	1238936	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1247177	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1240556	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1238943	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1238940	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1238941	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1238939	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1243903	1	17	5.8	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1238937	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1245626	2	38	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	1238942	1	20	5.0	5.0	✔
Conductivity in Water	E100	1238936	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1247177	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1240556	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1238943	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1238940	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1238941	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1238939	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1243903	1	17	5.8	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1238937	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1245626	2	38	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	1238942	1	20	5.0	5.0	✔
Conductivity in Water	E100	1238936	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1247177	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1240556	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1238943	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1238940	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1238941	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1238939	1	20	5.0	5.0	✔
TDS by Gravimetry	E162	1243903	1	17	5.8	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1245626	2	38	5.2	5.0	✔
Chloride in Water by IC	E235.Cl	1238942	1	20	5.0	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1247177	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1240556	2	40	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1238943	1	16	6.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1238940	1	19	5.2	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1238941	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1238939	1	20	5.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Affix ALS barcode label here  
(lab use only)

COC Number: 17 -

Page 1 of 1

<b>Report To</b> Contact and company name below will appear on the final report Company: Comox Valley Regional District Contact: Crystal Stuart Phone: 250-898-3722 Company address below will appear on the final report Street: 770 Hammston Avenue City/Province: Courtenay, BC Postal Code: V9N 0G8		<b>Report Format / Distribution</b> Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL) Quality Control (QC) Report with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: cstuart@comoxvalleyrd.ca Email 2: Email 3:		<b>Select Service Level Below - Contact your AM to confirm all E&amp;P T&amp;Ts (surcharges may apply)</b> Regular (R) <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply 4 day [P4-20%] <input type="checkbox"/> 3 day [P3-25%] <input type="checkbox"/> 2 day [P2-50%] <input type="checkbox"/> 1 Business day [E1 - 100%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] <input type="checkbox"/> Date and Time Required for all E&P T&Ts: dd-mm-yy hh:mm For tests that can not be performed according to the service level selected, you will be contacted.													
<b>Invoice To</b> Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Contact:		<b>Invoice Distribution</b> Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1 or Fax: Email 2:		<b>Analysis Request</b> Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below <table border="1"> <tr> <td>Alkalinity (specialized)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3) N-N</td> <td>Conductivity</td> <td>TDS</td> <td>Dissolved CSR Metals (including Hg, Hachdr)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachdr)						
Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachdr)												
<b>Project Information</b> ALS Account # / Quote #: VA23-COVR100-001 Job #: 4-2-1 PO / AFE: 23-016 LSD: CRWMC - Quarterly - GW ALS Lab Work Order # (lab use only): C7475		<b>Oil and Gas Required Fields (client use)</b> AFE/Cost Center: Major/Minor Code: Requisitioner: Location: ALS Contact: Selam W. Sampler: C Stuart		<table border="1"> <tr> <td>Alkalinity (specialized)</td> <td>Ammonia-N</td> <td>Anions (Cl, F, SO4, NO2, NO3) N-N</td> <td>Conductivity</td> <td>TDS</td> <td>Dissolved CSR Metals (including Hg, Hachdr)</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachdr)						
Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachdr)												
<b>ALS Sample # (lab use only)</b>	<b>Sample Identification and/or Coordinates (This description will appear on the report)</b>	<b>Date (dd-mm-yy)</b>	<b>Time (hh:mm)</b>	<b>Sample Type</b>	Alkalinity (specialized)	Ammonia-N	Anions (Cl, F, SO4, NO2, NO3) N-N	Conductivity	TDS	Dissolved CSR Metals (including Hg, Hachdr)	SAMPLES ON HOLD	Sample is hazardous (please provide further detail)	NUMBER OF CONTAINERS				
	WG-111323-CS-01	13-Nov-23	09:30	Water	X	X	X	X	X	X							
	02		10:25														
	03		11:10														
	04		11:40														
	05		11:45														
	06		12:20														
	07		14:30														
	08		15:00														
	09		15:40														
	WG-111323-CS-10	13-Nov-23	17:00	Water	X	X	X	X	X	X							

Environmental Division  
 Vancouver  
 Work Order Reference  
**VA23C7475**  
  
 Telephone: +1 804 253 4188

<b>Drinking Water (DW) Samples (client use)</b> Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO		<b>Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)</b> Nov 13/2023		<b>SAMPLE CONDITION AS RECEIVED (lab use only)</b> Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/> Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/> Cooling Initiated <input type="checkbox"/> INITIAL COOLER TEMPERATURES °C: _____ FINAL COOLER TEMPERATURES °C: 4 5	
<b>SHIPMENT RELEASE (client use)</b> Released by: C Stuart Time: 17:15		<b>INITIAL SHIPMENT RECEPTION (lab use only)</b> Received by: C Stuart Date: _____		<b>FINAL SHIPMENT RECEPTION (lab use only)</b> Received by: AS Date: 11/15/23 Time: 12 pm	



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23C7752</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quartetly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 5</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Date Analysis Commenced</b> : 18-Nov-2023</p> <p><b>Issue Date</b> : 27-Nov-2023 15:10</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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

## Qualifiers

<i>Qualifier</i>	<i>Description</i>
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-11423-CS-1 1	WG-11423-CS-1 2	WG-11423-CS-1 3	WG-11423-CS-1 4	WG-11423-CS-1 5
Client sampling date / time					14-Nov-2023 09:35	14-Nov-2023 10:45	14-Nov-2023 11:45	14-Nov-2023 12:40	14-Nov-2023 12:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7752-001 Result	VA23C7752-002 Result	VA23C7752-003 Result	VA23C7752-004 Result	VA23C7752-005 Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	442	62.2	91.9	95.2	94.6
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	442	62.2	91.9	95.2	94.6
Conductivity	----	E100/VA	2.0	µS/cm	958	138	188	191	192
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	463	71.0	90.5	92.2	94.7
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	616	114	122	112	116
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	0.0116	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	43.1	4.13	2.60	1.95	1.94
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.100 <sup>DLDS</sup>	<0.020	0.023	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	5.30	0.218	0.629	0.158	0.159
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	5.30	0.218	0.629	0.158	0.159
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0050 <sup>DLDS</sup>	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	8.76	3.60	1.77	2.57	2.59
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	<0.0010	3.22	0.0034	0.0040	0.0050
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00013	0.00058	0.00026	0.00185	0.00190
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.0182	0.0234	0.00737	0.00450	0.00456
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	0.000038	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.275	<0.010	<0.010	<0.010	<0.010
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000729	0.0000383	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	139	18.3	26.0	28.2	28.5
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	0.00881	0.00255	0.00053	0.00057
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	0.00056	0.00223	<0.00010	<0.00010	<0.00010





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-11423-CS-1	WG-11423-CS-1	WG-11423-CS-1	WG-11423-CS-1	WG-11423-CS-1
					1	2	3	4	5
Client sampling date / time					14-Nov-2023 09:35	14-Nov-2023 10:45	14-Nov-2023 11:45	14-Nov-2023 12:40	14-Nov-2023 12:45
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7752-001	VA23C7752-002	VA23C7752-003	VA23C7752-004	VA23C7752-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00421	0.0181	<0.00020	<0.00020	<0.00020
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	3.87	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	0.000325	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	0.0010	0.0012	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	28.2	6.15	6.21	5.30	5.71
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.502	0.0751	<0.00010	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000111	0.000104	0.000165	0.000102	0.000097
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	0.00210	0.00319	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	0.240	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	2.44	1.02	0.500	1.24	1.28
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	<0.000050	0.000282	0.000092	0.000154	0.000153
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	14.7	13.3	6.50	5.88	5.94
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	0.000016	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	30.6	3.96	2.42	1.66	1.71
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.336	0.0670	0.0415	0.0364	0.0360
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	4.18	1.06	<0.50	0.71	0.67
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	0.000011	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	0.192	<0.00030	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000663	0.000186	0.000229	0.000152	0.000149
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00179	0.0136	0.00631	0.0187	0.0196
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	0.0084	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	0.00048	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23C7752</b></p> <p><b>Client</b> : Comox Valley Regional District</p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> :</p> <p><b>Project</b> : 4-2-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart, 250-898-3722</p> <p><b>Site</b> : CRWMC-Quartetly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Date Analysis Commenced</b> : 18-Nov-2023</p> <p><b>Issue Date</b> : 27-Nov-2023 15:10</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kate Dimitrova	Supervisor - Inorganic	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

Page : 2 of 10  
Work Order : VA23C7752  
Client : Comox Valley Regional District  
Project : 4-2-2



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "--" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1243362)</b>											
VA23C7858-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	45.3	45.5	0.440%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	45.3	45.5	0.440%	20%	----
<b>Physical Tests (QC Lot: 1243363)</b>											
VA23C7858-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	97.3	98.0	0.717%	10%	----
<b>Physical Tests (QC Lot: 1245646)</b>											
VA23C7736-078	Anonymous	Solids, total dissolved [TDS]	----	E162	80	mg/L	13100	13400	2.19%	20%	----
<b>Physical Tests (QC Lot: 1245647)</b>											
VA23C7752-003	WG-11423-CS-13	Solids, total dissolved [TDS]	----	E162	13	mg/L	122	115	7	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243364)</b>											
VA23C7808-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243365)</b>											
VA23C7808-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243366)</b>											
VA23C7808-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243367)</b>											
VA23C7808-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	29.2	29.2	0.131%	20%	----
<b>Anions and Nutrients (QC Lot: 1243368)</b>											
VA23C7808-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	0.63	0.64	0.02	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1248130)</b>											
VA23C7752-001	WG-11423-CS-11	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0116	0.0124	0.0009	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1243960)</b>											
VA23C7739-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0030	0.0026	0.0003	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00013	0.00014	0.000009	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0166	0.0167	0.444%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	0.038	0.038	0.00004	Diff <2x LOR	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1243960) - continued</b>											
VA23C7739-001	Anonymous	Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	0.0000167	0.0000168	0.00000004	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	22.5	22.8	1.42%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	0.00044	0.00044	0.000006	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00033	0.00034	0.00001	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.015	0.015	0.00007	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	3.38	3.38	0.0682%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0106	0.0108	1.96%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.000497	0.000527	5.74%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	0.00130	0.00128	0.00001	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	1.18	1.20	0.904%	20%	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000298	0.000270	0.000028	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	5.79	5.69	1.78%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	4.58	4.77	4.14%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0860	0.0897	4.14%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	6.16	6.25	1.43%	20%	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000017	0.000017	0.0000006	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	0.0080	0.0085	0.0005	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1250956)</b>											
KS2304437-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1243362)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1243363)</b>						
Conductivity	---	E100	1	µS/cm	<1.0	---
<b>Physical Tests (QCLot: 1245646)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 1245647)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1243364)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1243365)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1243366)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1243367)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1243368)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1248130)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1243960)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1243960) - continued</b>						
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1250956)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1243362)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
<b>Physical Tests (QCLot: 1243363)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	93.0	90.0	110	----
<b>Physical Tests (QCLot: 1245646)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	110	85.0	115	----
<b>Physical Tests (QCLot: 1245647)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	103	85.0	115	----
<b>Anions and Nutrients (QCLot: 1243364)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243365)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.0	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243366)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243367)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243368)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.5	90.0	110	----
<b>Anions and Nutrients (QCLot: 1248130)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.3	85.0	115	----
<b>Dissolved Metals (QCLot: 1243960)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	97.2	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	96.0	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	102	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	98.3	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	98.2	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	98.0	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	103	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	96.4	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.8	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	98.7	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1243960) - continued</b>									
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	97.5	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	96.4	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	97.3	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.2	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	95.9	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	102	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	97.9	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	99.0	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	98.1	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	109	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	102	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	92.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	103	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	96.5	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	96.8	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	98.1	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	97.9	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	96.7	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	97.2	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	102	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	98.1	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1243364)</b>										
VA23C7808-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.52 mg/L	2.5 mg/L	101	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243365)</b>										
VA23C7808-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.496 mg/L	0.5 mg/L	99.2	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243366)</b>										
VA23C7808-002	Anonymous	Fluoride	16984-48-8	E235.F	0.988 mg/L	1 mg/L	98.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243367)</b>										
VA23C7808-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	96.6 mg/L	100 mg/L	96.6	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243368)</b>										
VA23C7808-002	Anonymous	Chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
<b>Anions and Nutrients (QCLot: 1248130)</b>										
VA23C7752-002	WG-11423-CS-12	Ammonia, total (as N)	7664-41-7	E298	0.0888 mg/L	0.1 mg/L	88.8	75.0	125	----
<b>Dissolved Metals (QCLot: 1243960)</b>										
VA23C7739-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.179 mg/L	0.2 mg/L	89.5	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0175 mg/L	0.02 mg/L	87.7	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0180 mg/L	0.02 mg/L	90.0	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0184 mg/L	0.02 mg/L	91.9	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0375 mg/L	0.04 mg/L	93.7	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00852 mg/L	0.01 mg/L	85.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.089 mg/L	0.1 mg/L	89.5	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00356 mg/L	0.004 mg/L	89.0	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0359 mg/L	0.04 mg/L	89.9	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0181 mg/L	0.02 mg/L	90.4	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0180 mg/L	0.02 mg/L	89.8	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.73 mg/L	2 mg/L	86.7	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0179 mg/L	0.02 mg/L	89.3	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0934 mg/L	0.1 mg/L	93.4	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0178 mg/L	0.02 mg/L	89.2	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0182 mg/L	0.02 mg/L	91.1	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1243960) - continued</b>										
VA23C7739-002	Anonymous	Nickel, dissolved	7440-02-0	E421	0.0372 mg/L	0.04 mg/L	93.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.67 mg/L	10 mg/L	96.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.79 mg/L	4 mg/L	94.8	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0369 mg/L	0.04 mg/L	92.2	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.28 mg/L	10 mg/L	92.8	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00355 mg/L	0.004 mg/L	88.8	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	18.9 mg/L	20 mg/L	94.5	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00351 mg/L	0.004 mg/L	87.7	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0177 mg/L	0.02 mg/L	88.7	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0370 mg/L	0.04 mg/L	92.6	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00349 mg/L	0.004 mg/L	87.3	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0926 mg/L	0.1 mg/L	92.6	70.0	130	----
Zinc, dissolved	7440-66-6	E421	0.371 mg/L	0.4 mg/L	92.9	70.0	130	----		
Zirconium, dissolved	7440-67-7	E421	0.0356 mg/L	0.04 mg/L	89.0	70.0	130	----		
<b>Dissolved Metals (QCLot: 1250956)</b>										
VA23C7732-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23C7752</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-2</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : Crystal Stuart</p> <p><b>Site</b> : CRWMC-Quartetly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 5</p> <p><b>No. of samples analysed</b> : 5</p>	<p><b>Page</b> : 1 of 13</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Issue Date</b> : 27-Nov-2023 15:10</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### Workorder Comments

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### Summary of Outliers

#### Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

***Outliers : Analysis Holding Time Compliance (Breaches)***

- Analysis Holding Time Outliers exist - please see following pages for full details.

***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-11423-CS-11	E298	14-Nov-2023	22-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-11423-CS-12	E298	14-Nov-2023	22-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-11423-CS-13	E298	14-Nov-2023	22-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-11423-CS-14	E298	14-Nov-2023	22-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-11423-CS-15	E298	14-Nov-2023	22-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-11423-CS-11	E235.Cl	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
HDPE WG-11423-CS-12	E235.Cl	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-11423-CS-13	E235.Cl	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-11423-CS-14	E235.Cl	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-11423-CS-15	E235.Cl	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-11423-CS-11	E235.F	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-11423-CS-12	E235.F	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-11423-CS-13	E235.F	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-11423-CS-14	E235.F	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-11423-CS-15	E235.F	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-13	E235.NO3-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	* EHTL	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-14	E235.NO3-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-15	E235.NO3-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-11	E235.NO3-L	14-Nov-2023	18-Nov-2023	3 days	4 days	*	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-12	E235.NO3-L	14-Nov-2023	18-Nov-2023	3 days	4 days	*	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-13	E235.NO2-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-14	E235.NO2-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-15	E235.NO2-L	14-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-11	E235.NO2-L	14-Nov-2023	18-Nov-2023	3 days	4 days	*	18-Nov-2023	3 days	4 days	*	EHTL
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-11423-CS-12	E235.NO2-L	14-Nov-2023	18-Nov-2023	3 days	4 days	*	18-Nov-2023	3 days	4 days	*	EHTL



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-11423-CS-11	E235.SO4	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-11423-CS-12	E235.SO4	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-11423-CS-13	E235.SO4	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-11423-CS-14	E235.SO4	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-11423-CS-15	E235.SO4	14-Nov-2023	18-Nov-2023	28 days	4 days	✔	18-Nov-2023	28 days	4 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-11423-CS-11	E509	14-Nov-2023	23-Nov-2023	28 days	9 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-11423-CS-12	E509	14-Nov-2023	23-Nov-2023	28 days	9 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-11423-CS-13	E509	14-Nov-2023	23-Nov-2023	28 days	9 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-11423-CS-14	E509	14-Nov-2023	23-Nov-2023	28 days	9 days	✔	23-Nov-2023	28 days	0 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
<b>Glass vial - dissolved (lab preserved)</b> WG-11423-CS-15	E509	14-Nov-2023	23-Nov-2023	28 days	9 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-11423-CS-11	E421	14-Nov-2023	21-Nov-2023	180 days	7 days	✓	22-Nov-2023	180 days	8 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-11423-CS-12	E421	14-Nov-2023	21-Nov-2023	180 days	7 days	✓	22-Nov-2023	180 days	8 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-11423-CS-13	E421	14-Nov-2023	21-Nov-2023	180 days	7 days	✓	22-Nov-2023	180 days	8 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-11423-CS-14	E421	14-Nov-2023	21-Nov-2023	180 days	7 days	✓	22-Nov-2023	180 days	8 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
<b>HDPE - dissolved (lab preserved)</b> WG-11423-CS-15	E421	14-Nov-2023	21-Nov-2023	180 days	7 days	✓	22-Nov-2023	180 days	8 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-11423-CS-11	E290	14-Nov-2023	18-Nov-2023	14 days	4 days	✓	18-Nov-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-11423-CS-12	E290	14-Nov-2023	18-Nov-2023	14 days	4 days	✓	18-Nov-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-11423-CS-13	E290	14-Nov-2023	18-Nov-2023	14 days	4 days	✓	18-Nov-2023	14 days	4 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-11423-CS-14	E290	14-Nov-2023	18-Nov-2023	14 days	4 days	✓	18-Nov-2023	14 days	4 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-11423-CS-15	E290	14-Nov-2023	18-Nov-2023	14 days	4 days	✓	18-Nov-2023	14 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-11423-CS-11	E100	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-11423-CS-12	E100	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-11423-CS-13	E100	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-11423-CS-14	E100	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-11423-CS-15	E100	14-Nov-2023	18-Nov-2023	28 days	4 days	✓	18-Nov-2023	28 days	4 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-11423-CS-14	E162	14-Nov-2023	----	----	----		21-Nov-2023	7 days	6 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-11423-CS-15	E162	14-Nov-2023	----	----	----		21-Nov-2023	7 days	6 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-11423-CS-11	E162	14-Nov-2023	----	----	----		21-Nov-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-11423-CS-12	E162	14-Nov-2023	----	----	----		21-Nov-2023	7 days	7 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-11423-CS-13	E162	14-Nov-2023	----	----	----		21-Nov-2023	7 days	7 days	✔

**Legend & Qualifier Definitions**

EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.

Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1243362	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1243368	1	19	5.2	5.0	✔
Conductivity in Water	E100	1243363	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1250956	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1243960	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1243366	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243364	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243365	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1243367	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1245647	2	23	8.7	5.0	✔
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1243362	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1243368	1	19	5.2	5.0	✔
Conductivity in Water	E100	1243363	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1250956	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1243960	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1243366	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243364	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243365	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1243367	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1245647	2	23	8.7	5.0	✔
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1243362	1	19	5.2	5.0	✔
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1243368	1	19	5.2	5.0	✔
Conductivity in Water	E100	1243363	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1250956	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1243960	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1243366	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243364	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243365	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1243367	1	19	5.2	5.0	✔
TDS by Gravimetry	E162	1245647	2	23	8.7	5.0	✔



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1243368	1	19	5.2	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1250956	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1243960	1	18	5.5	5.0	✔
Fluoride in Water by IC	E235.F	1243366	1	19	5.2	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243364	1	20	5.0	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243365	1	20	5.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1243367	1	19	5.2	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)





Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23C7757</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC-Quarterly-GW/SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 11</p> <p><b>No. of samples analysed</b> : 11</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Date Analysis Commenced</b> : 17-Nov-2023</p> <p><b>Issue Date</b> : 27-Nov-2023 15:08</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anshim Anshim	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WS-111523-CS-01	WS-111523-CS-02	WS-111523-CS-03	WS-111523-CS-04	WG-111523-CS-16
Client sampling date / time					15-Nov-2023 12:30	15-Nov-2023 12:35	15-Nov-2023 12:49	15-Nov-2023 15:15	15-Nov-2023 09:55
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-001	VA23C7757-002	VA23C7757-003	VA23C7757-004	VA23C7757-005
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	7.7	7.8	7.7	44.2	237
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	----	E290/VA	1.0	mg/L	7.7	7.8	7.7	44.2	237
Conductivity	----	E100/VA	2.0	µS/cm	32.5	32.6	31.8	276	576
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	9.67	9.51	9.14	99.9	162
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L	9.77	9.49	9.23	100	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	44	42	38	198	291
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	0.0066	0.0102	13.7
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	3.64	3.64	3.59	9.04	34.2
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-LV A	0.0050	mg/L	0.0098	0.0094	0.0121	4.44	<0.0050
Nitrate + Nitrite (as N)	----	EC235.N+N/V A	0.0050	mg/L	0.0098	0.0094	0.0121	4.45	<0.0051
Nitrite (as N)	14797-65-0	E235.NO2-LV A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0075	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	1.25	1.24	1.03	54.2	2.78
<b>Organic / Inorganic Carbon</b>									
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	5.56	5.67	5.96	9.10	----
<b>Total Metals</b>									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	0.0602	0.0569	0.0360	0.0177	----
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00024	----
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L	0.00014	0.00014	0.00014	0.00021	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	0.00148	0.00142	0.00159	0.00736	----
Beryllium, total	7440-41-7	E420/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	----
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	----
Boron, total	7440-42-8	E420/VA	0.010	mg/L	<0.010	<0.010	<0.010	0.039	----
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L	<0.0000050	0.0000056	<0.0000050	0.0000219	----



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WS-111523-CS-01	WS-111523-CS-02	WS-111523-CS-03	WS-111523-CS-04	WG-111523-CS-16
Client sampling date / time					15-Nov-2023 12:30	15-Nov-2023 12:35	15-Nov-2023 12:49	15-Nov-2023 15:15	15-Nov-2023 09:55
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-001	VA23C7757-002	VA23C7757-003	VA23C7757-004	VA23C7757-005
					Result	Result	Result	Result	Result
<b>Total Metals</b>									
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	2.23	2.19	2.12	31.4	---
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00011	---
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00500	---
Iron, total	7439-89-6	E420/VA	0.010	mg/L	0.078	0.077	0.064	0.014	---
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	0.000061	0.000062	<0.000050	<0.000050	---
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	---
Magnesium, total	7439-95-4	E420/VA	0.100	mg/L	1.02	0.976	0.955	5.28	---
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	0.00518	0.00549	0.00564	0.00126	---
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	---
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000295	---
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	0.00051	---
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	---
Potassium, total	7440-09-7	E420/VA	0.100	mg/L	0.191	0.184	0.145	2.05	---
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	0.000061	<0.000050	<0.000050	0.000111	---
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	2.16	2.10	2.00	8.11	---
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	---
Sodium, total	7440-23-5	E420/VA	0.050	mg/L	2.70	2.62	2.70	8.90	---
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L	0.0100	0.00988	0.0102	0.132	---
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L	<0.50	<0.50	<0.50	18.3	---
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	---
Tin, total	7440-31-5	E420/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	---
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L	0.00137	0.00157	0.00060	0.00062	---
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	---
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L	0.00076	0.00075	<0.00050	0.0158	---
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L	<0.0030	<0.0030	<0.0030	0.0081	---
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	---
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	---
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0530	0.0532	0.0344	0.0105	0.0011
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00023	<0.00010



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WS-111523-CS-01	WS-111523-CS-02	WS-111523-CS-03	WS-111523-CS-04	WG-111523-CS-16
Client sampling date / time					15-Nov-2023 12:30	15-Nov-2023 12:35	15-Nov-2023 12:49	15-Nov-2023 15:15	15-Nov-2023 09:55
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-001	VA23C7757-002	VA23C7757-003	VA23C7757-004	VA23C7757-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00014	0.00013	0.00014	0.00021	0.00020
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00138	0.00133	0.00148	0.00720	0.0262
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	<0.010	<0.010	0.038	0.206
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	0.0000232	0.0000739
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	2.24	2.24	2.14	31.8	48.8
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	0.00010	0.00102
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00036	0.00034	0.00025	0.00459	0.00956
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.065	0.065	0.048	<0.010	0.028
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	0.991	0.951	0.923	4.98	9.89
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00346	0.00329	0.00402	0.00073	1.56
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	0.000286	0.000702
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00201
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.199	0.195	0.155	2.06	9.26
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000056	<0.000050	<0.000050	0.000109	<0.000050
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	2.17	2.06	2.02	8.20	13.2
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	2.70	2.57	2.64	8.67	22.3
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.00983	0.00995	0.0101	0.130	0.234
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.54	<0.50	<0.50	17.2	1.14
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	0.00094	0.00108	0.00035	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	0.000286



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WS-111523-CS-01	WS-111523-CS-02	WS-111523-CS-03	WS-111523-CS-04	WG-111523-CS-16
Client sampling date / time					15-Nov-2023 12:30	15-Nov-2023 12:35	15-Nov-2023 12:49	15-Nov-2023 15:15	15-Nov-2023 09:55
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-001	VA23C7757-002	VA23C7757-003	VA23C7757-004	VA23C7757-005
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00062	0.00060	<0.00050	0.0148	0.00162
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	0.0078	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.





## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111523-CS-17	WG-111523-CS-18	WG-111523-CS-19	WG-111523-CS-20	WG-111523-CS-21
Client sampling date / time					15-Nov-2023 10:40	15-Nov-2023 11:25	15-Nov-2023 14:00	15-Nov-2023 14:20	15-Nov-2023 14:25
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-006	VA23C7757-007	VA23C7757-008	VA23C7757-009	VA23C7757-010
					Result	Result	Result	Result	Result
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	86.0	55.2	50.3	116	117
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	86.0	55.2	50.3	116	117
Conductivity	---	E100/VA	2.0	µS/cm	175	114	105	230	231
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	80.8	51.4	45.0	108	105
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	110	74	71	144	137
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	1.76	1.04	1.05	2.74	2.74
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.175	0.128	0.0921	0.221	0.220
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	0.175	0.128	0.0921	0.221	0.220
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.61	2.54	2.50	2.83	2.84
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0120	0.0042	0.0035	0.0040	0.0042
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00035	0.00034	0.00032	0.00055	0.00052
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00193	0.00073	0.00071	0.00273	0.00274
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.017	<0.010	0.012	0.016	0.015
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	28.6	17.6	15.3	38.2	37.0
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00042	<0.00020	<0.00020	0.00047	0.00047



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111523-CS-17	WG-111523-CS-18	WG-111523-CS-19	WG-111523-CS-20	WG-111523-CS-21
Client sampling date / time					15-Nov-2023 10:40	15-Nov-2023 11:25	15-Nov-2023 14:00	15-Nov-2023 14:20	15-Nov-2023 14:25
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-006	VA23C7757-007	VA23C7757-008	VA23C7757-009	VA23C7757-010
					Result	Result	Result	Result	Result
<b>Dissolved Metals</b>									
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.016	<0.010	<0.010	<0.010	<0.010
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	2.29	1.82	1.66	3.19	3.18
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00077	<0.00010	<0.00010	<0.00010	<0.00010
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000130	0.000109	0.000131	0.000102	0.000102
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.465	0.283	0.387	0.708	0.701
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000165	0.000102	0.000096	0.000130	0.000127
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	4.23	3.94	4.18	4.41	4.54
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.76	1.32	2.00	3.56	3.55
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0475	0.0278	0.0268	0.0635	0.0630
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.91	0.85	0.79	1.01	1.13
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	0.00067	<0.00030	<0.00030	<0.00030	<0.00030
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000057	0.000031	0.000033	0.000093	0.000092
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00222	0.00260	0.00230	0.00249	0.00253
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	Field	Field	Field
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	Field	Field	Field

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

Please refer to the Accreditation section for an explanation of analyte accreditations.



### Analytical Results

Sub-Matrix: Water					Client sample ID	WG-111523-CS-22	----	----	----	----
(Matrix: Water)					Client sampling date / time	15-Nov-2023 15:00	---	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-011	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Physical Tests</b>										
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	46.8	---	---	---	---	
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	---	---	---	---	
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	46.8	---	---	---	---	
Conductivity	---	E100/VA	2.0	µS/cm	95.6	---	---	---	---	
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	42.7	---	---	---	---	
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	62	---	---	---	---	
<b>Anions and Nutrients</b>										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	---	---	---	---	
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	0.86	---	---	---	---	
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	---	---	---	---	
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0472	---	---	---	---	
Nitrate + Nitrite (as N)	---	EC235.N+N/V A	0.0050	mg/L	0.0472	---	---	---	---	
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	<0.0010	---	---	---	---	
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.34	---	---	---	---	
<b>Dissolved Metals</b>										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0112	---	---	---	---	
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---	
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00059	---	---	---	---	
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.00123	---	---	---	---	
Beryllium, dissolved	7440-41-7	E421/VA	0.000020	mg/L	<0.000020	---	---	---	---	
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---	
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	<0.010	---	---	---	---	
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	<0.0000050	---	---	---	---	
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	14.6	---	---	---	---	
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	---	---	---	---	
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---	
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00024	---	---	---	---	



## Analytical Results

Sub-Matrix: Water					Client sample ID	WG-111523-CS-22	----	----	----	----
(Matrix: Water)					Client sampling date / time	15-Nov-2023 15:00	---	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7757-011	-----	-----	-----	-----	
					Result	---	---	---	---	
<b>Dissolved Metals</b>										
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	<0.010	---	---	---	---	
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	---	---	---	---	
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	---	---	---	---	
Magnesium, dissolved	7439-95-4	E421/VA	0.100	mg/L	1.52	---	---	---	---	
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.00015	---	---	---	---	
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	---	---	---	---	
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000163	---	---	---	---	
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	<0.00050	---	---	---	---	
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	---	---	---	---	
Potassium, dissolved	7440-09-7	E421/VA	0.100	mg/L	0.296	---	---	---	---	
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	0.000086	---	---	---	---	
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	3.44	---	---	---	---	
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	---	---	---	---	
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	1.04	---	---	---	---	
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.0212	---	---	---	---	
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.73	---	---	---	---	
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	---	---	---	---	
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	---	---	---	---	
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	<0.00030	---	---	---	---	
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000028	---	---	---	---	
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	0.00295	---	---	---	---	
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	---	---	---	---	
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	---	---	---	---	
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	---	---	---	---	
Dissolved metals filtration location	----	EP421/VA	-	-	Field	---	---	---	---	

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<b>Work Order</b>	<b>: VA23C7757</b>	<b>Page</b>	: 1 of 16
<b>Client</b>	: Comox Valley Regional District	<b>Laboratory</b>	: ALS Environmental - Vancouver
<b>Contact</b>	: Crystal Stuart	<b>Account Manager</b>	: Thomas Chang
<b>Address</b>	: 770 Harmston Avenue Courtney BC Canada V9N 0G8	<b>Address</b>	: 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9
<b>Telephone</b>	:	<b>Telephone</b>	: +1 604 253 4188
<b>Project</b>	: 4-2-3	<b>Date Samples Received</b>	: 17-Nov-2023 10:40
<b>PO</b>	: 23-015	<b>Date Analysis Commenced</b>	: 17-Nov-2023
<b>C-O-C number</b>	: ----	<b>Issue Date</b>	: 27-Nov-2023 15:08
<b>Sampler</b>	: ----                    250-898-3722		
<b>Site</b>	: CRWMC-Quarterly-GW/SW		
<b>Quote number</b>	: VA23-COVR100-001		
<b>No. of samples received</b>	: 11		
<b>No. of samples analysed</b>	: 11		

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

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Anshim Anshim	Lab Assistant	Vancouver Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Vancouver Metals, Burnaby, British Columbia
Kim Jensen	Department Manager - Metals	Vancouver Metals, Burnaby, British Columbia
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
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Work Order : VA23C7757  
Client : Comox Valley Regional District  
Project : 4-2-3



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

## Workorder Comments

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Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1242835)</b>											
VA23C7790-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	217	216	0.140%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	217	216	0.140%	20%	----
<b>Physical Tests (QC Lot: 1242836)</b>											
VA23C7790-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	1160	1150	0.173%	10%	----
<b>Physical Tests (QC Lot: 1245463)</b>											
VA23C7347-001	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	552	565	2.42%	20%	----
<b>Physical Tests (QC Lot: 1245464)</b>											
VA23C7757-006	WG-111523-CS-17	Solids, total dissolved [TDS]	----	E162	13	mg/L	110	110	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1242838)</b>											
VA23C7790-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1242839)</b>											
VA23C7790-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	441	421	4.72%	20%	----
<b>Anions and Nutrients (QC Lot: 1242840)</b>											
VA23C7790-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0250	mg/L	0.364	0.344	5.86%	20%	----
<b>Anions and Nutrients (QC Lot: 1242841)</b>											
VA23C7790-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1242842)</b>											
VA23C7790-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	<2.50	<2.50	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1247090)</b>											
VA23C7437-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.678	0.684	0.927%	20%	----
<b>Anions and Nutrients (QC Lot: 1248130)</b>											
VA23C7752-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0116	0.0124	0.0009	Diff <2x LOR	----
<b>Organic / Inorganic Carbon (QC Lot: 1247089)</b>											
VA23C7437-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	2.58	2.65	0.06	Diff <2x LOR	----
<b>Total Metals (QC Lot: 1242818)</b>											
VA23C7742-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----



Sub-Matrix: **Water** **Laboratory Duplicate (DUP) Report**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Total Metals (QC Lot: 1242818) - continued</b>											
VA23C7742-001	Anonymous	Barium, total	7440-39-3	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	<0.10	<0.10	0	Diff <2x LOR	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
<b>Total Metals (QC Lot: 1250759)</b>											
KS2304427-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000406	0.0000387	0.0000020	Diff <2x LOR	----

**Dissolved Metals (QC Lot: 1244028)**





Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1244028) - continued</b>											
VA23C7757-001	WS-111523-CS-01	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0530	0.0532	0.331%	20%	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00014	0.00014	0.000003	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.00138	0.00135	2.25%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.24	2.26	0.992%	20%	----
		Chromium, dissolved	7440-47-3	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.00020	mg/L	0.00036	0.00033	0.00003	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.065	0.064	0.001	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.100	mg/L	0.991	0.955	0.0366	Diff <2x LOR	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00346	0.00336	2.94%	20%	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Nickel, dissolved	7440-02-0	E421	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	0.199	0.190	0.008	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000056	<0.000050	0.000006	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	2.17	2.17	0.142%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	2.70	2.59	4.22%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.00983	0.00986	0.234%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	0.54	0.52	0.02	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.00030	mg/L	0.00094	0.00088	0.00006	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Vanadium, dissolved	7440-62-2	E421	0.00050	mg/L	0.00062	0.00062	0.000005	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

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 Work Order : VA23C7757  
 Client : Comox Valley Regional District  
 Project : 4-2-3



Sub-Matrix: <b>Water</b>					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1250898)</b>											
KS2304428-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



**Method Blank (MB) Report**

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1242835)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	<1.0	---
<b>Physical Tests (QCLot: 1242836)</b>						
Conductivity	---	E100	1	µS/cm	1.1	---
<b>Physical Tests (QCLot: 1245463)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Physical Tests (QCLot: 1245464)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1242838)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1242839)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1242840)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1242841)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1242842)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1247090)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1248130)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Organic / Inorganic Carbon (QCLot: 1247089)</b>						
Carbon, dissolved organic [DOC]	---	E358-L	0.5	mg/L	<0.50	---
<b>Total Metals (QCLot: 1242818)</b>						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	---
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	---
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	---
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	---
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Total Metals (QCLot: 1242818) - continued</b>						
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
<b>Total Metals (QCLot: 1250759)</b>						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
<b>Dissolved Metals (QCLot: 1244028)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	----



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1244028) - continued</b>						
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1250898)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----





## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Physical Tests (QCLot: 1242835)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
<b>Physical Tests (QCLot: 1242836)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	94.8	90.0	110	----
<b>Physical Tests (QCLot: 1245463)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	99.4	85.0	115	----
<b>Physical Tests (QCLot: 1245464)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.8	85.0	115	----
<b>Anions and Nutrients (QCLot: 1242838)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 1242839)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
<b>Anions and Nutrients (QCLot: 1242840)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.4	90.0	110	----
<b>Anions and Nutrients (QCLot: 1242841)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	98.3	90.0	110	----
<b>Anions and Nutrients (QCLot: 1242842)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 1247090)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	89.8	85.0	115	----
<b>Anions and Nutrients (QCLot: 1248130)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.3	85.0	115	----
<b>Organic / Inorganic Carbon (QCLot: 1247089)</b>									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	95.6	80.0	120	----
<b>Total Metals (QCLot: 1242818)</b>									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	105	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	106	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	110	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	100	80.0	120	----



Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Total Metals (QCLot: 1242818) - continued</b>									
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	102	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	100	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	103	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	107	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	105	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	108	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	105	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	100	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	109	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	106	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	105	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	103	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	106	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	106	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	107	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	108	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	109	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	98.6	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	102	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	106	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	101	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	109	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	107	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	104	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
<b>Total Metals (QCLot: 1250759)</b>									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	104	80.0	120	----
<b>Dissolved Metals (QCLot: 1244028)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	107	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	104	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	111	80.0	120	----





Sub-Matrix: **Water**

Laboratory Control Sample (LCS) Report

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Dissolved Metals (QCLot: 1244028) - continued</b>									
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	102	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	107	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	95.1	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	106	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	104	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	105	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	102	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	108	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	109	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	102	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	104	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	107	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	103	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	110	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	108	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	108	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	102	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	107	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	112	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	102	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	106	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	108	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	108	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	118	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	104	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	106	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	105	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	102	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1242838)</b>										
VA23C7790-002	Anonymous	Fluoride	16984-48-8	E235.F	10.9 mg/L	10 mg/L	109	75.0	125	----
<b>Anions and Nutrients (QCLot: 1242839)</b>										
VA23C7790-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1060 mg/L	1000 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1242840)</b>										
VA23C7790-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	26.6 mg/L	25 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1242841)</b>										
VA23C7790-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	5.25 mg/L	5 mg/L	105	75.0	125	----
<b>Anions and Nutrients (QCLot: 1242842)</b>										
VA23C7790-002	Anonymous	Chloride	16887-00-6	E235.Cl	1060 mg/L	1000 mg/L	106	75.0	125	----
<b>Anions and Nutrients (QCLot: 1247090)</b>										
VA23C7440-006	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0879 mg/L	0.1 mg/L	87.9	75.0	125	----
<b>Anions and Nutrients (QCLot: 1248130)</b>										
VA23C7752-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0888 mg/L	0.1 mg/L	88.8	75.0	125	----
<b>Organic / Inorganic Carbon (QCLot: 1247089)</b>										
VA23C7440-006	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
<b>Total Metals (QCLot: 1242818)</b>										
VA23C7742-002	Anonymous	Aluminum, total	7429-90-5	E420	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0205 mg/L	0.02 mg/L	103	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0372 mg/L	0.04 mg/L	93.1	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0100 mg/L	0.01 mg/L	100	70.0	130	----
		Boron, total	7440-42-8	E420	0.091 mg/L	0.1 mg/L	91.2	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00407 mg/L	0.004 mg/L	102	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0400 mg/L	0.04 mg/L	100	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Copper, total	7440-50-8	E420	0.0195 mg/L	0.02 mg/L	97.5	70.0	130	----



Sub-Matrix: Water

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Total Metals (QCLot: 1242818) - continued</b>										
VA23C7742-002	Anonymous	Iron, total	7439-89-6	E420	1.99 mg/L	2 mg/L	99.3	70.0	130	----
		Lead, total	7439-92-1	E420	0.0198 mg/L	0.02 mg/L	99.2	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0872 mg/L	0.1 mg/L	87.2	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0201 mg/L	0.02 mg/L	101	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0388 mg/L	0.04 mg/L	96.9	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.1 mg/L	10 mg/L	101	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0416 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, total	7440-21-3	E420	9.04 mg/L	10 mg/L	90.4	70.0	130	----
		Silver, total	7440-22-4	E420	0.00409 mg/L	0.004 mg/L	102	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	20.6 mg/L	20 mg/L	103	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00394 mg/L	0.004 mg/L	98.5	70.0	130	----
		Tin, total	7440-31-5	E420	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0390 mg/L	0.04 mg/L	97.6	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00417 mg/L	0.004 mg/L	104	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Zinc, total	7440-66-6	E420	0.394 mg/L	0.4 mg/L	98.6	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0407 mg/L	0.04 mg/L	102	70.0	130	----
<b>Total Metals (QCLot: 1250759)</b>										
KS2304427-002	Anonymous	Mercury, total	7439-97-6	E508	ND mg/L	0.0001 mg/L	ND	70.0	130	----
<b>Dissolved Metals (QCLot: 1244028)</b>										
VA23C7757-002	WS-111523-CS-02	Aluminum, dissolved	7429-90-5	E421	0.193 mg/L	0.2 mg/L	96.5	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0211 mg/L	0.02 mg/L	105	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0202 mg/L	0.02 mg/L	101	70.0	130	----
		Barium, dissolved	7440-39-3	E421	0.0200 mg/L	0.02 mg/L	100.0	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.0108 mg/L	0.01 mg/L	108	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.097 mg/L	0.1 mg/L	96.9	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00411 mg/L	0.004 mg/L	103	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	4.05 mg/L	4 mg/L	101	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0400 mg/L	0.04 mg/L	100	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1244028) - continued</b>										
VA23C7757-002	WS-111523-CS-02	Cobalt, dissolved	7440-48-4	E421	0.0203 mg/L	0.02 mg/L	102	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0199 mg/L	0.02 mg/L	99.6	70.0	130	----
		Iron, dissolved	7439-89-6	E421	2.02 mg/L	2 mg/L	101	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0214 mg/L	0.02 mg/L	107	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.101 mg/L	0.1 mg/L	101	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	0.972 mg/L	1 mg/L	97.2	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0203 mg/L	0.02 mg/L	101	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0209 mg/L	0.02 mg/L	104	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0400 mg/L	0.04 mg/L	100.0	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.68 mg/L	10 mg/L	96.8	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.06 mg/L	4 mg/L	101	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0418 mg/L	0.04 mg/L	104	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.79 mg/L	10 mg/L	97.9	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00425 mg/L	0.004 mg/L	106	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	19.7 mg/L	20 mg/L	98.4	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00427 mg/L	0.004 mg/L	107	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0200 mg/L	0.02 mg/L	100	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0403 mg/L	0.04 mg/L	101	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00435 mg/L	0.004 mg/L	109	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0996 mg/L	0.1 mg/L	99.6	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.416 mg/L	0.4 mg/L	104	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
<b>Dissolved Metals (QCLot: 1250898)</b>										
VA23C7609-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000103 mg/L	0.0001 mg/L	103	70.0	130	----

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## QUALITY CONTROL INTERPRETIVE REPORT

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<p><b>Work Order</b> : <b>VA23C7757</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-3</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : ----</p> <p><b>Site</b> : CRWMC-Quarterly-GW/SW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 11</p> <p><b>No. of samples analysed</b> : 11</p>	<p><b>Page</b> : 1 of 23</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Issue Date</b> : 27-Nov-2023 15:08</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

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### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WS-111523-CS-01	E298	15-Nov-2023	21-Nov-2023	28 days	6 days	✔	24-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WS-111523-CS-02	E298	15-Nov-2023	21-Nov-2023	28 days	6 days	✔	24-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WS-111523-CS-03	E298	15-Nov-2023	21-Nov-2023	28 days	6 days	✔	24-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WS-111523-CS-04	E298	15-Nov-2023	21-Nov-2023	28 days	6 days	✔	24-Nov-2023	28 days	9 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111523-CS-16	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111523-CS-17	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
Amber glass total (sulfuric acid) WG-111523-CS-18	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111523-CS-19	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111523-CS-20	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111523-CS-21	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111523-CS-22	E298	15-Nov-2023	22-Nov-2023	28 days	7 days	✔	23-Nov-2023	28 days	8 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111523-CS-19	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111523-CS-20	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111523-CS-21	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111523-CS-22	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WS-111523-CS-02	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WS-111523-CS-03	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WS-111523-CS-04	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-111523-CS-16	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-111523-CS-17	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WG-111523-CS-18	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Chloride in Water by IC</b>											
HDPE WS-111523-CS-01	E235.Cl	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-19	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-20	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-21	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-22	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS-111523-CS-02	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS-111523-CS-03	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS-111523-CS-04	E235.F	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-16	E235.F	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-17	E235.F	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WG-111523-CS-18	E235.F	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Fluoride in Water by IC</b>											
HDPE WS-111523-CS-01	E235.F	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-19	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✓	18-Nov-2023	3 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-20	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-21	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-22	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-02	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-03	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-04	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-16	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-17	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-18	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✔	18-Nov-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-01	E235.NO3-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-19	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-20	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-21	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-22	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-02	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-03	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-04	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	3 days	✔	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-16	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✔	18-Nov-2023	3 days	3 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-17	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111523-CS-18	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WS-111523-CS-01	E235.NO2-L	15-Nov-2023	18-Nov-2023	3 days	3 days	✓	18-Nov-2023	3 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-19	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-20	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-21	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-22	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-111523-CS-02	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-111523-CS-03	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-111523-CS-04	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-16	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	3 days	✔	18-Nov-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-17	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	3 days	✔	18-Nov-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111523-CS-18	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	3 days	✔	18-Nov-2023	28 days	3 days	✔	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WS-111523-CS-01	E235.SO4	15-Nov-2023	18-Nov-2023	28 days	3 days	✔	18-Nov-2023	28 days	3 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111523-CS-16	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111523-CS-17	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111523-CS-18	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111523-CS-19	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔	



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111523-CS-20	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111523-CS-21	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WG-111523-CS-22	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WS-111523-CS-01	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WS-111523-CS-02	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WS-111523-CS-03	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>										
Glass vial - dissolved (lab preserved) WS-111523-CS-04	E509	15-Nov-2023	23-Nov-2023	28 days	8 days	✓	23-Nov-2023	28 days	0 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111523-CS-16	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✓	22-Nov-2023	180 days	7 days	✓
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>										
HDPE - dissolved (lab preserved) WG-111523-CS-17	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✓	22-Nov-2023	180 days	7 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111523-CS-18	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111523-CS-19	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111523-CS-20	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111523-CS-21	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111523-CS-22	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WS-111523-CS-01	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WS-111523-CS-02	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WS-111523-CS-03	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WS-111523-CS-04	E421	15-Nov-2023	21-Nov-2023	180 days	6 days	✔	22-Nov-2023	180 days	7 days	✔	





Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> WS-111523-CS-01	E358-L	15-Nov-2023	21-Nov-2023	28 days	6 days	✓	22-Nov-2023	28 days	7 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> WS-111523-CS-02	E358-L	15-Nov-2023	21-Nov-2023	28 days	6 days	✓	22-Nov-2023	28 days	7 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> WS-111523-CS-03	E358-L	15-Nov-2023	21-Nov-2023	28 days	6 days	✓	22-Nov-2023	28 days	7 days	✓
<b>Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)</b>										
<b>Amber glass dissolved (sulfuric acid)</b> WS-111523-CS-04	E358-L	15-Nov-2023	21-Nov-2023	28 days	6 days	✓	22-Nov-2023	28 days	7 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-111523-CS-19	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-111523-CS-20	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-111523-CS-21	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WG-111523-CS-22	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
<b>HDPE</b> WS-111523-CS-02	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WS-111523-CS-03	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WS-111523-CS-04	E290	15-Nov-2023	18-Nov-2023	14 days	2 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111523-CS-16	E290	15-Nov-2023	18-Nov-2023	14 days	3 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111523-CS-17	E290	15-Nov-2023	18-Nov-2023	14 days	3 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111523-CS-18	E290	15-Nov-2023	18-Nov-2023	14 days	3 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WS-111523-CS-01	E290	15-Nov-2023	18-Nov-2023	14 days	3 days	✓	18-Nov-2023	14 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-19	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-20	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-21	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-22	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WS-111523-CS-02	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WS-111523-CS-03	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WS-111523-CS-04	E100	15-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-16	E100	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-17	E100	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111523-CS-18	E100	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : Conductivity in Water</b>										
HDPE WS-111523-CS-01	E100	15-Nov-2023	18-Nov-2023	28 days	3 days	✓	18-Nov-2023	28 days	3 days	✓
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-16	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✓



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-17	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-18	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-19	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-20	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-21	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111523-CS-22	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WS-111523-CS-01	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WS-111523-CS-02	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WS-111523-CS-03	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WS-111523-CS-04	E162	15-Nov-2023	----	----	----		20-Nov-2023	7 days	5 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial - total (lab preserved) WS-111523-CS-01	E508	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial - total (lab preserved) WS-111523-CS-02	E508	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial - total (lab preserved) WS-111523-CS-03	E508	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔
<b>Total Metals : Total Mercury in Water by CVAAS</b>										
Glass vial - total (lab preserved) WS-111523-CS-04	E508	15-Nov-2023	23-Nov-2023	28 days	8 days	✔	23-Nov-2023	28 days	0 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) WS-111523-CS-01	E420	15-Nov-2023	20-Nov-2023	180 days	5 days	✔	22-Nov-2023	180 days	7 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) WS-111523-CS-02	E420	15-Nov-2023	20-Nov-2023	180 days	5 days	✔	22-Nov-2023	180 days	7 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) WS-111523-CS-03	E420	15-Nov-2023	20-Nov-2023	180 days	5 days	✔	22-Nov-2023	180 days	7 days	✔
<b>Total Metals : Total Metals in Water by CRC ICPMS</b>										
HDPE - total (lab preserved) WS-111523-CS-04	E420	15-Nov-2023	20-Nov-2023	180 days	5 days	✔	22-Nov-2023	180 days	7 days	✔

Legend & Qualifier Definitions

Page : 18 of 23  
Work Order : VA23C7757  
Client : Comox Valley Regional District  
Project : 4-2-3

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Rec. HT: ALS recommended hold time (see units).



## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1242835	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1247090	2	33	6.0	5.0	✓
Chloride in Water by IC	E235.Cl	1242842	1	20	5.0	5.0	✓
Conductivity in Water	E100	1242836	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250898	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244028	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1247089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1242838	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1242840	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1242841	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1242839	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1245463	2	26	7.6	5.0	✓
Total Mercury in Water by CVAAS	E508	1250759	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1242818	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1242835	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1247090	2	33	6.0	5.0	✓
Chloride in Water by IC	E235.Cl	1242842	1	20	5.0	5.0	✓
Conductivity in Water	E100	1242836	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250898	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244028	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1247089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1242838	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1242840	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1242841	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1242839	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1245463	2	26	7.6	5.0	✓
Total Mercury in Water by CVAAS	E508	1250759	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1242818	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1242835	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1247090	2	33	6.0	5.0	✓
Chloride in Water by IC	E235.Cl	1242842	1	20	5.0	5.0	✓
Conductivity in Water	E100	1242836	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250898	1	20	5.0	5.0	✓



Matrix: **Water**

Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Method Blanks (MB) - Continued</b>							
Dissolved Metals in Water by CRC ICPMS	E421	1244028	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1247089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1242838	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1242840	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1242841	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1242839	1	20	5.0	5.0	✓
TDS by Gravimetry	E162	1245463	2	26	7.6	5.0	✓
Total Mercury in Water by CVAAS	E508	1250759	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1242818	1	20	5.0	5.0	✓
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1247090	2	33	6.0	5.0	✓
Chloride in Water by IC	E235.Cl	1242842	1	20	5.0	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250898	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244028	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1247089	1	19	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1242838	1	20	5.0	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1242840	1	20	5.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1242841	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1242839	1	20	5.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1250759	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1242818	1	20	5.0	5.0	✓





## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO <sub>2</sub> . NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Vancouver	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Total Mercury in Water by CVAAS	E508 ALS Environmental - Vancouver	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Vancouver	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.



<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
	ALS Environmental - Vancouver			
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



## CERTIFICATE OF ANALYSIS

<p><b>Work Order</b> : <b>VA23C7786</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-4</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CStuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 2</p> <p><b>No. of samples analysed</b> : 2</p>	<p><b>Page</b> : 1 of 5</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby BC Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Date Analysis Commenced</b> : 18-Nov-2023</p> <p><b>Issue Date</b> : 27-Nov-2023 15:13</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
Angelo Salandanan	Lab Assistant	Metals, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Inorganics, Burnaby, British Columbia
Kevin Duarte	Supervisor - Metals ICP Instrumentation	Metals, Burnaby, British Columbia
Owen Cheng		Metals, Burnaby, British Columbia
Sam Silveira	Lab Assistant	Metals, Burnaby, British Columbia



## General Comments

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

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

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

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

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

<i>Unit</i>	<i>Description</i>
-	no units
µS/cm	microsiemens per centimetre
mg/L	milligrams per litre

<: less than.

>: greater than.

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

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

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



## Analytical Results

Sub-Matrix: Water					Client sample ID				
(Matrix: Water)					WG-111623-CS-23	WG-111623-CS-24	---	---	---
Client sampling date / time					16-Nov-2023 10:20	16-Nov-2023 10:51	---	---	---
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7786-001	VA23C7786-002	-----	-----	-----
					Result	Result	---	---	---
<b>Physical Tests</b>									
Alkalinity, bicarbonate (as CaCO3)	---	E290/VA	1.0	mg/L	188	44.6	---	---	---
Alkalinity, carbonate (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	---	---	---
Alkalinity, hydroxide (as CaCO3)	---	E290/VA	1.0	mg/L	<1.0	<1.0	---	---	---
Alkalinity, total (as CaCO3)	---	E290/VA	1.0	mg/L	188	44.6	---	---	---
Conductivity	---	E100/VA	2.0	µS/cm	473	93.3	---	---	---
Hardness (as CaCO3), dissolved	---	EC100/VA	0.60	mg/L	155	41.9	---	---	---
Solids, total dissolved [TDS]	---	E162/VA	10	mg/L	308	65	---	---	---
<b>Anions and Nutrients</b>									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	4.52	<0.0050	---	---	---
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	37.7	0.79	---	---	---
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	---	---	---
Nitrate (as N)	14797-55-8	E235.NO3-L/V A	0.0050	mg/L	0.0053	0.0666	---	---	---
Nitrite (as N)	14797-65-0	E235.NO2-L/V A	0.0010	mg/L	0.0015	<0.0010	---	---	---
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	2.39	2.37	---	---	---
<b>Dissolved Metals</b>									
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L	0.0209	0.0031	---	---	---
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L	0.00135	0.00030	---	---	---
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L	0.0118	0.00045	---	---	---
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L	<0.000100	<0.000100	---	---	---
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L	<0.000050	<0.000050	---	---	---
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L	0.124	<0.010	---	---	---
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L	0.0000395	0.0000068	---	---	---
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L	52.4	14.0	---	---	---
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---
Chromium, dissolved	7440-47-3	E421/VA	0.00050	mg/L	<0.00050	<0.00050	---	---	---
Cobalt, dissolved	7440-48-4	E421/VA	0.00010	mg/L	0.00016	<0.00010	---	---	---
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L	0.00041	0.00230	---	---	---



## Analytical Results

Sub-Matrix: Water					Client sample ID		WG-111623-CS-23	WG-111623-CS-24	----	----	----
(Matrix: Water)					Client sampling date / time		16-Nov-2023 10:20	16-Nov-2023 10:51	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	VA23C7786-001	VA23C7786-002	-----	-----	-----	-----	-----
					Result	Result	---	---	---	---	---
<b>Dissolved Metals</b>											
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L	0.202	0.024	---	---	---	---	---
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L	<0.000050	0.000210	---	---	---	---	---
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L	<0.0010	<0.0010	---	---	---	---	---
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L	5.84	1.68	---	---	---	---	---
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L	0.922	0.00057	---	---	---	---	---
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L	<0.0000050	<0.0000050	---	---	---	---	---
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L	0.000151	0.000135	---	---	---	---	---
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L	0.00084	<0.00050	---	---	---	---	---
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L	<0.050	<0.050	---	---	---	---	---
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L	4.50	0.234	---	---	---	---	---
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L	0.00035	<0.00020	---	---	---	---	---
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L	<0.000050	0.000098	---	---	---	---	---
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L	8.11	4.05	---	---	---	---	---
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---	---	---
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L	22.6	1.20	---	---	---	---	---
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L	0.164	0.0228	---	---	---	---	---
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L	0.83	0.61	---	---	---	---	---
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L	<0.00020	<0.00020	---	---	---	---	---
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L	<0.000010	<0.000010	---	---	---	---	---
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---	---
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---	---
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L	0.00211	<0.00030	---	---	---	---	---
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L	<0.00010	<0.00010	---	---	---	---	---
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L	0.000080	0.000015	---	---	---	---	---
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L	<0.00050	0.00226	---	---	---	---	---
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L	<0.0010	0.0204	---	---	---	---	---
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L	<0.00020	<0.00020	---	---	---	---	---
Dissolved mercury filtration location	----	EP509/VA	-	-	Field	Field	---	---	---	---	---
Dissolved metals filtration location	----	EP421/VA	-	-	Field	Field	---	---	---	---	---



Page : 5 of 5  
Work Order : VA23C7786  
Client : Comox Valley Regional District  
Project : 4-2-4

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

Please refer to the Accreditation section for an explanation of analyte accreditations.

## QUALITY CONTROL REPORT

<p><b>Work Order</b> : <b>VA23C7786</b></p> <p><b>Client</b> : Comox Valley Regional District</p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> :</p> <p><b>Project</b> : 4-2-4</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CStuart 250-898-3722</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 2</p> <p><b>No. of samples analysed</b> : 2</p>	<p><b>Page</b> : 1 of 10</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Date Analysis Commenced</b> : 18-Nov-2023</p> <p><b>Issue Date</b> : 27-Nov-2023 15:13</p>
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

### Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Laboratory Department</i>
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Work Order : VA23C7786  
Client : Comox Valley Regional District  
Project : 4-2-4



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## General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO = Data Quality Objective.

LOR = Limit of Reporting (detection limit).

RPD = Relative Percent Difference

# = Indicates a QC result that did not meet the ALS DQO.

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## Workorder Comments

Holding times are displayed as "--" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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### Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Physical Tests (QC Lot: 1243589)</b>											
KS2304436-001	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	97.2	97.9	0.718%	200%	----
		Alkalinity, carbonate (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, hydroxide (as CaCO3)	----	E290	1.0	mg/L	<1.0	<1.0	0.00%	200%	----
		Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	97.2	97.9	0.718%	20%	----
<b>Physical Tests (QC Lot: 1243590)</b>											
KS2304436-001	Anonymous	Conductivity	----	E100	2.0	µS/cm	179	183	2.43%	10%	----
<b>Physical Tests (QC Lot: 1247987)</b>											
VA23C7775-005	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	1560	1600	2.81%	20%	----
<b>Anions and Nutrients (QC Lot: 1243591)</b>											
KS2304428-001	Anonymous	Fluoride	16984-48-8	E235.F	0.400	mg/L	<0.400	<0.400	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243592)</b>											
KS2304428-001	Anonymous	Chloride	16887-00-6	E235.Cl	10.0	mg/L	15.8	15.5	0.29	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243594)</b>											
KS2304428-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.100	mg/L	1.47	1.47	0.316%	20%	----
<b>Anions and Nutrients (QC Lot: 1243595)</b>											
KS2304428-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0200	mg/L	<0.0200	<0.0200	0	Diff <2x LOR	----
<b>Anions and Nutrients (QC Lot: 1243596)</b>											
KS2304428-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	6.00	mg/L	2630	2640	0.282%	20%	----
<b>Anions and Nutrients (QC Lot: 1248130)</b>											
VA23C7752-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0116	0.0124	0.0009	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1244635)</b>											
VA23C7783-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0086	0.0080	0.0006	Diff <2x LOR	----
		Antimony, dissolved	7440-36-0	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Arsenic, dissolved	7440-38-2	E421	0.00010	mg/L	0.00151	0.00143	5.42%	20%	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0114	0.0112	2.21%	20%	----
		Beryllium, dissolved	7440-41-7	E421	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Bismuth, dissolved	7440-69-9	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, dissolved	7440-42-8	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Cadmium, dissolved	7440-43-9	E421	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	19.5	19.1	2.11%	20%	----



Sub-Matrix: Water					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
<b>Dissolved Metals (QC Lot: 1244635) - continued</b>											
VA23C7783-001	Anonymous	Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Cobalt, dissolved	7440-48-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Copper, dissolved	7440-50-8	E421	0.000020	mg/L	0.000022	0.000021	0.000008	Diff <2x LOR	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
		Lead, dissolved	7439-92-1	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, dissolved	7439-93-2	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	1.73	1.66	4.03%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00105	0.00107	1.83%	20%	----
		Nickel, dissolved	7440-02-0	E421	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Phosphorus, dissolved	7723-14-0	E421	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.874	0.843	3.51%	20%	----
		Rubidium, dissolved	7440-17-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000445	0.000423	0.000023	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.25	3.97	6.76%	20%	----
		Silver, dissolved	7440-22-4	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	1.53	1.45	5.24%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.000020	mg/L	0.0785	0.0796	1.38%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	2.79	2.64	0.15	Diff <2x LOR	----
		Tellurium, dissolved	13494-80-9	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thallium, dissolved	7440-28-0	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, dissolved	7440-29-1	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Tin, dissolved	7440-31-5	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Titanium, dissolved	7440-32-6	E421	0.000030	mg/L	<0.000030	<0.000030	0	Diff <2x LOR	----
		Tungsten, dissolved	7440-33-7	E421	0.000010	mg/L	0.00013	0.00013	0.0000007	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000137	0.000130	5.54%	20%	----
		Vanadium, dissolved	7440-62-2	E421	0.000050	mg/L	0.00152	0.00144	0.000008	Diff <2x LOR	----
		Zinc, dissolved	7440-66-6	E421	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
		Zirconium, dissolved	7440-67-7	E421	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
<b>Dissolved Metals (QC Lot: 1250899)</b>											
VA23C7779-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----



## Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: Water

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Physical Tests (QCLot: 1243589)</b>						
Alkalinity, bicarbonate (as CaCO3)	---	E290	1	mg/L	1.4	---
Alkalinity, carbonate (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, hydroxide (as CaCO3)	---	E290	1	mg/L	<1.0	---
Alkalinity, total (as CaCO3)	---	E290	1	mg/L	1.4	---
<b>Physical Tests (QCLot: 1243590)</b>						
Conductivity	---	E100	1	µS/cm	1.2	---
<b>Physical Tests (QCLot: 1247987)</b>						
Solids, total dissolved [TDS]	---	E162	10	mg/L	<10	---
<b>Anions and Nutrients (QCLot: 1243591)</b>						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	---
<b>Anions and Nutrients (QCLot: 1243592)</b>						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	---
<b>Anions and Nutrients (QCLot: 1243594)</b>						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	---
<b>Anions and Nutrients (QCLot: 1243595)</b>						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	---
<b>Anions and Nutrients (QCLot: 1243596)</b>						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	---
<b>Anions and Nutrients (QCLot: 1248130)</b>						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	---
<b>Dissolved Metals (QCLot: 1244635)</b>						
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	<0.0010	---
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	<0.00010	---
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	<0.00010	---
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	<0.00010	---
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	<0.000020	---
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	<0.000050	---
Boron, dissolved	7440-42-8	E421	0.01	mg/L	<0.010	---
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	<0.0000050	---
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	---
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	<0.000010	---



Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
<b>Dissolved Metals (QCLot: 1244635) - continued</b>						
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	<0.00050	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	<0.00010	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	<0.00020	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	<0.000050	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	<0.0010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	<0.000050	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	<0.00050	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	<0.050	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	<0.00020	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	<0.000050	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	<0.050	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	<0.000010	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	<0.00020	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	<0.50	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	<0.00020	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	<0.000010	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	<0.00010	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	<0.00010	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	<0.00030	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	<0.00010	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	<0.000010	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	<0.00050	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	<0.0010	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	<0.00020	----
<b>Dissolved Metals (QCLot: 1250899)</b>						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----



## Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: Water

					Laboratory Control Sample (LCS) Report				
Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		Qualifier
					Concentration	LCS	Low	High	
<b>Physical Tests (QCLot: 1243589)</b>									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	108	85.0	115	----
<b>Physical Tests (QCLot: 1243590)</b>									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	96.0	90.0	110	----
<b>Physical Tests (QCLot: 1247987)</b>									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	99.1	85.0	115	----
<b>Anions and Nutrients (QCLot: 1243591)</b>									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.7	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243592)</b>									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.9	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243594)</b>									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.6	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243595)</b>									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 1243596)</b>									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	100	90.0	110	----
<b>Anions and Nutrients (QCLot: 1248130)</b>									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	90.3	85.0	115	----
<b>Dissolved Metals (QCLot: 1244635)</b>									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	96.5	80.0	120	----
Antimony, dissolved	7440-36-0	E421	0.0001	mg/L	1 mg/L	99.5	80.0	120	----
Arsenic, dissolved	7440-38-2	E421	0.0001	mg/L	1 mg/L	97.8	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	99.2	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	106	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	93.1	80.0	120	----
Boron, dissolved	7440-42-8	E421	0.01	mg/L	1 mg/L	98.7	80.0	120	----
Cadmium, dissolved	7440-43-9	E421	0.000005	mg/L	0.1 mg/L	97.9	80.0	120	----
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Cesium, dissolved	7440-46-2	E421	0.00001	mg/L	0.05 mg/L	100	80.0	120	----
Chromium, dissolved	7440-47-3	E421	0.0005	mg/L	0.25 mg/L	97.7	80.0	120	----
Cobalt, dissolved	7440-48-4	E421	0.0001	mg/L	0.25 mg/L	93.7	80.0	120	----





Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1244635) - continued</b>									
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	92.5	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	95.8	80.0	120	----
Lead, dissolved	7439-92-1	E421	0.00005	mg/L	0.5 mg/L	97.7	80.0	120	----
Lithium, dissolved	7439-93-2	E421	0.001	mg/L	0.25 mg/L	106	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	97.7	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	93.8	80.0	120	----
Molybdenum, dissolved	7439-98-7	E421	0.00005	mg/L	0.25 mg/L	98.9	80.0	120	----
Nickel, dissolved	7440-02-0	E421	0.0005	mg/L	0.5 mg/L	95.0	80.0	120	----
Phosphorus, dissolved	7723-14-0	E421	0.05	mg/L	10 mg/L	102	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	102	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	96.5	80.0	120	----
Selenium, dissolved	7782-49-2	E421	0.00005	mg/L	1 mg/L	99.0	80.0	120	----
Silicon, dissolved	7440-21-3	E421	0.05	mg/L	10 mg/L	103	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	95.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	97.6	80.0	120	----
Strontium, dissolved	7440-24-6	E421	0.0002	mg/L	0.25 mg/L	100	80.0	120	----
Sulfur, dissolved	7704-34-9	E421	0.5	mg/L	50 mg/L	89.3	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	101	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	94.2	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	96.2	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	91.2	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	93.1	80.0	120	----
Uranium, dissolved	7440-61-1	E421	0.00001	mg/L	0.005 mg/L	99.0	80.0	120	----
Vanadium, dissolved	7440-62-2	E421	0.0005	mg/L	0.5 mg/L	96.1	80.0	120	----
Zinc, dissolved	7440-66-6	E421	0.001	mg/L	0.5 mg/L	100	80.0	120	----
Zirconium, dissolved	7440-67-7	E421	0.0002	mg/L	0.1 mg/L	101	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	103	80.0	120	----



### Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Anions and Nutrients (QCLot: 1243591)</b>										
KS2304435-001	Anonymous	Fluoride	16984-48-8	E235.F	0.998 mg/L	1 mg/L	99.8	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243592)</b>										
KS2304435-001	Anonymous	Chloride	16887-00-6	E235.Cl	103 mg/L	100 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243594)</b>										
KS2304435-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.57 mg/L	2.5 mg/L	103	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243595)</b>										
KS2304435-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.518 mg/L	0.5 mg/L	104	75.0	125	----
<b>Anions and Nutrients (QCLot: 1243596)</b>										
KS2304435-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	102 mg/L	100 mg/L	102	75.0	125	----
<b>Anions and Nutrients (QCLot: 1248130)</b>										
VA23C7752-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0888 mg/L	0.1 mg/L	88.8	75.0	125	----
<b>Dissolved Metals (QCLot: 1244635)</b>										
VA23C7783-002	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.188 mg/L	0.2 mg/L	93.8	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0186 mg/L	0.02 mg/L	93.1	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0182 mg/L	0.02 mg/L	91.0	70.0	130	----
		Barium, dissolved	7440-39-3	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Beryllium, dissolved	7440-41-7	E421	0.0382 mg/L	0.04 mg/L	95.4	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00952 mg/L	0.01 mg/L	95.2	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.092 mg/L	0.1 mg/L	91.6	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00367 mg/L	0.004 mg/L	91.7	70.0	130	----
		Calcium, dissolved	7440-70-2	E421	ND mg/L	4 mg/L	ND	70.0	130	----
		Cesium, dissolved	7440-46-2	E421	0.00943 mg/L	0.01 mg/L	94.3	70.0	130	----
		Chromium, dissolved	7440-47-3	E421	0.0378 mg/L	0.04 mg/L	94.5	70.0	130	----
		Cobalt, dissolved	7440-48-4	E421	0.0183 mg/L	0.02 mg/L	91.7	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0179 mg/L	0.02 mg/L	89.4	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.79 mg/L	2 mg/L	89.7	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0188 mg/L	0.02 mg/L	94.0	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0936 mg/L	0.1 mg/L	93.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	1 mg/L	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0183 mg/L	0.02 mg/L	91.6	70.0	130	----



Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
<b>Dissolved Metals (QCLot: 1244635) - continued</b>										
VA23C7783-002	Anonymous	Molybdenum, dissolved	7439-98-7	E421	0.0187 mg/L	0.02 mg/L	93.6	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0368 mg/L	0.04 mg/L	92.1	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	9.44 mg/L	10 mg/L	94.4	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.88 mg/L	4 mg/L	97.1	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0186 mg/L	0.02 mg/L	93.0	70.0	130	----
		Selenium, dissolved	7782-49-2	E421	0.0392 mg/L	0.04 mg/L	97.9	70.0	130	----
		Silicon, dissolved	7440-21-3	E421	9.35 mg/L	10 mg/L	93.5	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00376 mg/L	0.004 mg/L	93.9	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	2 mg/L	ND	70.0	130	----
		Strontium, dissolved	7440-24-6	E421	ND mg/L	0.02 mg/L	ND	70.0	130	----
		Sulfur, dissolved	7704-34-9	E421	20.5 mg/L	20 mg/L	103	70.0	130	----
		Tellurium, dissolved	13494-80-9	E421	0.0373 mg/L	0.04 mg/L	93.2	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00373 mg/L	0.004 mg/L	93.3	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0192 mg/L	0.02 mg/L	95.9	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0187 mg/L	0.02 mg/L	93.5	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0369 mg/L	0.04 mg/L	92.3	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0183 mg/L	0.02 mg/L	91.7	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00397 mg/L	0.004 mg/L	99.2	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.0922 mg/L	0.1 mg/L	92.2	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.392 mg/L	0.4 mg/L	98.1	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
<b>Dissolved Metals (QCLot: 1250899)</b>										
VA23C7782-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000104 mg/L	0.0001 mg/L	104	70.0	130	----

## QUALITY CONTROL INTERPRETIVE REPORT

<p><b>Work Order</b> : <b>VA23C7786</b></p> <p><b>Client</b> : <b>Comox Valley Regional District</b></p> <p><b>Contact</b> : Crystal Stuart</p> <p><b>Address</b> : 770 Harmston Avenue Courtney BC Canada V9N 0G8</p> <p><b>Telephone</b> : 250-898-3722</p> <p><b>Project</b> : 4-2-4</p> <p><b>PO</b> : 23-015</p> <p><b>C-O-C number</b> : ----</p> <p><b>Sampler</b> : CStuart</p> <p><b>Site</b> : CRWMC-Quarterly-GW</p> <p><b>Quote number</b> : VA23-COVR100-001</p> <p><b>No. of samples received</b> : 2</p> <p><b>No. of samples analysed</b> : 2</p>	<p><b>Page</b> : 1 of 9</p> <p><b>Laboratory</b> : ALS Environmental - Vancouver</p> <p><b>Account Manager</b> : Thomas Chang</p> <p><b>Address</b> : 8081 Lougheed Highway Burnaby, British Columbia Canada V5A 1W9</p> <p><b>Telephone</b> : +1 604 253 4188</p> <p><b>Date Samples Received</b> : 17-Nov-2023 10:40</p> <p><b>Issue Date</b> : 27-Nov-2023 15:13</p>
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This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

**Key**

- Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
- CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
- DQO: Data Quality Objective.
- LOR: Limit of Reporting (detection limit).
- RPD: Relative Percent Difference.

### ***Workorder Comments***

Holding times are displayed as "----" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

### ***Summary of Outliers***

#### ***Outliers : Quality Control Samples***

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

#### ***Outliers: Reference Material (RM) Samples***

- No Reference Material (RM) Sample outliers occur.

### ***Outliers : Analysis Holding Time Compliance (Breaches)***

- No Analysis Holding Time Outliers exist.

### ***Outliers : Frequency of Quality Control Samples***

- No Quality Control Sample Frequency Outliers occur.



## Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111623-CS-23	E298	16-Nov-2023	22-Nov-2023	28 days	6 days	✔	23-Nov-2023	28 days	7 days	✔
<b>Anions and Nutrients : Ammonia by Fluorescence</b>										
<b>Amber glass total (sulfuric acid)</b> WG-111623-CS-24	E298	16-Nov-2023	22-Nov-2023	28 days	6 days	✔	23-Nov-2023	28 days	7 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111623-CS-23	E235.Cl	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	2 days	✔
<b>Anions and Nutrients : Chloride in Water by IC</b>										
<b>HDPE</b> WG-111623-CS-24	E235.Cl	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	2 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> WG-111623-CS-23	E235.F	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	2 days	✔
<b>Anions and Nutrients : Fluoride in Water by IC</b>										
<b>HDPE</b> WG-111623-CS-24	E235.F	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	18-Nov-2023	28 days	2 days	✔
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>										
<b>HDPE</b> WG-111623-CS-23	E235.NO3-L	16-Nov-2023	18-Nov-2023	3 days	2 days	✔	18-Nov-2023	3 days	2 days	✔



Matrix: **Water** Evaluation: \* = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis				
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval	
				Rec	Actual			Rec	Actual		
<b>Anions and Nutrients : Nitrate in Water by IC (Low Level)</b>											
HDPE WG-111623-CS-24	E235.NO3-L	16-Nov-2023	18-Nov-2023	3 days	2 days	✓	18-Nov-2023	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111623-CS-23	E235.NO2-L	16-Nov-2023	18-Nov-2023	3 days	2 days	✓	18-Nov-2023	3 days	2 days	✓	
<b>Anions and Nutrients : Nitrite in Water by IC (Low Level)</b>											
HDPE WG-111623-CS-24	E235.NO2-L	16-Nov-2023	18-Nov-2023	3 days	2 days	✓	18-Nov-2023	3 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111623-CS-23	E235.SO4	16-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	2 days	✓	
<b>Anions and Nutrients : Sulfate in Water by IC</b>											
HDPE WG-111623-CS-24	E235.SO4	16-Nov-2023	18-Nov-2023	28 days	2 days	✓	18-Nov-2023	28 days	2 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111623-CS-23	E509	16-Nov-2023	23-Nov-2023	28 days	7 days	✓	23-Nov-2023	28 days	0 days	✓	
<b>Dissolved Metals : Dissolved Mercury in Water by CVAAS</b>											
Glass vial - dissolved (lab preserved) WG-111623-CS-24	E509	16-Nov-2023	23-Nov-2023	28 days	7 days	✓	23-Nov-2023	28 days	0 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111623-CS-23	E421	16-Nov-2023	21-Nov-2023	180 days	5 days	✓	22-Nov-2023	180 days	6 days	✓	
<b>Dissolved Metals : Dissolved Metals in Water by CRC ICPMS</b>											
HDPE - dissolved (lab preserved) WG-111623-CS-24	E421	16-Nov-2023	21-Nov-2023	180 days	5 days	✓	22-Nov-2023	180 days	6 days	✓	



Matrix: **Water** Evaluation: ✖ = Holding time exceedance ; ✔ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times		Eval	Analysis Date	Holding Times		Eval
				Rec	Actual			Rec	Actual	
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111623-CS-23	E290	16-Nov-2023	18-Nov-2023	14 days	2 days	✔	19-Nov-2023	14 days	3 days	✔
<b>Physical Tests : Alkalinity Species by Titration</b>										
HDPE WG-111623-CS-24	E290	16-Nov-2023	18-Nov-2023	14 days	2 days	✔	19-Nov-2023	14 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111623-CS-23	E100	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	19-Nov-2023	28 days	3 days	✔
<b>Physical Tests : Conductivity in Water</b>										
HDPE WG-111623-CS-24	E100	16-Nov-2023	18-Nov-2023	28 days	2 days	✔	19-Nov-2023	28 days	3 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111623-CS-23	E162	16-Nov-2023	----	----	----		22-Nov-2023	7 days	6 days	✔
<b>Physical Tests : TDS by Gravimetry</b>										
HDPE WG-111623-CS-24	E162	16-Nov-2023	----	----	----		22-Nov-2023	7 days	6 days	✔

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).





## Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water** Evaluation: \* = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<b>Analytical Methods</b>							
<b>Laboratory Duplicates (DUP)</b>							
Alkalinity Species by Titration	E290	1243589	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1243592	1	8	12.5	5.0	✓
Conductivity in Water	E100	1243590	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250899	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244635	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1243591	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243594	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243595	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1243596	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1247987	1	20	5.0	5.0	✓
<b>Laboratory Control Samples (LCS)</b>							
Alkalinity Species by Titration	E290	1243589	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1243592	1	8	12.5	5.0	✓
Conductivity in Water	E100	1243590	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250899	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244635	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1243591	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243594	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243595	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1243596	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1247987	1	20	5.0	5.0	✓
<b>Method Blanks (MB)</b>							
Alkalinity Species by Titration	E290	1243589	1	20	5.0	5.0	✓
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1243592	1	8	12.5	5.0	✓
Conductivity in Water	E100	1243590	1	17	5.8	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1250899	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1244635	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1243591	1	8	12.5	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243594	1	17	5.8	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243595	1	11	9.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1243596	1	11	9.0	5.0	✓
TDS by Gravimetry	E162	1247987	1	20	5.0	5.0	✓



Matrix: **Water** Evaluation: ✖ = QC frequency outside specification; ✔ = QC frequency within specification.

Quality Control Sample Type	Method	QC Lot #	Count		Frequency (%)		
			QC	Regular	Actual	Expected	Evaluation
<i>Analytical Methods</i>							
<b>Matrix Spikes (MS)</b>							
Ammonia by Fluorescence	E298	1248130	1	20	5.0	5.0	✔
Chloride in Water by IC	E235.Cl	1243592	1	8	12.5	5.0	✔
Dissolved Mercury in Water by CVAAS	E509	1250899	1	20	5.0	5.0	✔
Dissolved Metals in Water by CRC ICPMS	E421	1244635	1	20	5.0	5.0	✔
Fluoride in Water by IC	E235.F	1243591	1	8	12.5	5.0	✔
Nitrate in Water by IC (Low Level)	E235.NO3-L	1243594	1	17	5.8	5.0	✔
Nitrite in Water by IC (Low Level)	E235.NO2-L	1243595	1	11	9.0	5.0	✔
Sulfate in Water by IC	E235.SO4	1243596	1	11	9.0	5.0	✔



## Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Vancouver	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
TDS by Gravimetry	E162 ALS Environmental - Vancouver	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Vancouver	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Vancouver	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)



<i>Analytical Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS.  Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Dissolved Mercury in Water by CVAAS	E509 ALS Environmental - Vancouver	Water	APHA 3030B/EPA 1631E (mod)	Water samples are filtered (0.45 um), preserved with HCl, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO <sub>3</sub> ), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO <sub>3</sub> equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.

<i>Preparation Methods</i>	<i>Method / Lab</i>	<i>Matrix</i>	<i>Method Reference</i>	<i>Method Descriptions</i>
Preparation for Ammonia	EP298 ALS Environmental - Vancouver	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Dissolved Metals Water Filtration	EP421 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO <sub>3</sub> .
Dissolved Mercury Water Filtration	EP509 ALS Environmental - Vancouver	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HCl.



# **Appendix G**

## **Data Verification Memorandum**

# Data Verification Report

February 15, 2024

<b>To</b>	Diana Nowak; Kathleen Hasler	<b>Project No.</b>	11209296-52
<b>Copy to</b>	David R. Barton, Debra Tong	<b>DVR No.</b>	02
<b>From</b>	Stephanie Berton	<b>Contact No.</b>	1-519-884-0510
<b>Project Name</b>	56484-CVRD EMP	<b>Email</b>	Stephanie.Berton@ghd.com
<b>Subject</b>	Data Quality Assessment and Verification Groundwater, Surface Water and Leachate Monitoring Events Campbell River Site Comox Valley Regional District		

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

<b>Laboratory:</b>	ALS Global Ltd. (ALS)				
<b>Lab Job No.:</b>	VA23A4471, VA23A4568, VA23A4596, VA23A5076, VA23A5217, VA23A5220, VA23B0448, VA23B0953, VA23B0946, VA23B1186, VA23B8799, VA23B9056, VA23B9075, VA23B9297, VA23C7475, VA23C7786, VA23C7757, VA23C7752				
<b>Date(s) Sampled:</b>	February 27 to November 16, 2023				
<b>Media Sampled:</b>	Groundwater and Surface Water				
QA/QC	Criteria	Pass	Qualifiers	Fail	N/A
<b>Holding Times</b>	Analyte specific	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Temperature</b>	<10°C at receipt	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Sample Preservation</b>	Required container/preservatives	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Duplicate (blind)</b>	Within 20%/<1xRL	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Field Blank (blind)</b>	Non detect	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Trip Blank</b>	Non detect	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Lab QA/QC</b>	Within standard recoveries	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following results are qualified due to holding time exceedance:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A5076	03/07/2023	WG-030723-CS-49	Total dissolved solids (TDS)	120	J	mg/L
VA23A5076	03/07/2023	WG-030723-CS-50	Total dissolved solids (TDS)	68	J	mg/L
VA23A5076	03/07/2023	WG-030723-CS-51	Total dissolved solids (TDS)	78	J	mg/L
VA23A5076	03/07/2023	WG-030723-CS-52	Total dissolved solids (TDS)	89	J	mg/L
VA23A5076	03/07/2023	WG-030723-CS-53	Total dissolved solids (TDS)	87	J	mg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A5076	03/07/2023	WG-030723-CS-54	Total dissolved solids (TDS)	72	J	mg/L
VA23A5217	03/08/2023	WG-030823-CS-55	Total dissolved solids (TDS)	269	J	mg/L
VA23A5217	03/08/2023	WG-030823-CS-56	Total dissolved solids (TDS)	289	J	mg/L
VA23A5217	03/08/2023	WG-030823-CS-57	Total dissolved solids (TDS)	535	J	mg/L
VA23A5217	03/08/2023	WG-030823-CS-58	Total dissolved solids (TDS)	122	J	mg/L
VA23A5217	03/08/2023	WG-030823-CS-59	Total dissolved solids (TDS)	357	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-11	Nitrate (as N)	10.9	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-11	Nitrite (as N)	0.0062	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-11	Nitrite/Nitrate	10.9	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-12	Nitrate (as N)	0.0512	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-12	Nitrite (as N)		R	mg/L
VA23A5220	03/03/2023	WS-030823-CS-12	Nitrite/Nitrate	0.0512	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-13	Nitrate (as N)	0.0493	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-13	Nitrite (as N)		R	mg/L
VA23A5220	03/03/2023	WS-030823-CS-13	Nitrite/Nitrate	0.0493	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrate (as N)	0.0686	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrite/Nitrate	0.0686	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrate (as N)	0.187	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrite/Nitrate	0.187	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrate (as N)	0.106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrite/Nitrate	0.106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrate (as N)	0.105	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrite/Nitrate	0.105	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrate (as N)	0.534	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrite (as N)	0.0010	UJ	mg/L



Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrite/Nitrate	0.534	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrate (as N)	0.269	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrite/Nitrate	0.269	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrate (as N)	12.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrite (as N)	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrite/Nitrate	12.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrate (as N)	4.88	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrite/Nitrate	4.88	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-11	Nitrate (as N)	5.30	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-11	Nitrite (as N)	0.0050	UJ	mg/L
VA23C7752	11/14/2023	WG-111423-CS-11	Nitrite/Nitrate	5.30	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-12	Nitrate (as N)	0.218	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-12	Nitrite (as N)	0.0010	UJ	mg/L
VA23C7752	11/14/2023	WG-111423-CS-12	Nitrite/Nitrate	0.218	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-13	Nitrate (as N)	0.629	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-13	Nitrite (as N)	0.0010	UJ	mg/L
VA23C7752	11/14/2023	WG-111423-CS-13	Nitrite/Nitrate	0.629	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-14	Nitrate (as N)	0.158	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-14	Nitrite (as N)	0.0010	UJ	mg/L
VA23C7752	11/14/2023	WG-111423-CS-14	Nitrite/Nitrate	0.158	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-15	Nitrate (as N)	0.159	J	mg/L
VA23C7752	11/14/2023	WG-111423-CS-15	Nitrite (as N)	0.0010	UJ	mg/L
VA23C7752	11/14/2023	WG-111423-CS-15	Nitrite/Nitrate	0.0010	UJ	mg/L

The following results are qualified based on dissolved results that are significantly higher than the total results:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A4596	02/28/2023	WS-022823-CS-10	Aluminum	0.0617	J	mg/L
VA23A4596	02/28/2023	WS-022823-CS-10	Aluminum (dissolved)	0.105	J	mg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A4596	02/28/2023	WS-022823-CS-10	Chromium	0.00050	UJ	mg/L
VA23A4596	02/28/2023	WS-022823-CS-10	Chromium (dissolved)	0.00612	J	mg/L
VA23A4596	02/28/2023	WS-022823-CS-10	Nickel	0.00050	UJ	mg/L
VA23A4596	02/28/2023	WS-022823-CS-10	Nickel (dissolved)	0.00256	J	mg/L

The following results are qualified due to field duplicate variability:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A5220	03/03/2023	WS-030823-CS-12	Total dissolved solids (TDS)	17	J	mg/L
VA23A5220	03/03/2023	WS-030823-CS-13	Total dissolved solids (TDS)	31	J	mg/L

The following results are qualified based on field blank detections:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23A5217	03/08/2023	WG-030823-CS-57	Ammonia-N	0.0122	U	mg/L
VA23A5217	03/08/2023	WG-030823-CS-58	Ammonia-N	0.0222	U	mg/L

The following results are qualified due to high temperature (>10°C) upon arrival at the laboratory:

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-01	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Alkalinity, bicarbonate	35.8	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Alkalinity, total (as CaCO <sub>3</sub> )	35.8	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Bromoform	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-01	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Chloride (dissolved)	0.88	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Conductivity	75.9	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-01	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Hardness	34.0	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Methylene chloride	1.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrate (as N)	0.0686	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Nitrite/Nitrate	0.0686	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Sulfate (dissolved)	2.12	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Total dissolved solids (TDS)	57	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-01	Xylenes (total)	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-02	Alkalinity, bicarbonate	106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Alkalinity, total (as CaCO3)	106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Chloride (dissolved)	2.48	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Conductivity	207	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-02	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Hardness	99.2	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrate (as N)	0.187	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Nitrite/Nitrate	0.187	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Sulfate (dissolved)	2.44	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-02	Total dissolved solids (TDS)	130	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Alkalinity, bicarbonate	53.9	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Alkalinity, total (as CaCO3)	53.9	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Bromoform	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Chloride (dissolved)	1.94	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Chloroform (Trichloromethane)	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-03	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Conductivity	114	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-03	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Hardness	50.6	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Methylene chloride	50.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrate (as N)	0.106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Nitrite/Nitrate	0.106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Sulfate (dissolved)	2.29	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Total dissolved solids (TDS)	80	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-03	Xylenes (total)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,1-Dichloroethane	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-04	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Alkalinity, bicarbonate	54.0	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Alkalinity, total (as CaCO3)	54.0	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Bromoform	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Chloride (dissolved)	1.94	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Conductivity	114	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-04	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Hardness	49.8	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Methylene chloride	50.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrate (as N)	0.105	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Nitrite/Nitrate	0.105	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Sulfate (dissolved)	2.29	J	mg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-04	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Total dissolved solids (TDS)	85	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-04	Xylenes (total)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Alkalinity, bicarbonate	57.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Alkalinity, total (as CaCO3)	57.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Bromoform	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Chloride (dissolved)	3.01	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Chloroform (Trichloromethane)	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-05	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Conductivity	131	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-05	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Hardness	54.8	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Methylene chloride	1.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrate (as N)	0.534	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Nitrite/Nitrate	0.534	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Sulfate (dissolved)	4.34	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Total dissolved solids (TDS)	90	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-05	Xylenes (total)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,1-Dichloroethane	0.50	UJ	µg/L



Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-06	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Alkalinity, bicarbonate	77.9	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Alkalinity, total (as CaCO3)	77.9	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Ammonia-N	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Bromoform	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Chloride (dissolved)	4.47	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Conductivity	167	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-06	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Hardness	82.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Methylene chloride	1.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrate (as N)	0.269	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Nitrite/Nitrate	0.269	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Sulfate (dissolved)	2.62	J	mg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B8799	08/13/2023	WG-081323-CS-06	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Total dissolved solids (TDS)	106	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-06	Xylenes (total)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Alkalinity, bicarbonate	313	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Alkalinity, total (as CaCO3)	313	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Ammonia-N	0.0110	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Benzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Bromodichloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Bromoform	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Carbon tetrachloride	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Chloride (dissolved)	61.9	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Chlorobenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Chloroethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Chloroform (Trichloromethane)	0.50	UJ	µg/L

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VA23B8799	08/13/2023	WG-081323-CS-07	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Conductivity	862	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-07	Dibromochloromethane	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Ethylbenzene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Fluoride	0.100	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Hardness	371	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	m&p-Xylenes	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Methylene chloride	1.0	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrate (as N)	12.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrite (as N)	0.0050	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Nitrite/Nitrate	12.4	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	o-Xylene	0.30	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Styrene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Sulfate (dissolved)	10.1	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Tetrachloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Toluene	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Total dissolved solids (TDS)	568	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Trichloroethene	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Vinyl chloride	0.40	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-07	Xylenes (total)	0.50	UJ	µg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Alkalinity, bicarbonate	317	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Alkalinity, total (as CaCO3)	317	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Ammonia-N	0.0050	UJ	mg/L

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VA23B8799	08/13/2023	WG-081323-CS-08	Chloride (dissolved)	10.2	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Conductivity	640	J	µS/cm
VA23B8799	08/13/2023	WG-081323-CS-08	Fluoride	0.020	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Hardness	316	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrate (as N)	4.88	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrite (as N)	0.0010	UJ	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Nitrite/Nitrate	4.88	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Sulfate (dissolved)	13.6	J	mg/L
VA23B8799	08/13/2023	WG-081323-CS-08	Total dissolved solids (TDS)	391	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Alkalinity, bicarbonate	192	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Alkalinity, total (as CaCO3)	192	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Chloride (dissolved)	15.1	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Conductivity	393	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-09	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Hardness	223	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Nitrate (as N)	1.14	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Nitrite/Nitrate	1.14	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Sulfate (dissolved)	6.15	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-09	Total dissolved solids (TDS)	279	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Alkalinity, bicarbonate	162	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Alkalinity, carbonate	1.0	UJ	mg/L

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VA23B9056	08/14/2023	WG-081423-C5-10	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Alkalinity, total (as CaCO3)	162	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Benzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Bromodichloromethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Bromoform	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Carbon tetrachloride	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Chloride (dissolved)	131	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Chlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Chloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Conductivity	964	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-10	Dibromochloromethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Ethylbenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Fluoride	0.100	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Hardness	361	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	m&p-Xylenes	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Methylene chloride	1.0	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Nitrate (as N)	26.9	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Nitrite (as N)	0.0672	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Nitrite/Nitrate	27.0	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	o-Xylene	0.30	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Styrene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Sulfate (dissolved)	35.4	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Tetrachloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Toluene	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Total dissolved solids (TDS)	696	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	trans-1,2-Dichloroethene	0.50	UJ	µg/L

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VA23B9056	08/14/2023	WG-081423-C5-10	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Trichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Vinyl chloride	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-10	Xylenes (total)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Alkalinity, bicarbonate	91.9	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Alkalinity, total (as CaCO3)	91.9	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Chloride (dissolved)	2.58	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Conductivity	181	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-11	Fluoride	0.026	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Hardness	94.4	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Nitrate (as N)	0.610	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Nitrite/Nitrate	0.610	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Sulfate (dissolved)	2.10	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-11	Total dissolved solids (TDS)	118	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Alkalinity, bicarbonate	78.8	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Alkalinity, total (as CaCO3)	78.8	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Chloride (dissolved)	1.72	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Conductivity	156	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-12	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Hardness	83.8	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Nitrate (as N)	0.209	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Nitrite/Nitrate	0.209	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Sulfate (dissolved)	3.05	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-12	Total dissolved solids (TDS)	121	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B9056	08/14/2023	WG-081423-C5-13	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Alkalinity, bicarbonate	354	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Alkalinity, total (as CaCO <sub>3</sub> )	354	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Ammonia-N	19.9	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Benzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Bromodichloromethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Bromoform	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Carbon tetrachloride	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Chloride (dissolved)	56.5	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Chlorobenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Chloroethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Conductivity	800	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-13	Dibromochloromethane	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Ethylbenzene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Hardness	292	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	m&p-Xylenes	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Methyl tert butyl ether (MTBE)	0.94	J	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Methylene chloride	1.0	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Nitrate (as N)	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Nitrite (as N)	0.0023	J	mg/L

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VA23B9056	08/14/2023	WG-081423-C5-13	Nitrite/Nitrate	0.0051	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	o-Xylene	0.30	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Styrene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Sulfate (dissolved)	3.54	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Tetrachloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Toluene	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Total dissolved solids (TDS)	421	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Trichloroethene	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Vinyl chloride	0.40	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-13	Xylenes (total)	0.50	UJ	µg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Alkalinity, bicarbonate	52.8	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Alkalinity, total (as CaCO3)	52.8	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Chloride (dissolved)	1.23	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Conductivity	107	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-14	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Hardness	55.1	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Nitrate (as N)	0.124	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Nitrite/Nitrate	0.124	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Sulfate (dissolved)	2.48	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-14	Total dissolved solids (TDS)	82	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Alkalinity, bicarbonate	52.3	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Alkalinity, total (as CaCO3)	52.3	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Ammonia-N	0.0050	UJ	mg/L



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VA23B9056	08/14/2023	WG-081423-C5-15	Chloride (dissolved)	1.22	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Conductivity	106	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-15	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Hardness	53.2	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Nitrate (as N)	0.122	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Nitrite/Nitrate	0.122	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Sulfate (dissolved)	2.44	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-15	Total dissolved solids (TDS)	75	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Alkalinity, bicarbonate	86.0	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Alkalinity, total (as CaCO3)	86.0	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Ammonia-N	0.0050	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Chloride (dissolved)	1.77	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Conductivity	168	J	µS/cm
VA23B9056	08/14/2023	WG-081423-C5-16	Fluoride	0.020	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Hardness	89.1	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Nitrate (as N)	0.159	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Nitrite/Nitrate	0.159	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Sulfate (dissolved)	2.48	J	mg/L
VA23B9056	08/14/2023	WG-081423-C5-16	Total dissolved solids (TDS)	109	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Alkalinity, bicarbonate	43.8	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Alkalinity, total (as CaCO3)	43.8	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Ammonia-N	0.0050	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Chloride (dissolved)	0.84	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Conductivity	85.6	J	µS/cm
VA23B9297	08/16/2023	WG-081623-C5-20	Fluoride	0.020	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Hardness	43.8	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Nitrate (as N)	0.0673	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Nitrite/Nitrate	0.0673	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-20	Sulfate (dissolved)	2.00	J	mg/L

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VA23B9297	08/16/2023	WG-081623-C5-20	Total dissolved solids (TDS)	69	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Alkalinity, bicarbonate	43.8	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Alkalinity, total (as CaCO3)	43.8	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Ammonia-N	0.0050	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Chloride (dissolved)	0.83	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Conductivity	84.9	J	µS/cm
VA23B9297	08/16/2023	WG-081623-C5-21	Fluoride	0.020	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Hardness	42.9	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Nitrate (as N)	0.0666	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Nitrite/Nitrate	0.0666	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Sulfate (dissolved)	2.00	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-21	Total dissolved solids (TDS)	59	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Alkalinity, bicarbonate	63.4	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Alkalinity, total (as CaCO3)	63.4	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Ammonia-N	0.0050	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Chloride (dissolved)	4.33	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Conductivity	134	J	µS/cm
VA23B9297	08/16/2023	WG-081623-C5-22	Fluoride	0.020	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Hardness	65.6	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Nitrate (as N)	0.221	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Nitrite/Nitrate	0.221	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Sulfate (dissolved)	3.27	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-22	Total dissolved solids (TDS)	102	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,1-Dichloroethene	0.50	UJ	µg/L

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VA23B9297	08/16/2023	WG-081623-C5-23	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Alkalinity, bicarbonate	205	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Alkalinity, total (as CaCO3)	205	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Ammonia-N	5.76	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Benzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Bromodichloromethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Bromoform	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Carbon tetrachloride	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Chloride (dissolved)	35.1	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Chlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Chloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Chloroform (Trichloromethane)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Conductivity	464	J	µS/cm
VA23B9297	08/16/2023	WG-081623-C5-23	Dibromochloromethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Ethylbenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Fluoride	0.040	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Hardness	179	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	m&p-Xylenes	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Methylene chloride	1.0	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Nitrate (as N)	0.0050	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Nitrite (as N)	0.0035	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Nitrite/Nitrate	0.0051	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	o-Xylene	0.30	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Styrene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Sulfate (dissolved)	1.84	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Tetrachloroethene	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B9297	08/16/2023	WG-081623-C5-23	Toluene	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Total dissolved solids (TDS)	273	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Trichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Vinyl chloride	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-23	Xylenes (total)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1,1,2-Tetrachloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1,1-Trichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1,2,2-Tetrachloroethane	0.20	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1,2-Trichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1-Dichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,1-Dichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,2-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,2-Dichloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,2-Dichloropropane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,3-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	1,4-Dichlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Alkalinity, bicarbonate	53.1	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Alkalinity, carbonate	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Alkalinity, hydroxide	1.0	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Alkalinity, total (as CaCO3)	53.1	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Ammonia-N	0.0050	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Benzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Bromodichloromethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Bromoform	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Carbon tetrachloride	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Chloride (dissolved)	0.75	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Chlorobenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Chloroethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Chloroform (Trichloromethane)	0.50	UJ	µg/L

Lab Report #	Sample Date (mm/dd/yyyy)	Sample ID	Analyte	Result	Qualifier	Units
VA23B9297	08/16/2023	WG-081623-C5-24	Chloromethane (Methyl chloride)	5.0	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	cis-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	cis-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	cis-1,3-Dichloropropene/ trans-1,3-Dichloropropene	0.75	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Conductivity	103	J	µS/cm
VA23B9297	08/16/2023	WG-081623-C5-24	Dibromochloromethane	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Ethylbenzene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Fluoride	0.020	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Hardness	54.6	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	m&p-Xylenes	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Methyl tert butyl ether (MTBE)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Methylene chloride	50.0	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Nitrate (as N)	0.0592	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Nitrite (as N)	0.0010	UJ	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Nitrite/Nitrate	0.0592	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	o-Xylene	0.30	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Styrene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Sulfate (dissolved)	1.97	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Tetrachloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Toluene	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Total dissolved solids (TDS)	72	J	mg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Total Petroleum Hydrocarbons VPH (C6-C10)LessBTEX	100	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Total Petroleum Hydrocarbons VH (C6-C10)	100	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	trans-1,2-Dichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	trans-1,3-Dichloropropene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Trichloroethene	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Trichlorofluoromethane (CFC-11)	0.50	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Vinyl chloride	0.40	UJ	µg/L
VA23B9297	08/16/2023	WG-081623-C5-24	Xylenes (total)	0.50	UJ	µg/L

**Conclusion:**

Based on the assessment detailed in the foregoing, the data summarized are acceptable with the specific qualifications and exception noted above.

Notes:

N/A - Not Applicable

QA/QC - Quality Assurance/Quality Control

RL - Reporting Limit

N - Nitrogen

VH - Volatile Hydrocarbons

VPH - Volatile Petroleum Hydrocarbons

BTEX - Benzene, Toluene, Ethylbenzene, Xylenes

U - The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ - The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

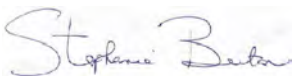
J - The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

R - The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

Data verification reference documents:

1. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, September 2016.
2. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R-94-013, September 2016.
3. "British Columbia Environmental Laboratory Manual", Analysis, Reporting & Knowledge Services Knowledge Management Branch Ministry of Environment and Climate Change Strategy Province of British Columbia, April 2020.

Regards

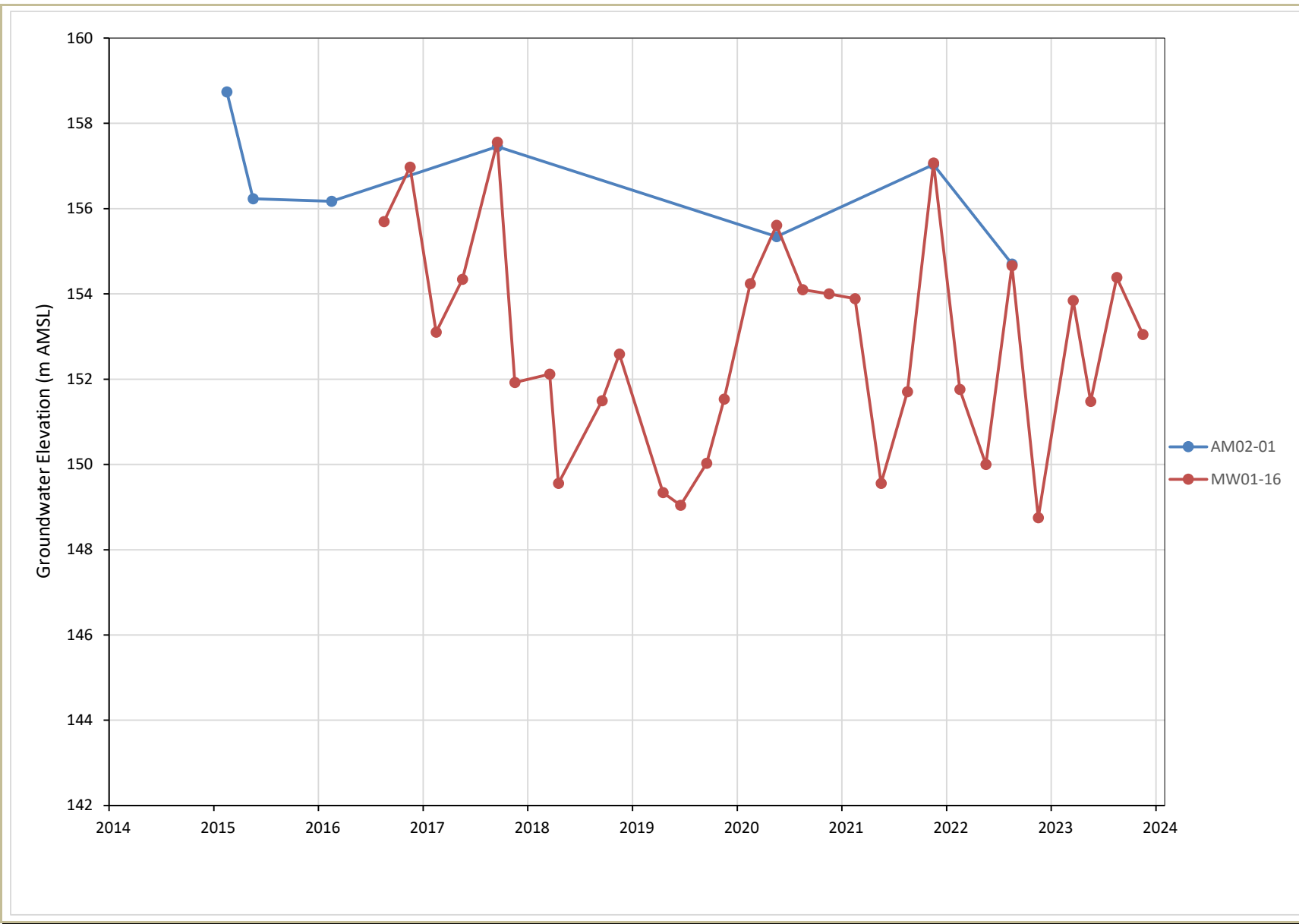


**Stephanie Berton**

Data Management – Data Validator

# Appendix H

Hydrographs



Note: AM02-01 was dry during all monitoring events from 2018-2023, except for Q2 2020, Q4 2021 and Q3 2022.



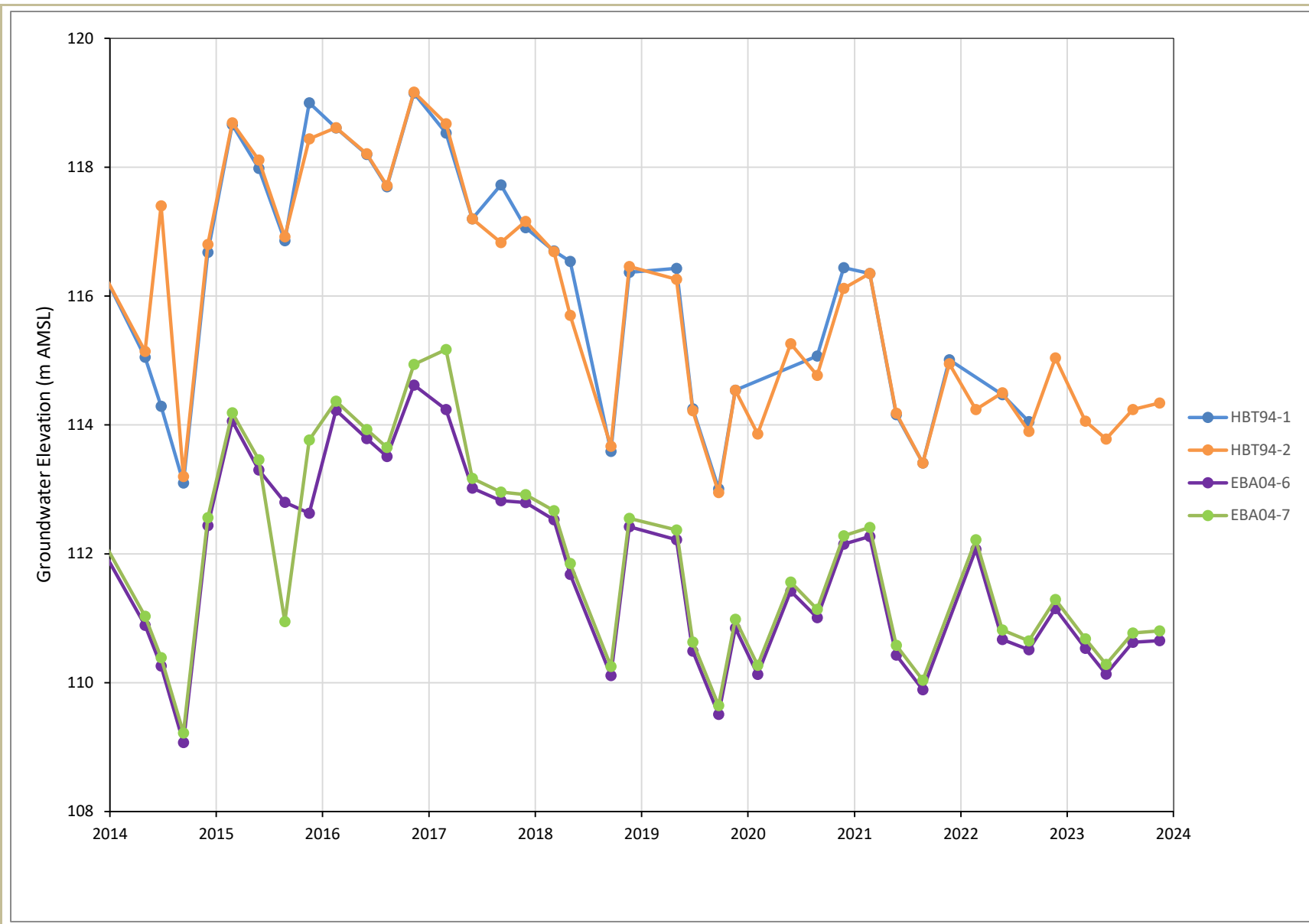
COMOX STRATHCONA WASTE MANAGEMENT  
 2023 OPERATIONS AND MONITORING REPORT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Project No. 11209296-52  
 Date April 2024

BACKGROUND WELLS - HYDROGRAPH 2014 - 2023

FIGURE H-1





Note: HBT94-1 was dry in 2023.

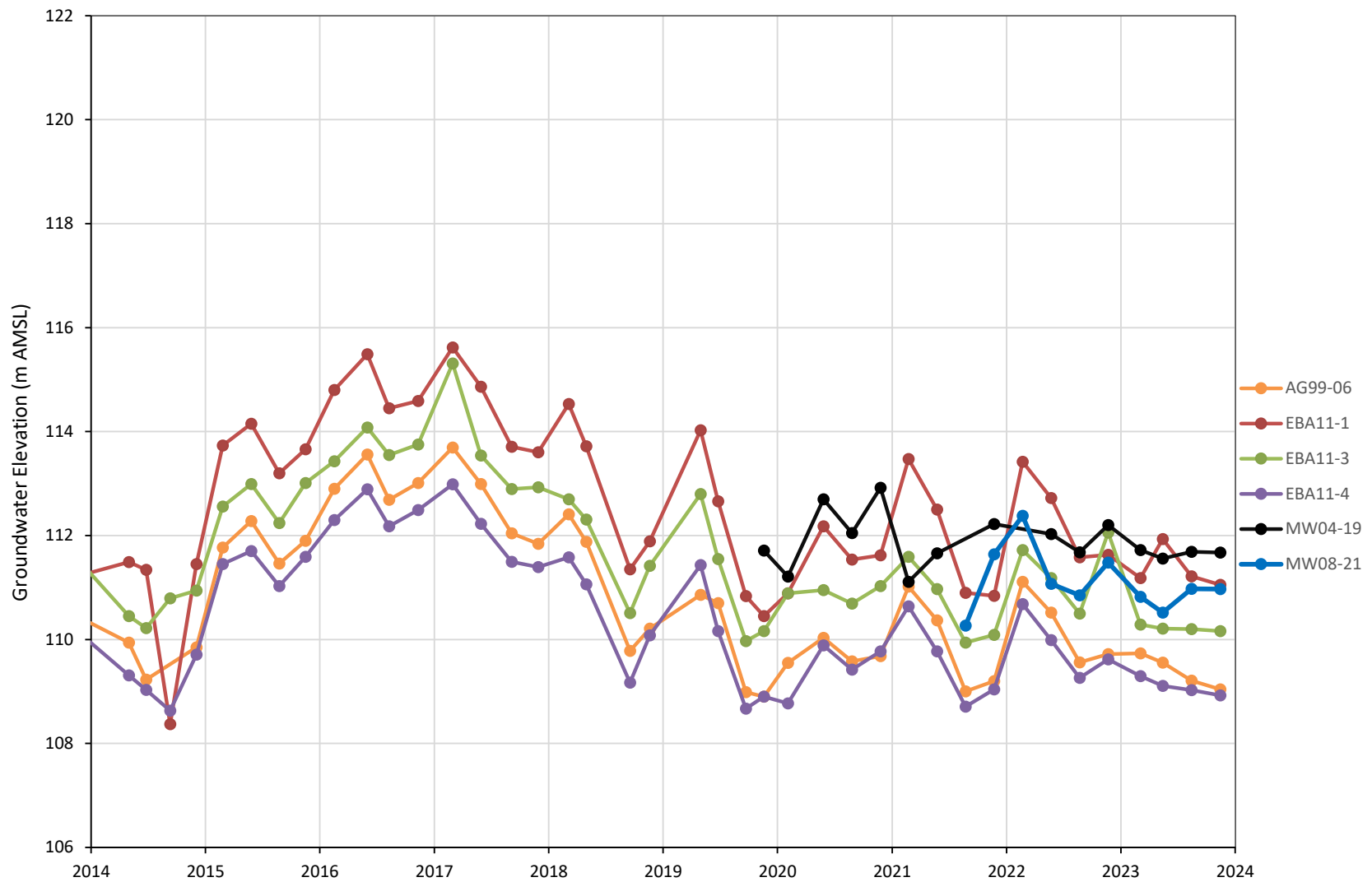


COMOX STRATHCONA WASTE MANAGEMENT  
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 CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Project No. 11209296-52  
 Date April 2024

LANDFILL VICINITY WELLS - HYDROGRAPH 2014 - 2023

FIGURE H-2

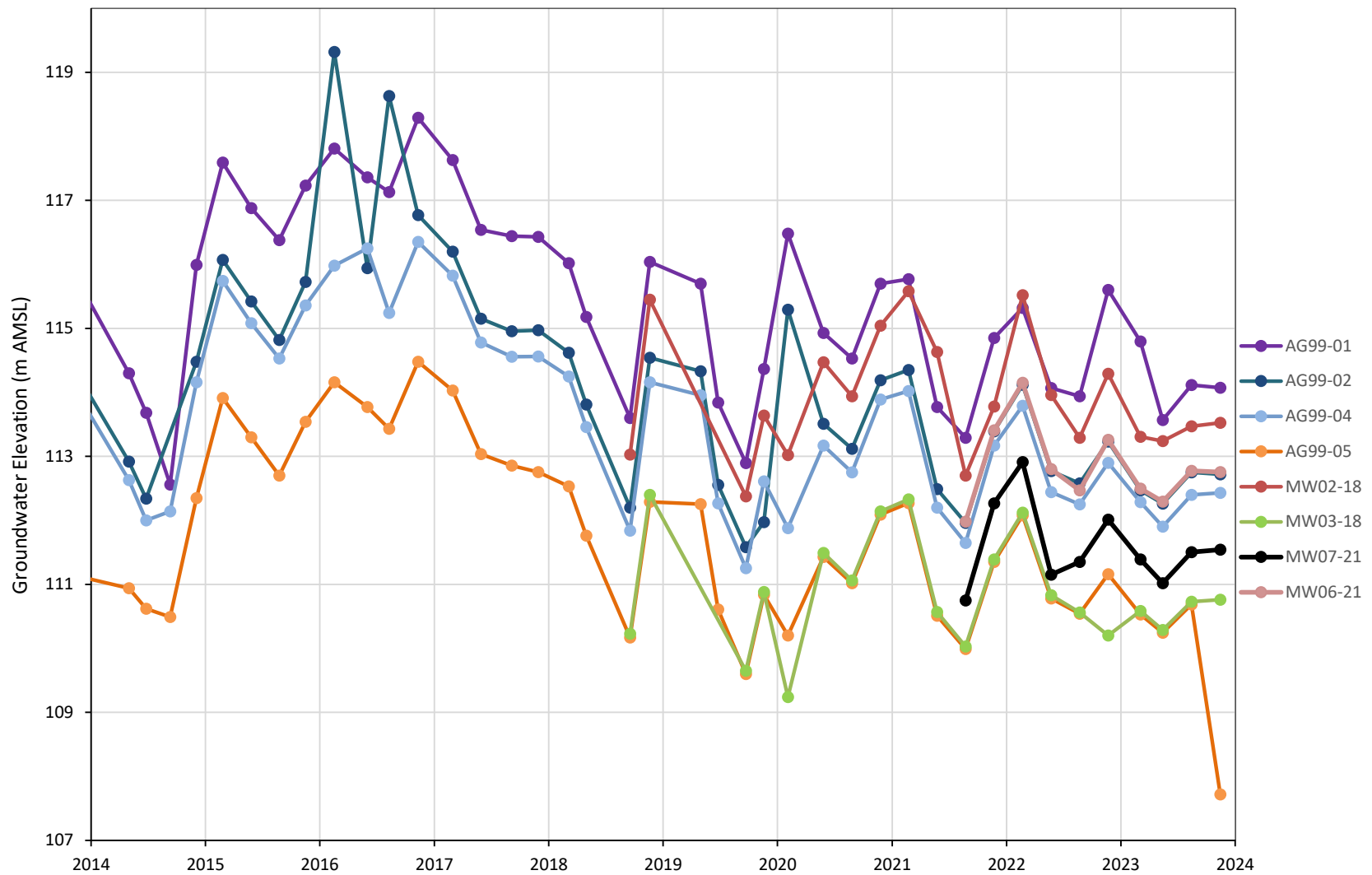


COMOX STRATHCONA WASTE MANAGEMENT  
 2023 OPERATIONS AND MONITORING REPORT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE

Project No. 11209296-52  
 Date April 2024

BLOCK J VICINITY WELLS - HYDROGRAPH 2014 - 2023

FIGURE H-3



# **Appendix I**

**Leachate Indicator Parameter  
Concentration Ranges**

## Appendix I

## Typical Leachate Indicator Parameters Concentration Ranges

Table I-1 Background Wells

Parameter	Typical MSW Leachate	MW01-16	AM02-01
		n = 4	n = 0
Alkalinity	71 - 3,340 <sup>(1)</sup>	34.4 - 44.9	-
Ammonia	84.3 - 449 <sup>(1)</sup>	ND (0.005)	-
Boron	3.2 - 4.68 <sup>(1)</sup>	ND (0.01) - 0.01	-
Chloride	500 <sup>(2)</sup>	0.78 - 1.03	-
TDS	2,000 <sup>(2)</sup>	50 - 63	-
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	74.3 - 91.8	-
Iron	100 - 500 <sup>(2)</sup>	ND (0.01) - 0.018	-
Manganese	0.03 - 7.9 <sup>(2)</sup>	ND (0.0001) - 0.00113	-
Sulphate	50 <sup>(2)</sup>	2.12 - 2.68	-

\*\* AM02-01 was dry in 2023.

Table I-2 Landfill Vicinity Wells

Parameter	Typical MSW Leachate	HBT94-2	EBA04-6	EBA04-1	HBT94-1	EBA04-7
		n = 4	n = 5	n = 5	n = 0	n = 4
Alkalinity	71 - 3,340 <sup>(1)</sup>	188 - 254	252 - 323	42.8 - 44.6	-	283 - 442
Ammonia	84.3 - 449 <sup>(1)</sup>	4.52 - 7.02	ND (0.005)	ND (0.005)	-	ND (0.0122) - 0.0116
Boron	3.2 - 4.68 <sup>(1)</sup>	0.124 - 0.187	0.034 - 0.127	ND (0.01)	-	0.119 - 0.275
Chloride	500 <sup>(2)</sup>	35.1 - 49.2	2.56 - 10.9	0.79 - 0.86	-	43.1 - 63.1
TDS	2,000 <sup>(2)</sup>	273 - 357	269 - 416	55 - 69	-	525 - 616
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	464 - 612	466 - 640	84.9 - 93.3	-	780 - 958
Iron	100 - 500 <sup>(2)</sup>	0.202 - 0.389	ND (0.01)	0.011 - 0.033	-	ND (0.01)
Manganese	0.03 - 7.9 <sup>(2)</sup>	0.922 - 1.42	ND (0.0001) - 0.00027	0.0002 - 0.00057	-	0.309 - 0.502
Sulphate	50 <sup>(2)</sup>	1.84 - 3.16	2.02 - 14.2	1.9 - 2.37	-	8.76 - 11.7

\*\* HBT94-1 was dry in 2023.

Table I-3 Shallow Block J Vicinity Wells

Parameter	Typical MSW Leachate	EBA11-1	EBA11-2	AG99-06	EBA11-4	EBA11-3
		n = 4	n = 0	n = 4	n = 6	n = 5
Alkalinity	71 - 3,340 <sup>(1)</sup>	107 - 208	-	44.3 - 77.9	50.9 - 61.4	53.9 - 55.8
Ammonia	84.3 - 449 <sup>(1)</sup>	ND (0.005)	-	ND (0.005)	ND (0.005)	ND (0.005) - 0.0055
Boron	3.2 - 4.68 <sup>(1)</sup>	0.107 - 0.148	-	ND (0.01)	ND (0.01)	ND (0.01)
Chloride	500 <sup>(2)</sup>	98.4 - 152	-	2.34 - 26	2.84 - 5.59	1.41 - 4.22
TDS	2,000 <sup>(2)</sup>	498 - 748	-	60 - 151	72 - 93	68 - 87
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	722 - 1020	-	94.7 - 210	118 - 140	110 - 124
Iron	100 - 500 <sup>(2)</sup>	ND (0.01) - 0.005	-	ND (0.01) - 0.05	ND (0.01)	ND (0.01)
Manganese	0.03 - 7.9 <sup>(2)</sup>	0.15 - 0.565	-	0.00017 - 0.00196	ND (0.0001)	ND (0.0001) - 0.00005
Sulphate	50 <sup>(2)</sup>	30 - 47.2	-	1.43 - 2.72	1.75 - 6.14	2.29 - 2.51

\*\* EBA 11-2 was dry in 2023.

Table I-4 Deep Block J Vicinity Wells

Parameter	Typical MSW Leachate	MW04-19	MW08-21
		n = 4	n = 4
Alkalinity	71 - 3,340 <sup>(1)</sup>	62.2 - 105	192 - 229
Ammonia	84.3 - 449 <sup>(1)</sup>	ND (0.005) - 0.0165	ND (0.005)
Boron	3.2 - 4.68 <sup>(1)</sup>	ND (0.01)	0.014 - 0.017
Chloride	500 <sup>(2)</sup>	4.13 - 5.99	15.1 - 23.4
TDS	2,000 <sup>(2)</sup>	102 - 122	272 - 295
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	134 - 198	393 - 482
Iron	100 - 500 <sup>(2)</sup>	ND (0.01) - 3.87	ND (0.01) - 0.026
Manganese	0.03 - 7.9 <sup>(2)</sup>	ND (0.0001) - 0.0751	ND (0.0001) - 0.0005
Sulphate	50 <sup>(2)</sup>	3.27 - 5.1	6.15 - 8.25



Table I-5 Shallow Downgradient Off-Site Wells

Parameter	Typical MSW Leachate	MW02-18	MW03-18	MW06-21	MW07-21
		n = 5	n = 5	n = 4	n = 4
Alkalinity	71 - 3,340 <sup>(1)</sup>	203 - 354	66.2 - 117	90.1 - 91.9	67.3 - 86
Ammonia	84.3 - 449 <sup>(1)</sup>	12.2 - 19.9	ND (0.005)	ND (0.005)	ND (0.005)
Boron	3.2 - 4.68 <sup>(1)</sup>	0.206 - 0.222	0.015 - 0.035	ND (0.01)	0.011 - 0.017
Chloride	500 <sup>(2)</sup>	33.3 - 56.5	1.26 - 2.74	2.56 - 2.72	1.2 - 1.77
TDS	2,000 <sup>(2)</sup>	248 - 421	76 - 144	118 - 123	78 - 110
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	496 - 800	129 - 231	181 - 188	137 - 175
Iron	100 - 500 <sup>(2)</sup>	0.022 - 0.035	ND (0.01)	ND (0.01) - 0.201	ND (0.01) - 0.016
Manganese	0.03 - 7.9 <sup>(2)</sup>	1.43 - 2.95	ND (0.0001)	ND (0.0001) - 0.00754	ND (0.0001) - 0.00077
Sulphate	50 <sup>(2)</sup>	2.11 - 3.54	1.96 - 2.84	1.77 - 2.1	1.95 - 2.61

Table I-6 Deep Downgradient Off-Site Wells

Parameter	Typical MSW Leachate	AG99-01 n = 4	AG99-02 n = 6	AG99-04 n = 5	AG99-05 n = 4
Alkalinity	71 - 3,340 <sup>(1)</sup>	106 - 113	78.8 - 151	49.2 - 55.2	50.3 - 93.6
Ammonia	84.3 - 449 <sup>(1)</sup>	ND (0.005)	ND (0.005)	ND (0.005)	ND (0.005)
Boron	3.2 - 4.68 <sup>(1)</sup>	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01) - 0.031
Chloride	500 <sup>(2)</sup>	1.99 - 2.49	1.37 - 1.95	1.04 - 1.23	1.05 - 3.12
TDS	2,000 <sup>(2)</sup>	130 - 154	112 - 164	64 - 70	65 - 117
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	207 - 223	156 - 282	100 - 114	105 - 184
Iron	100 - 500 <sup>(2)</sup>	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)
Manganese	0.03 - 7.9 <sup>(2)</sup>	ND (0.0001)	ND (0.0001)	ND (0.0001)	ND (0.0001)
Sulphate	50 <sup>(2)</sup>	2.44 - 3.22	2.57 - 3.05	1.85 - 2.54	1.85 - 2.5

Table I-7 Surface Water

Parameter	Typical MSW Leachate	SW-1	SW03-17	SWM Pond
		n = 6	n = 5	n = 2
Alkalinity	71 - 3,340 <sup>(1)</sup>	6.3 - 10.1	7.5 - 8.4	39.7 - 44.2
Ammonia	84.3 - 449 <sup>(1)</sup>	ND (0.005) - 0.0624	ND (0.005) - 0.0418	0.0054 - 0.0102
Boron	3.2 - 4.68 <sup>(1)</sup>	ND (0.01)	ND (0.01)	0.022 - 0.038
Chloride	500 <sup>(2)</sup>	3.32 - 3.64	3.48 - 4.1	9.04 - 50
TDS	2,000 <sup>(2)</sup>	17 - 44	28 - 42	198 - 234
Conductivity (µS/cm)	161 - 8,126 <sup>(1)</sup>	28.9 - 35.6	30.7 - 33.7	276 - 390
Iron	100 - 500 <sup>(2)</sup>	0.065 - 0.263	0.042 - 0.174	0.024 - 0.024
Manganese	0.03 - 7.9 <sup>(2)</sup>	0.00329 - 0.0493	0.00306 - 0.0842	0.00073 - 0.0344
Sulphate	50 <sup>(2)</sup>	0.35 - 1.25	0.53 - 1.03	29.1 - 54.2

**Notes:**

All concentrations in mg/L unless otherwise specified.

All parameters measured in laboratory.

< - indicates below reportable detection limit.

n = number of samples.

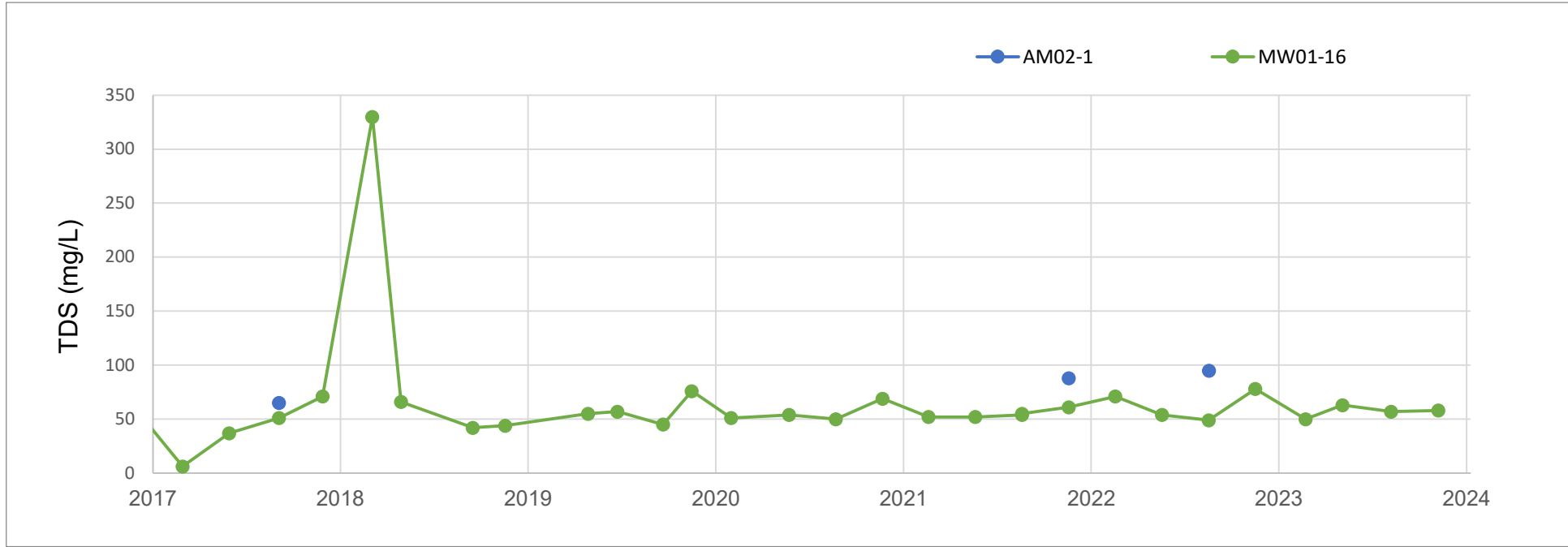
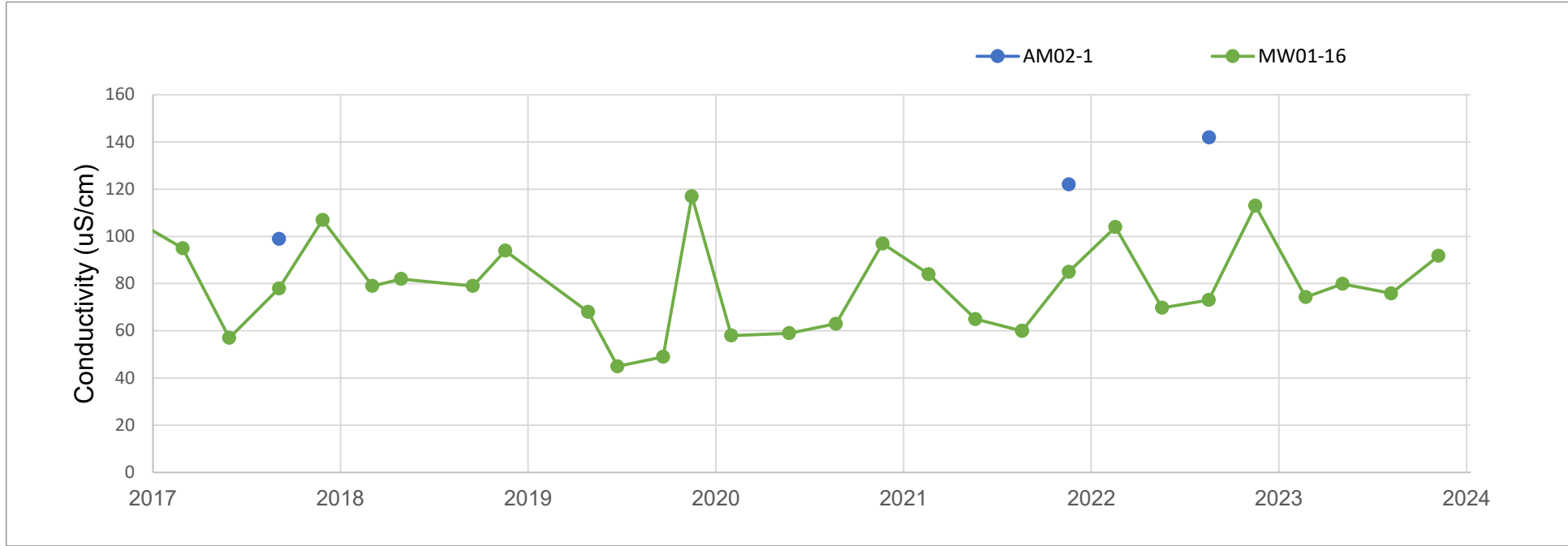
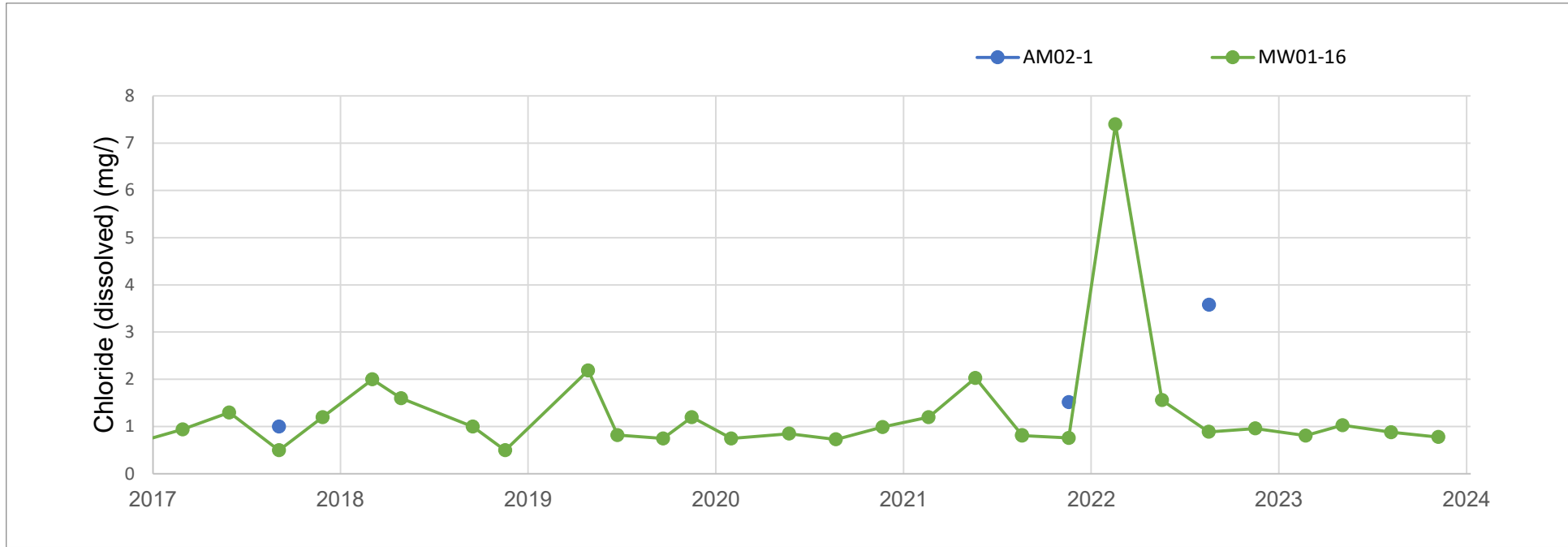
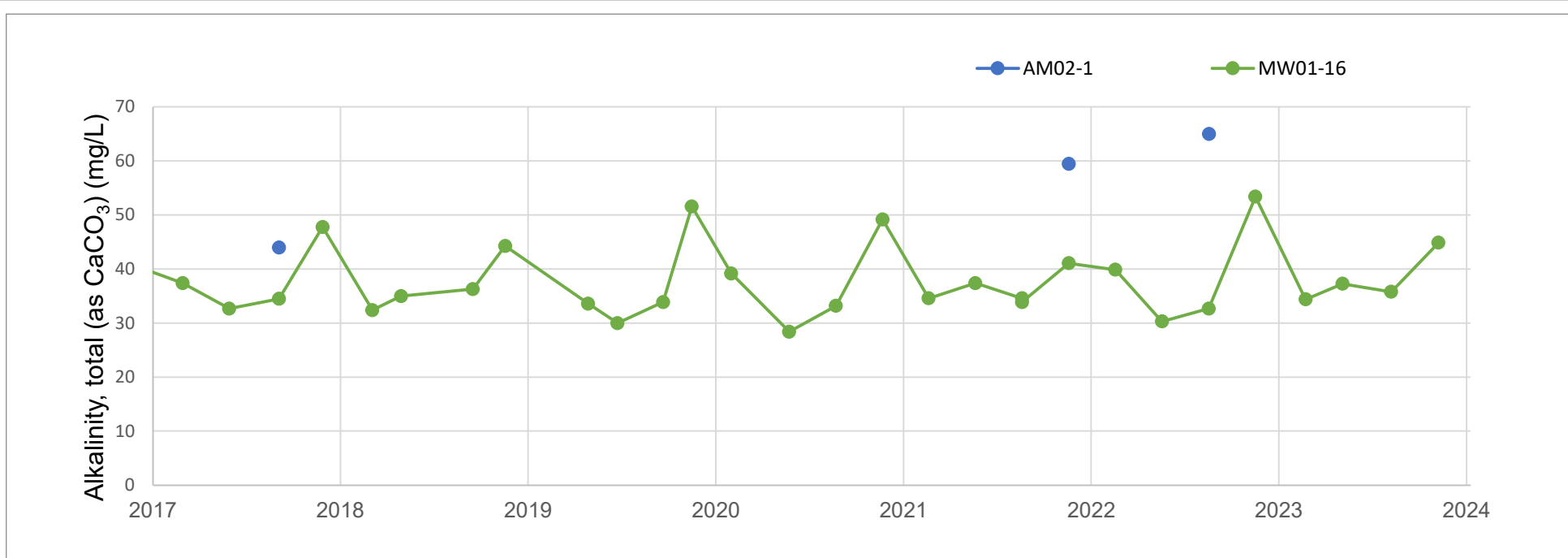
mg/L - milligrams per litre; µS/cm - microSiemens per centimeter.

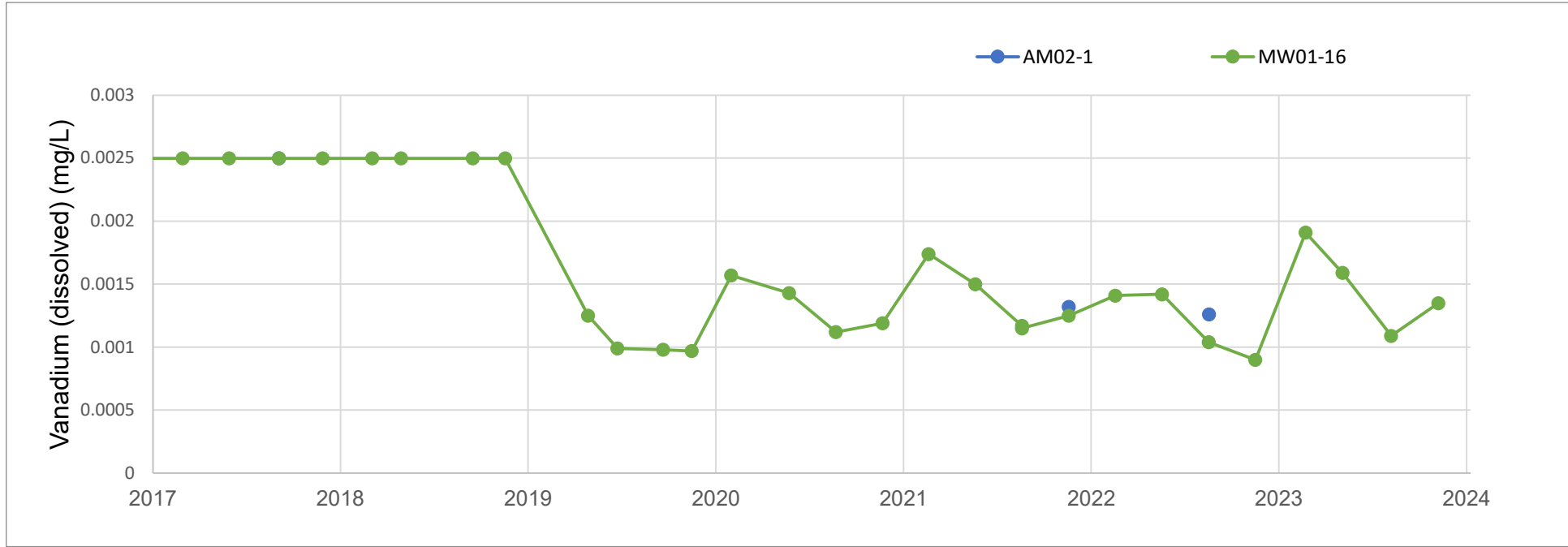
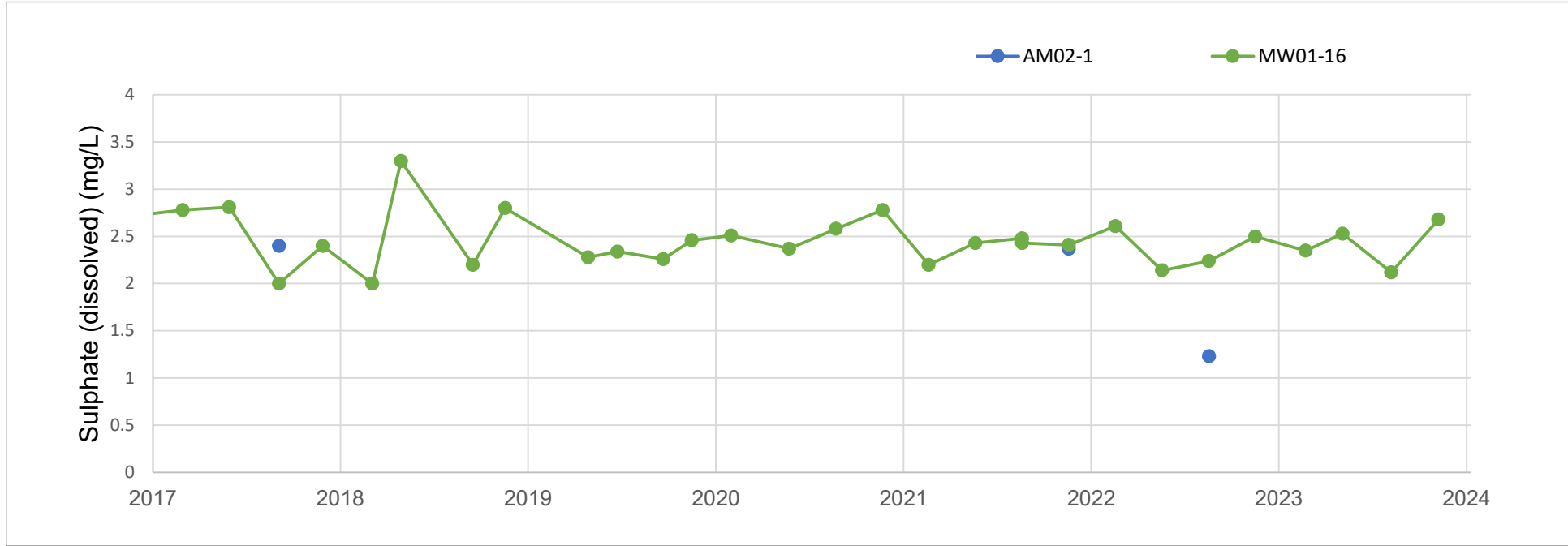
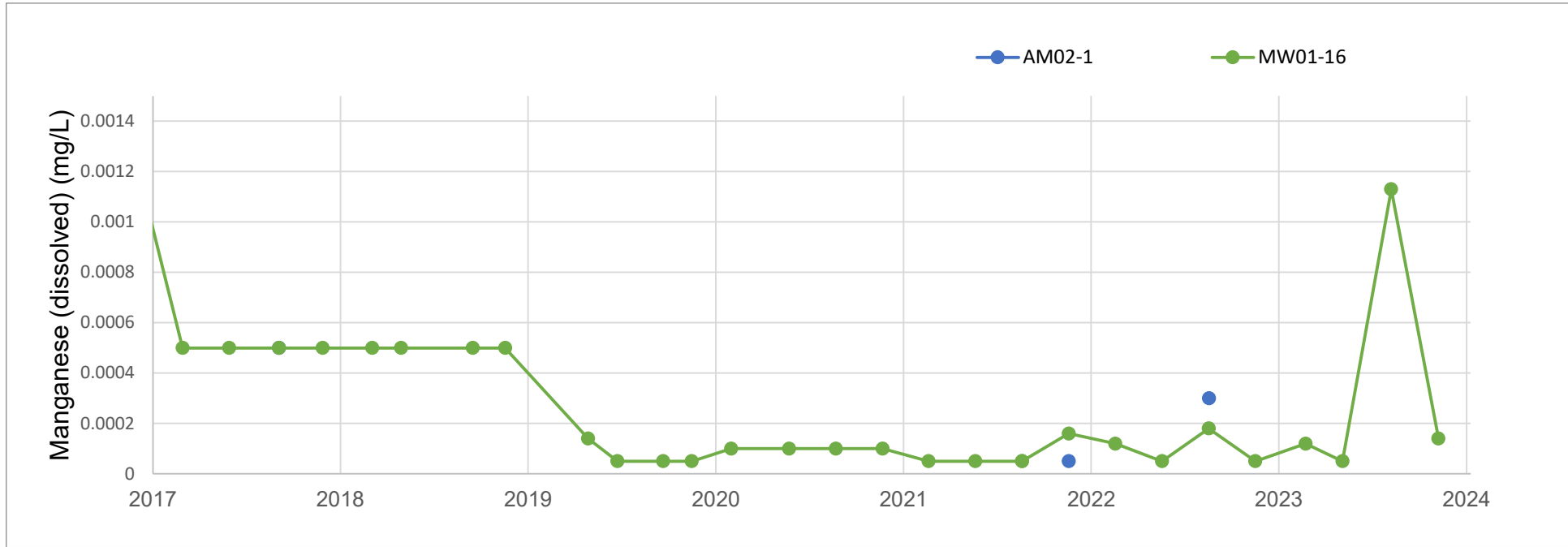
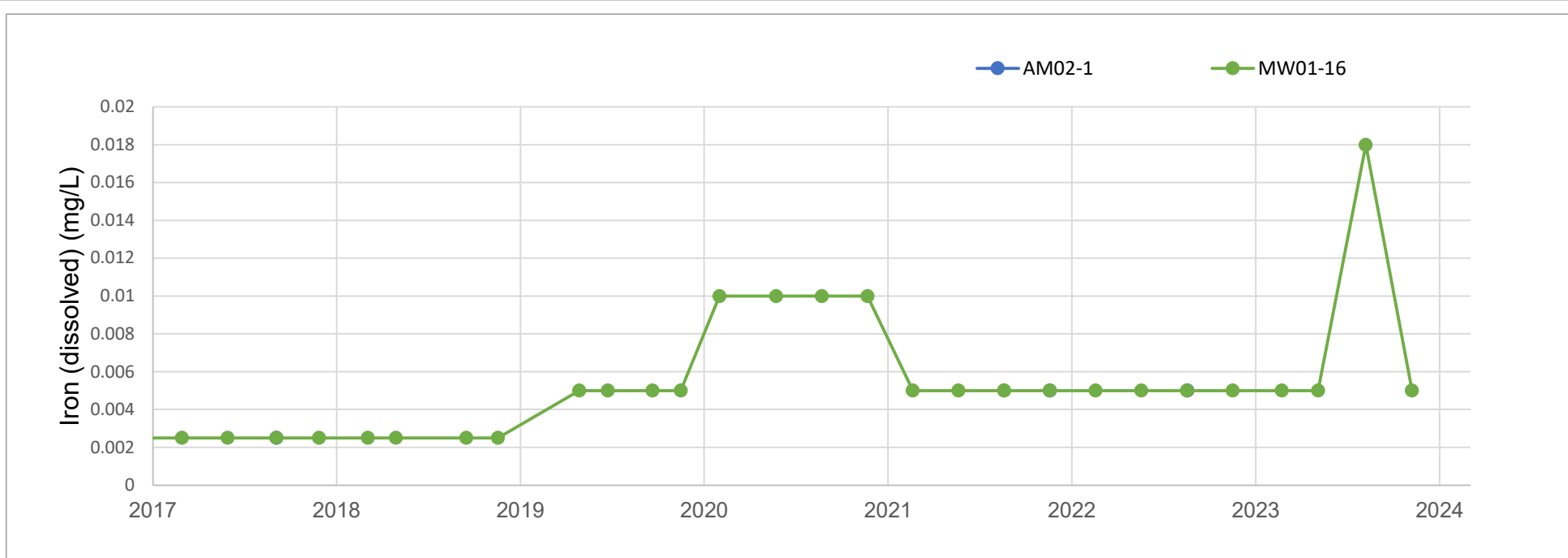
(1) CRA, 2015.

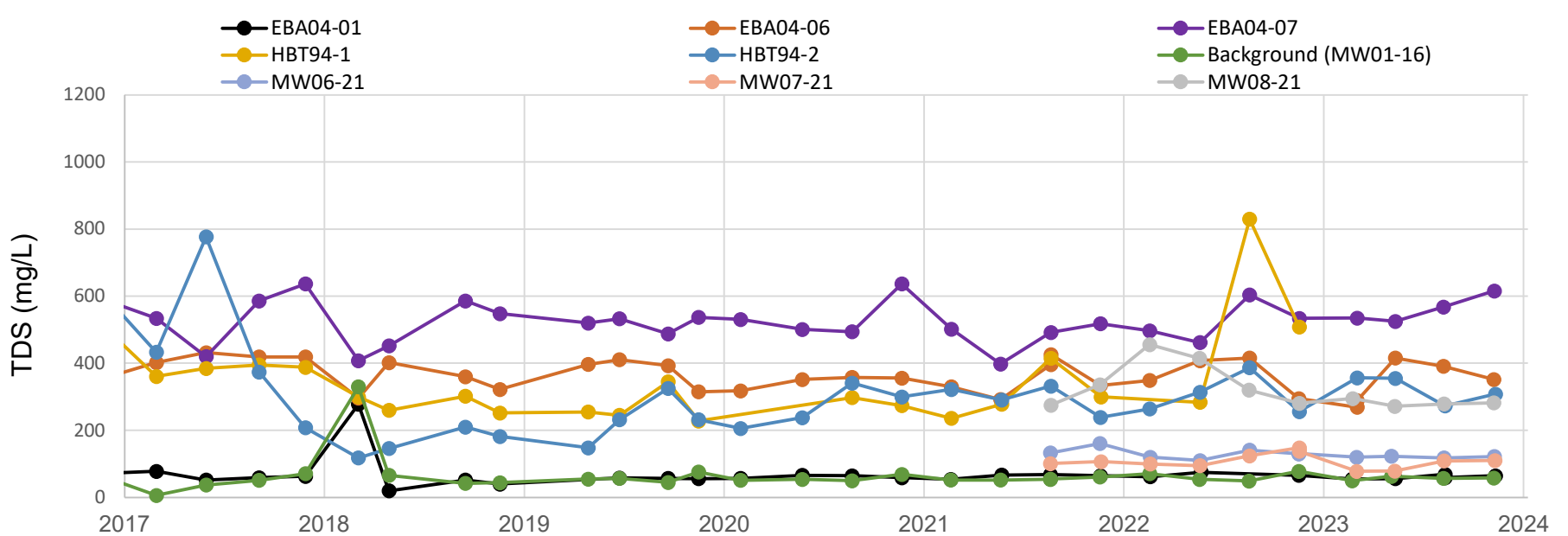
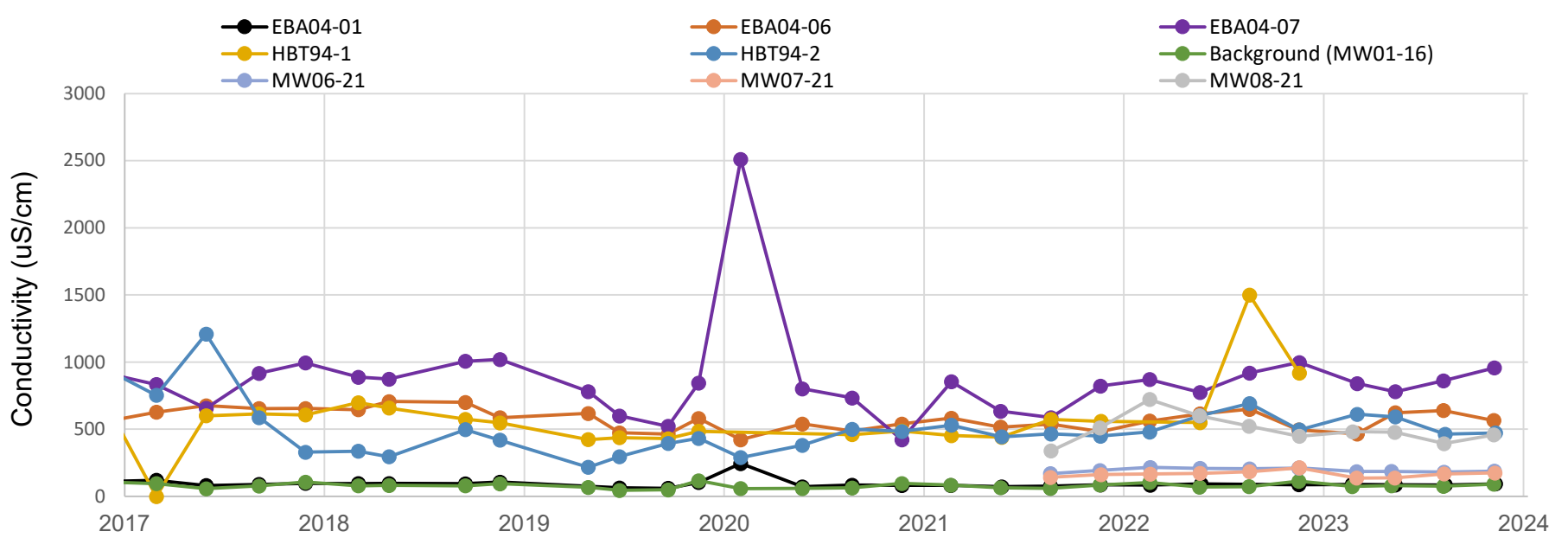
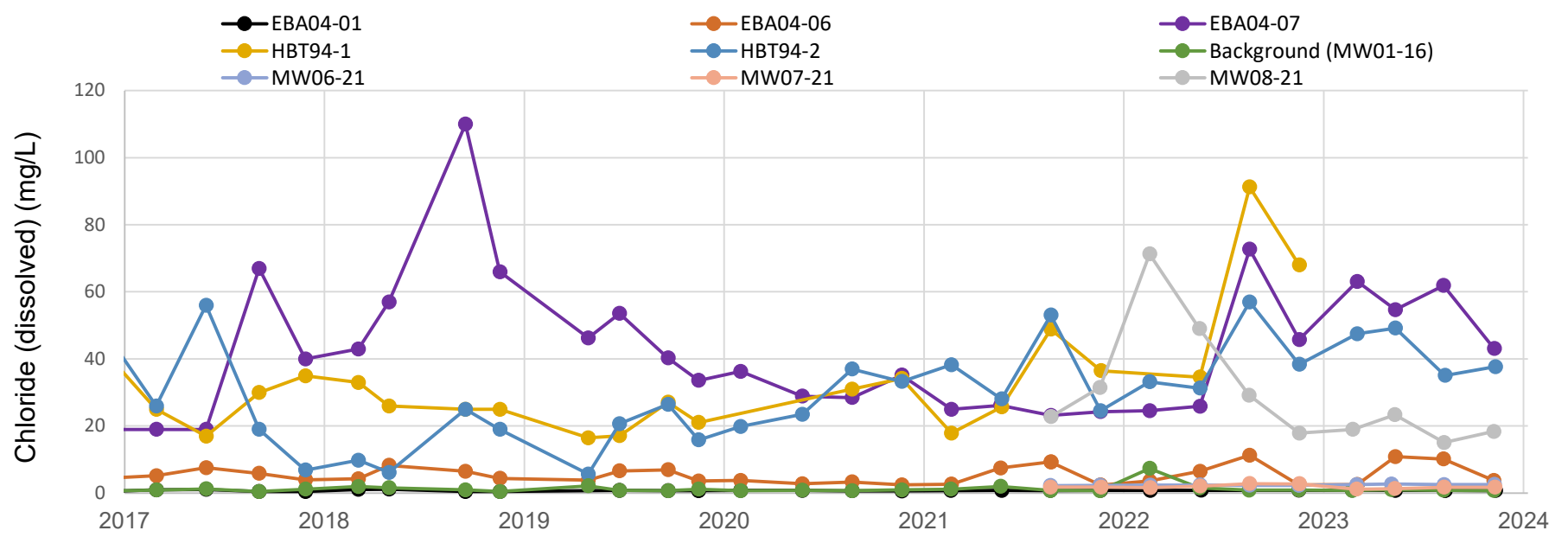
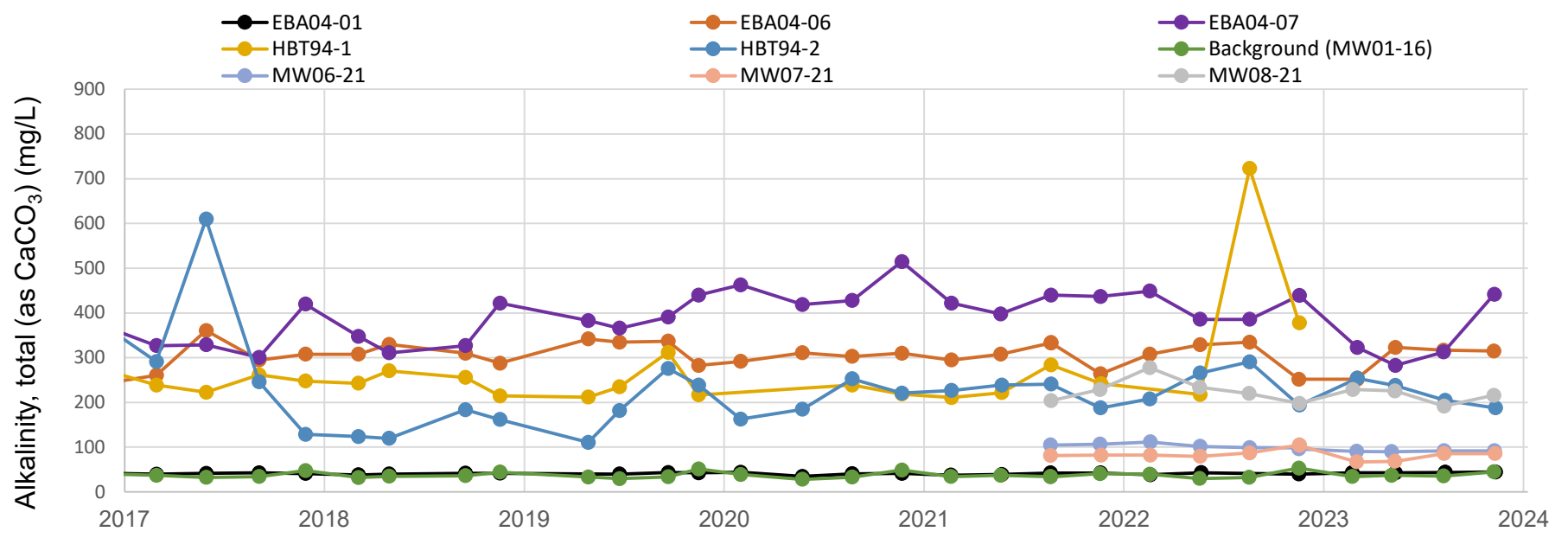
(2) Mulamootil, et. al, 1999.

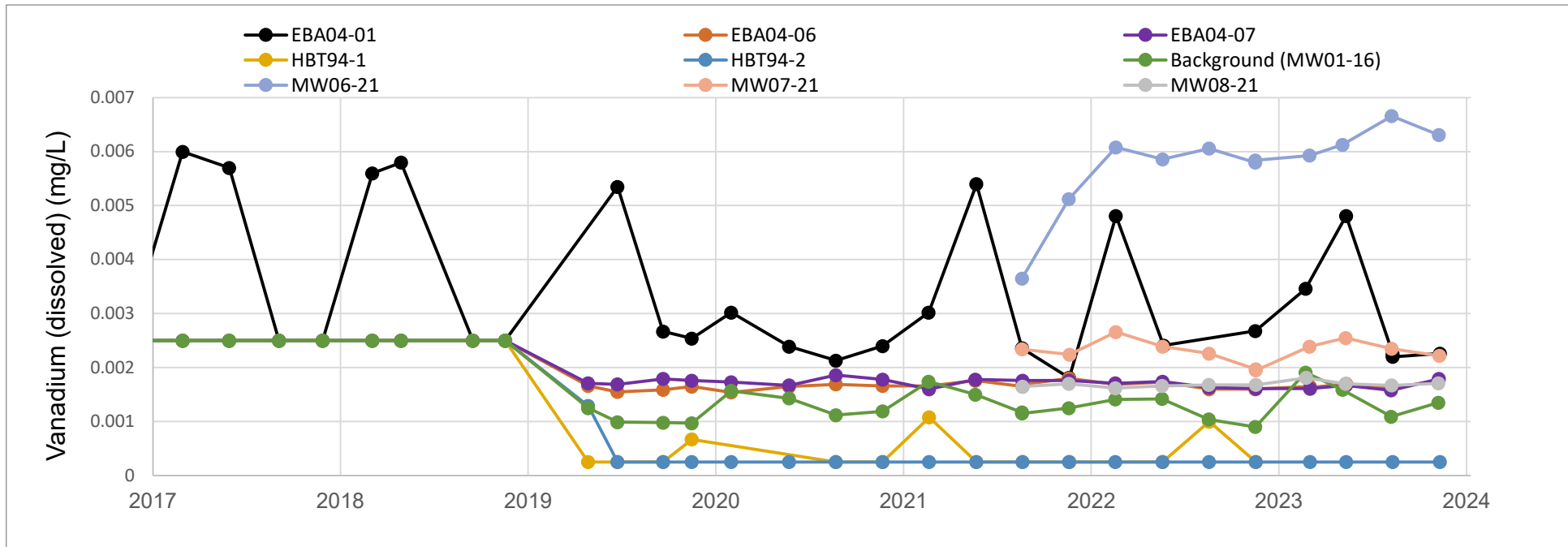
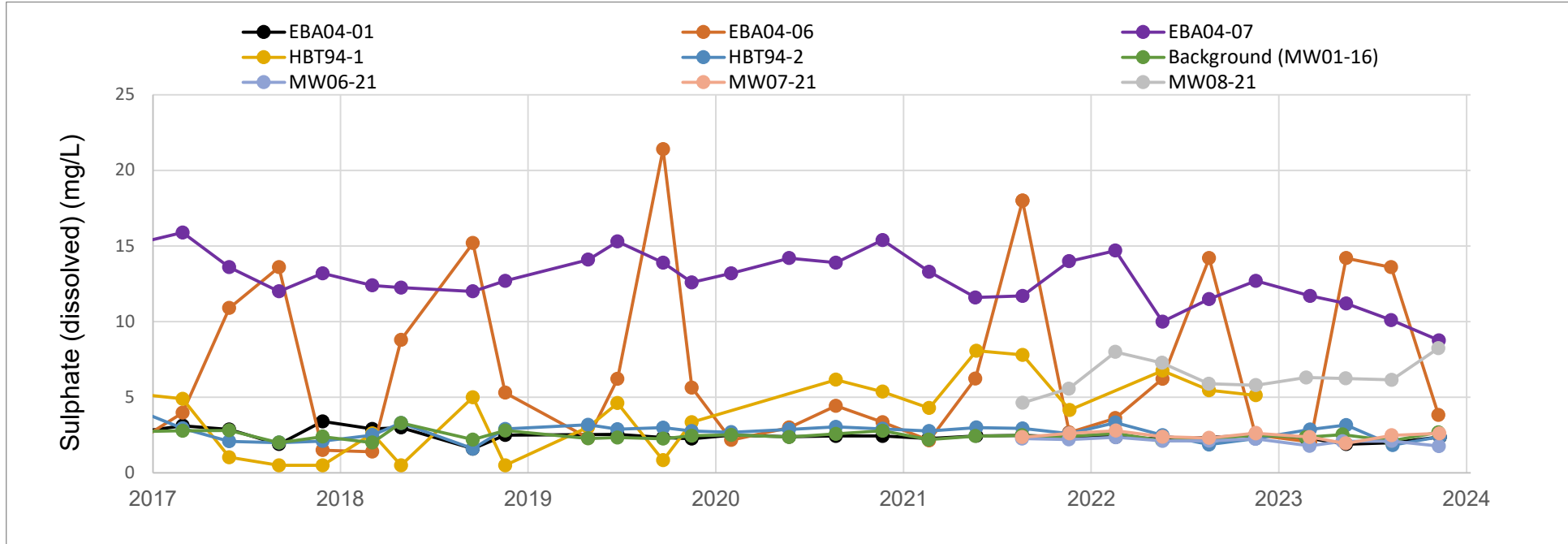
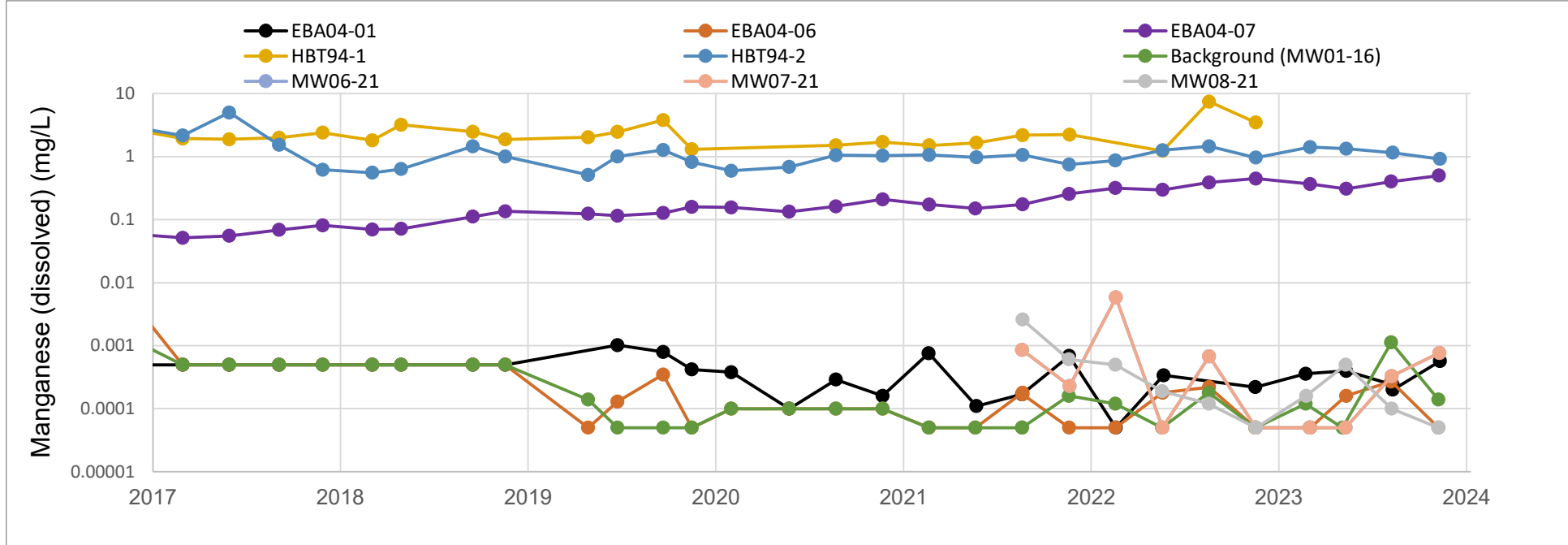
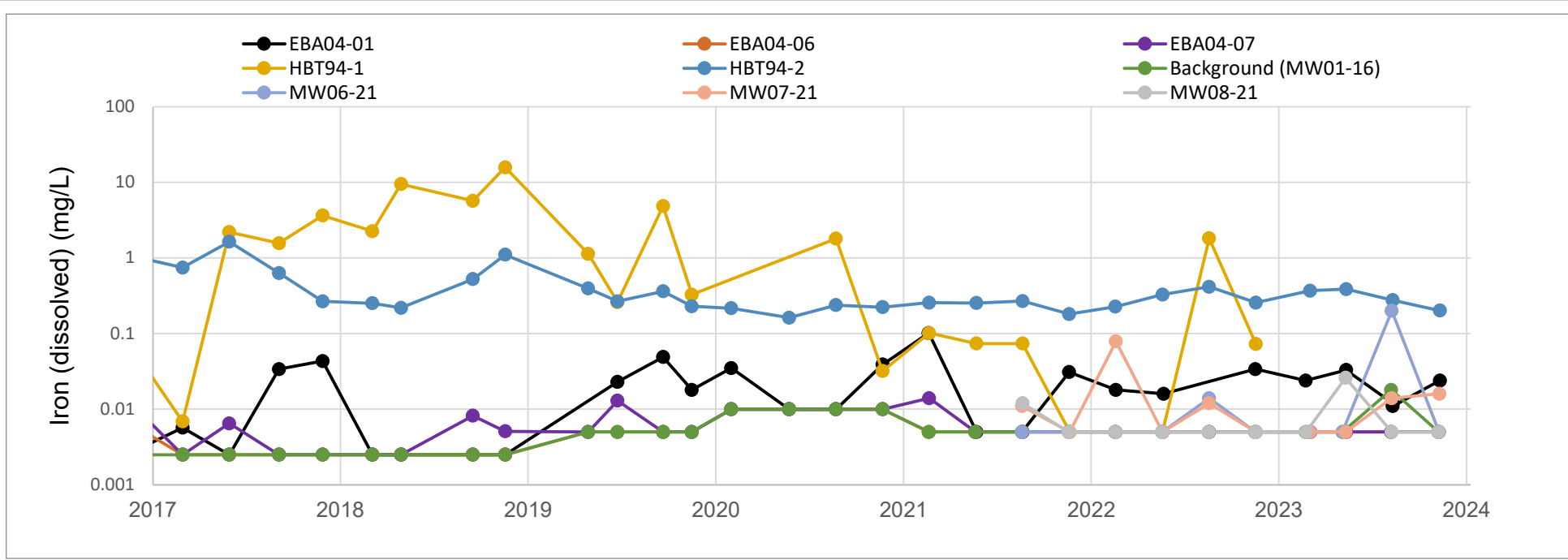
# **Appendix J**

**Concentration versus Time Plots**

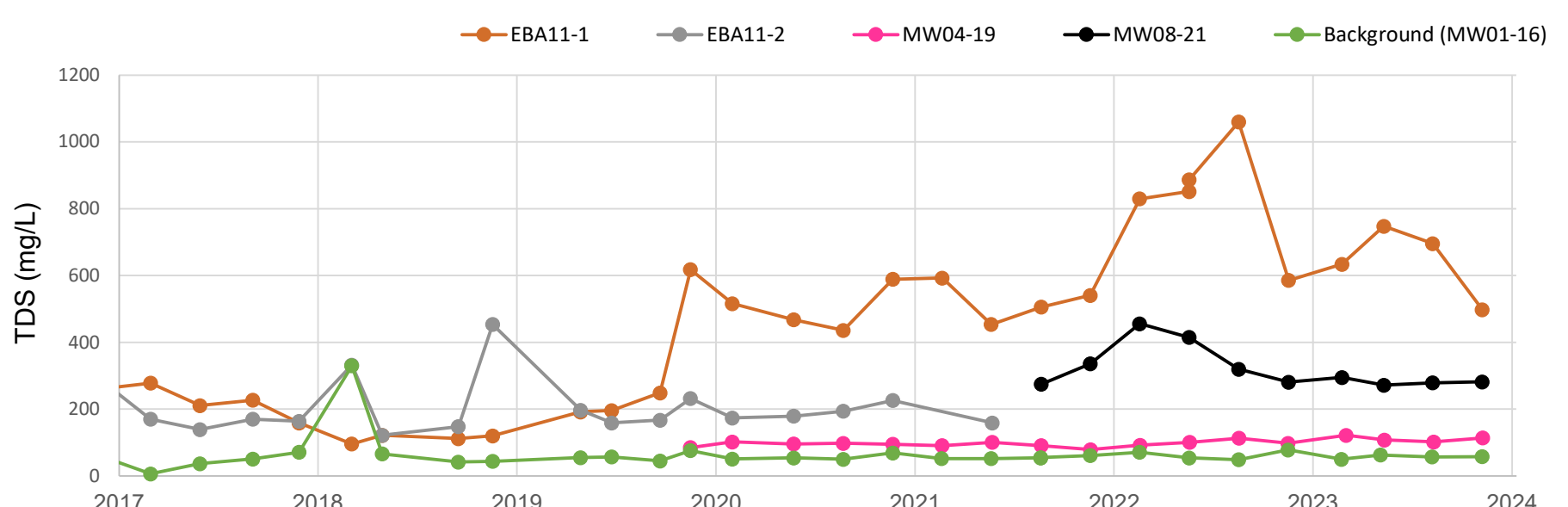
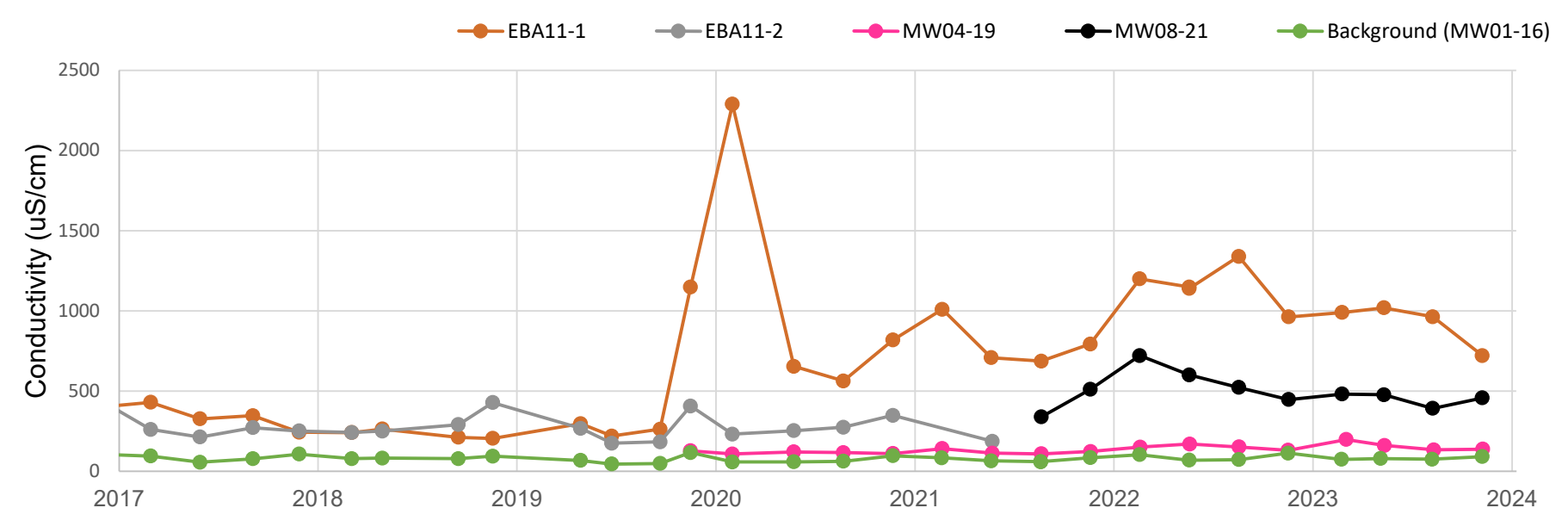
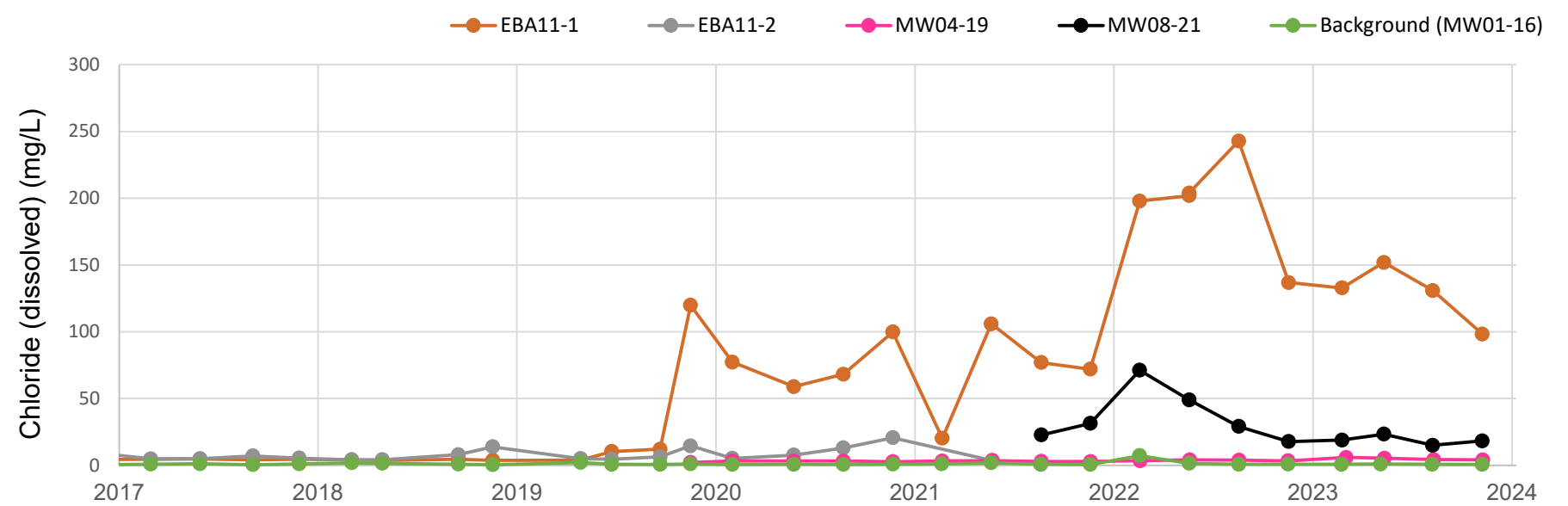
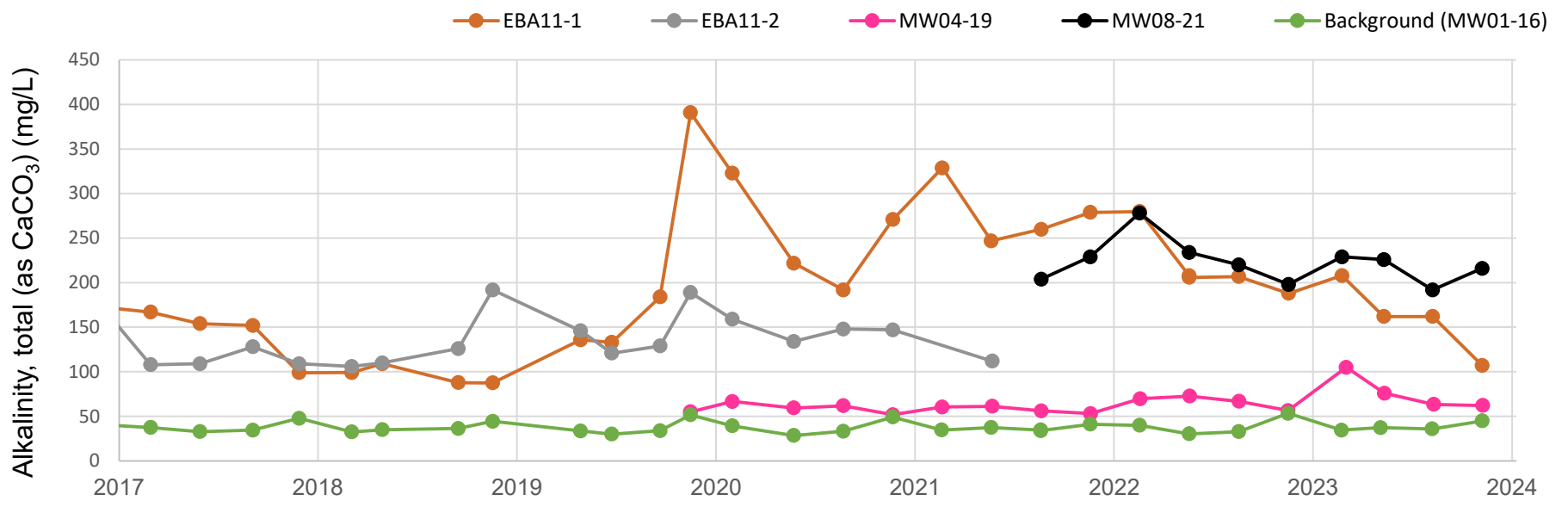


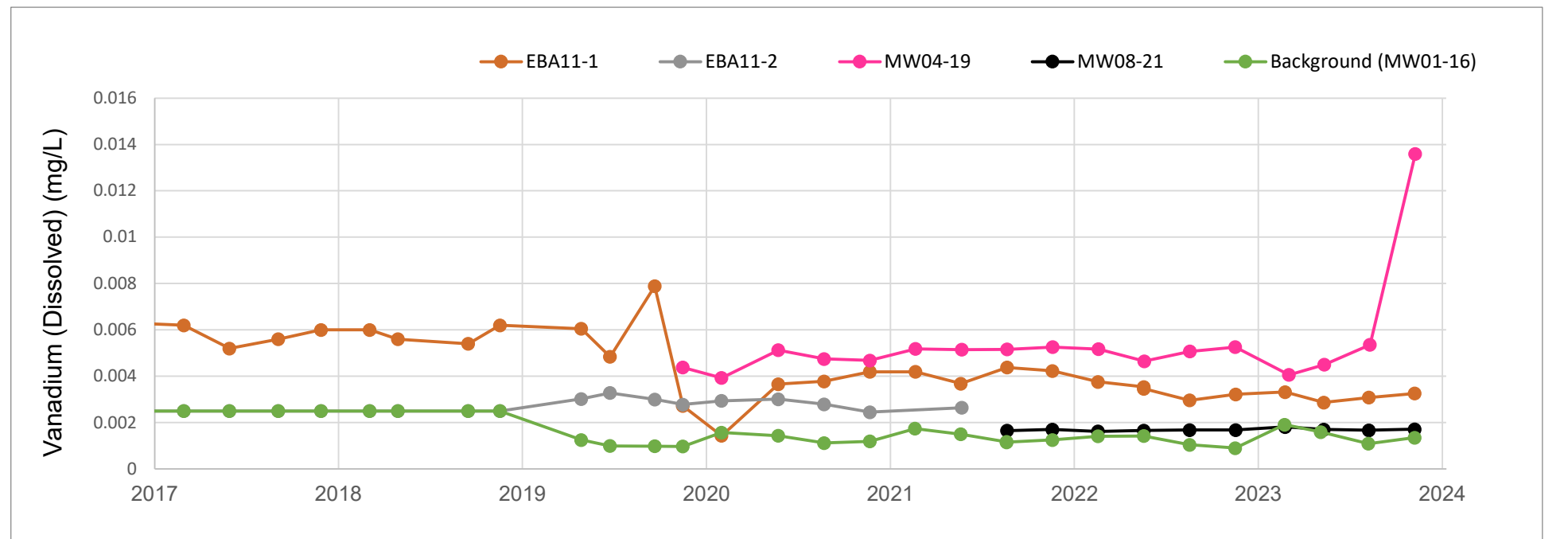
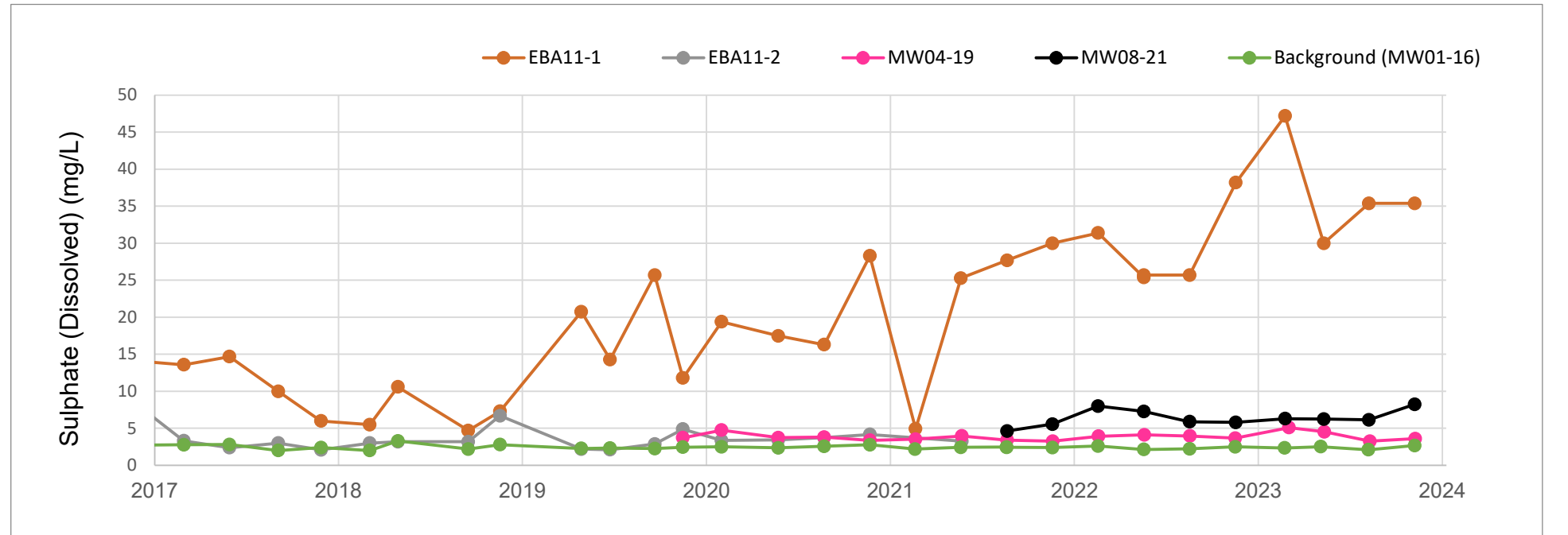
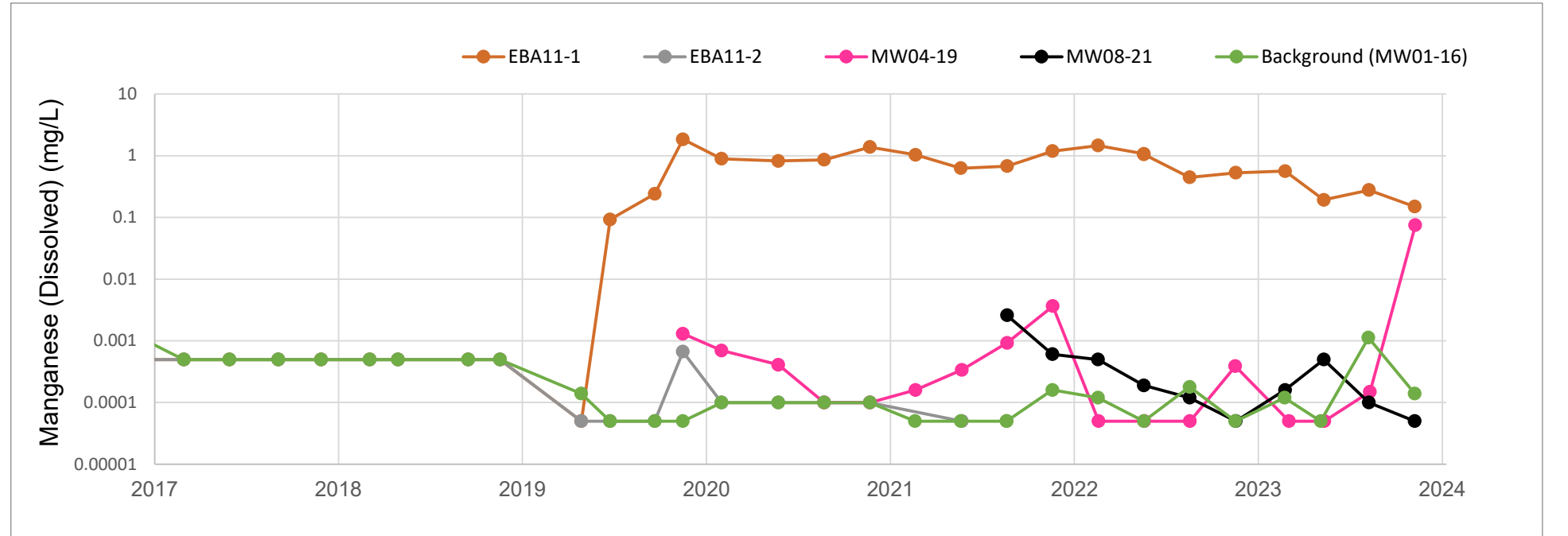
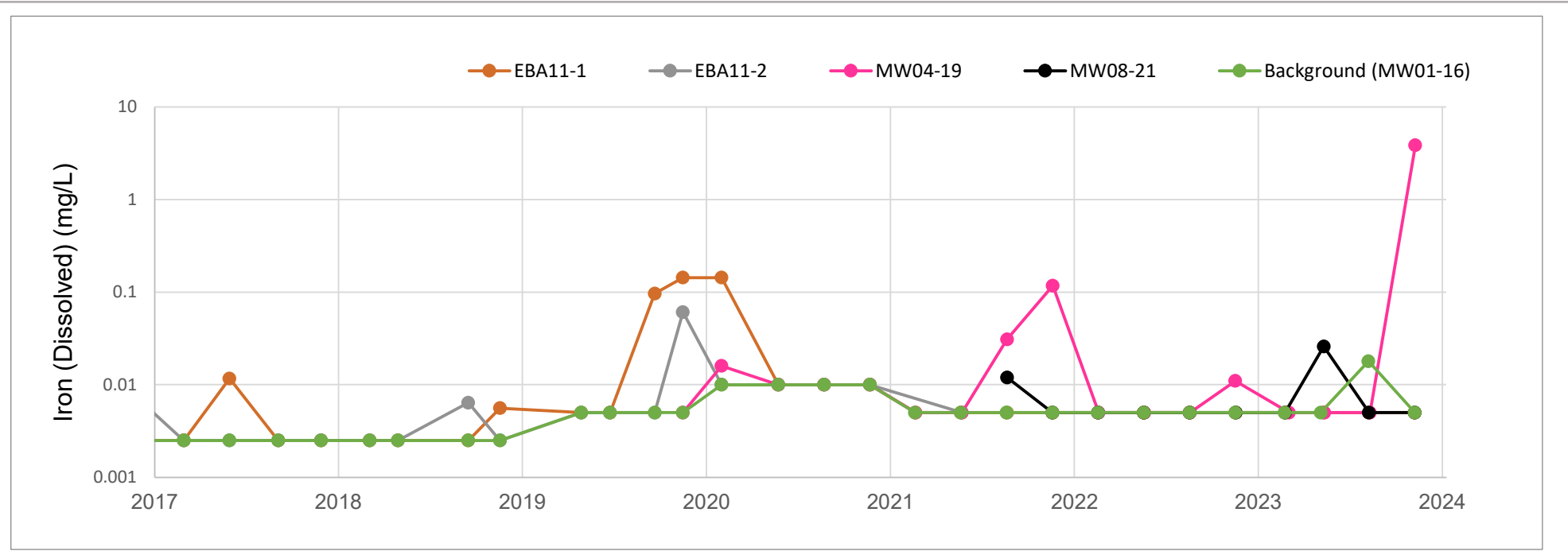


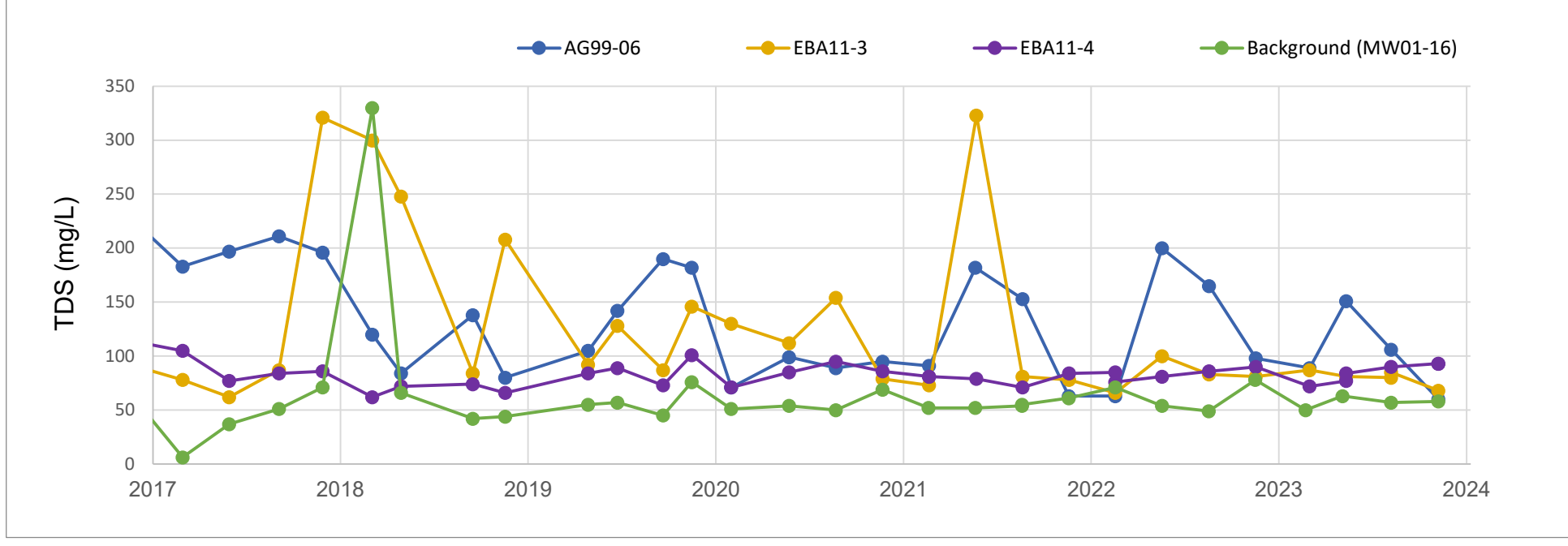
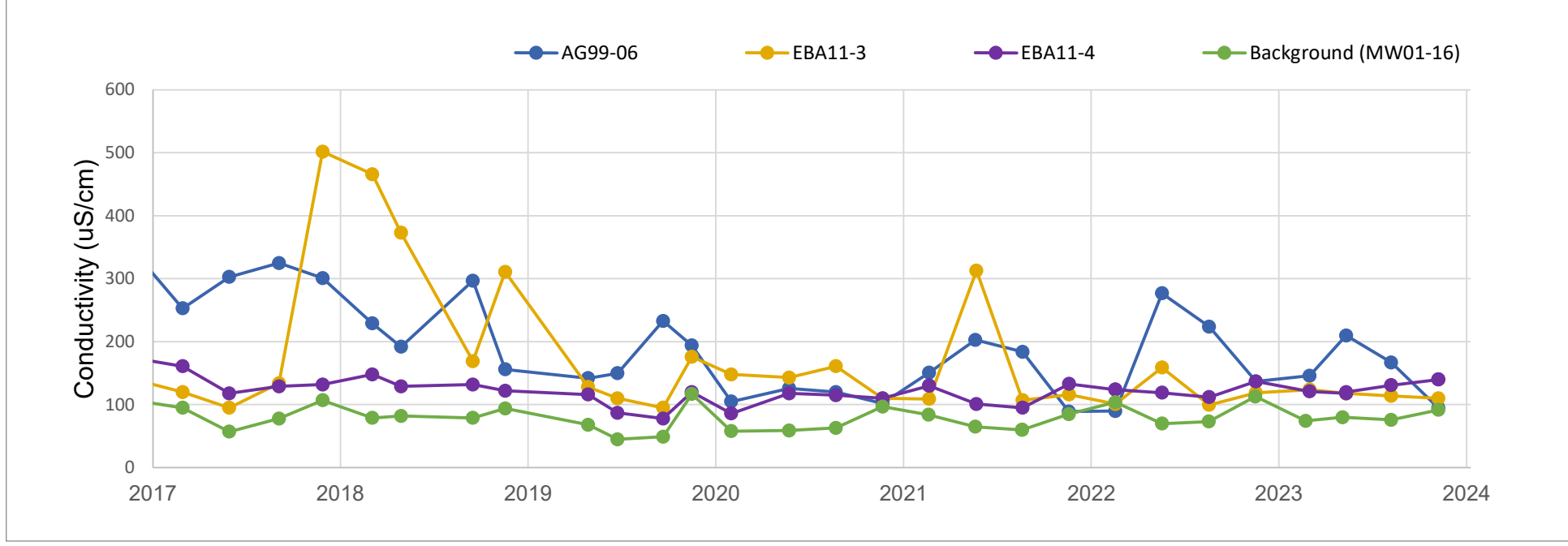
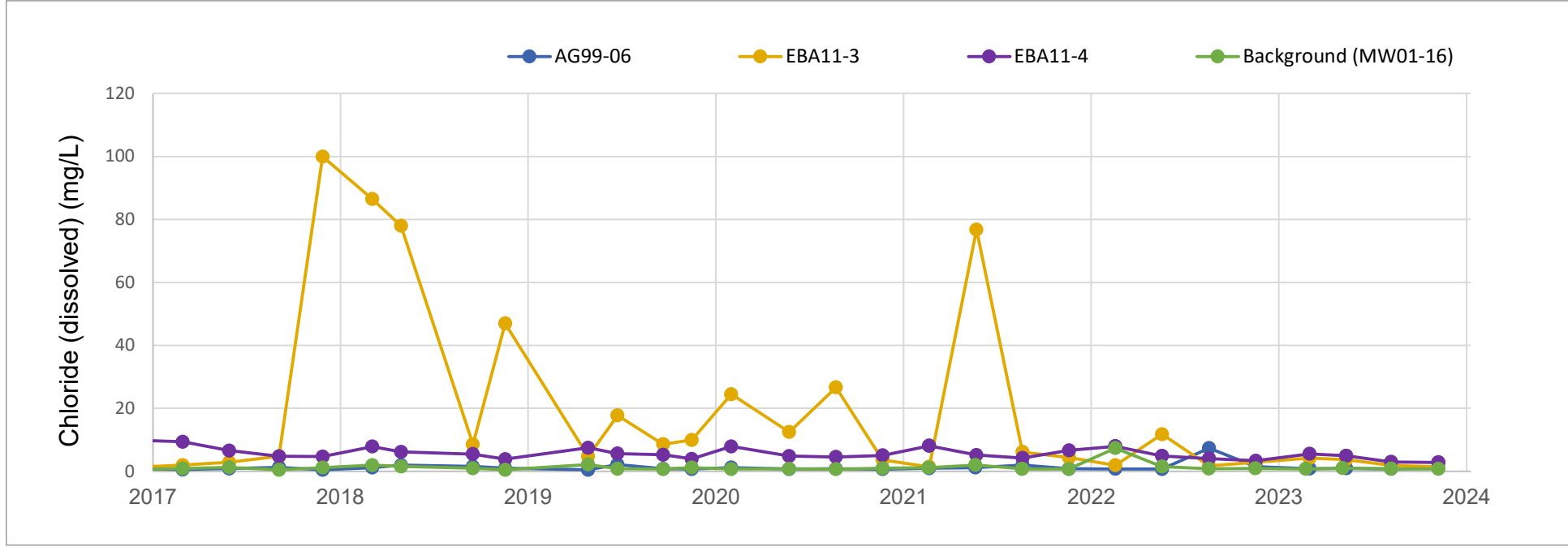
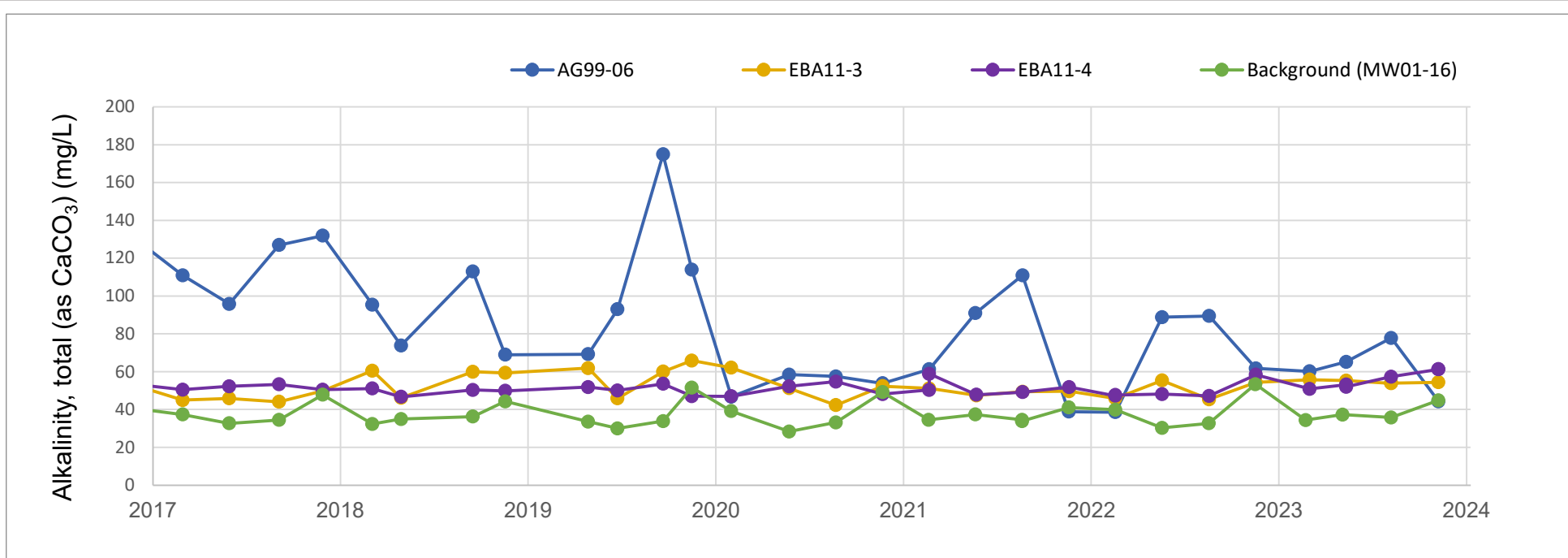


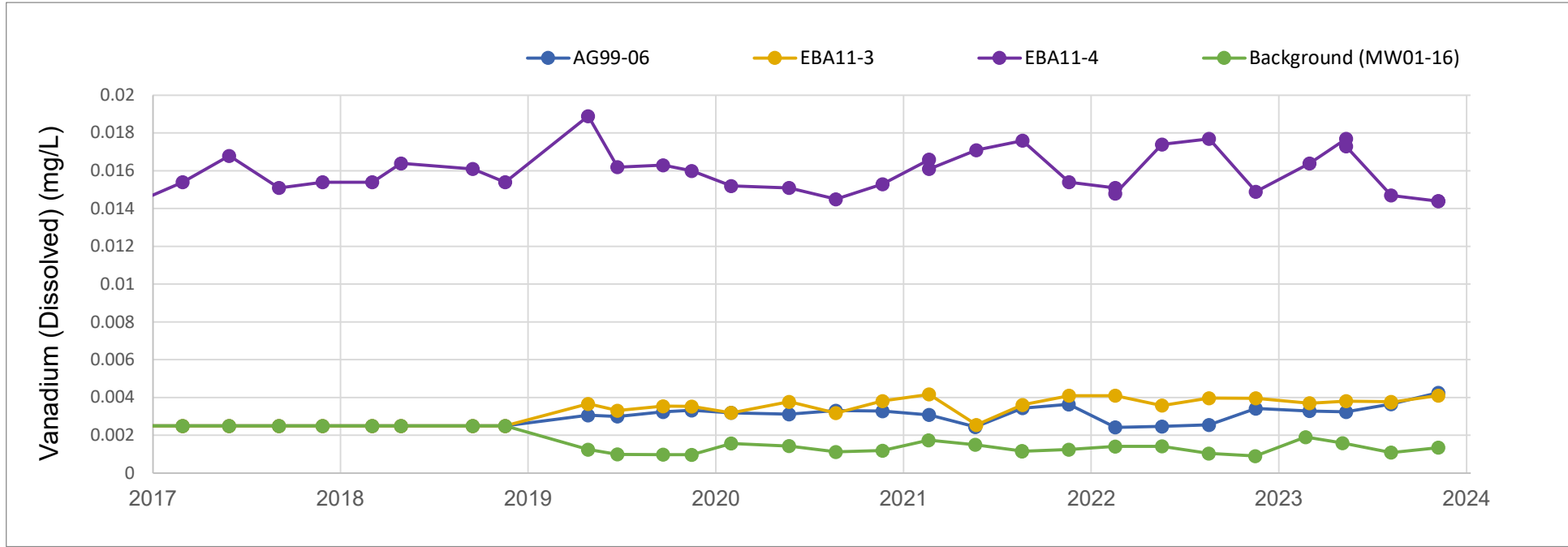
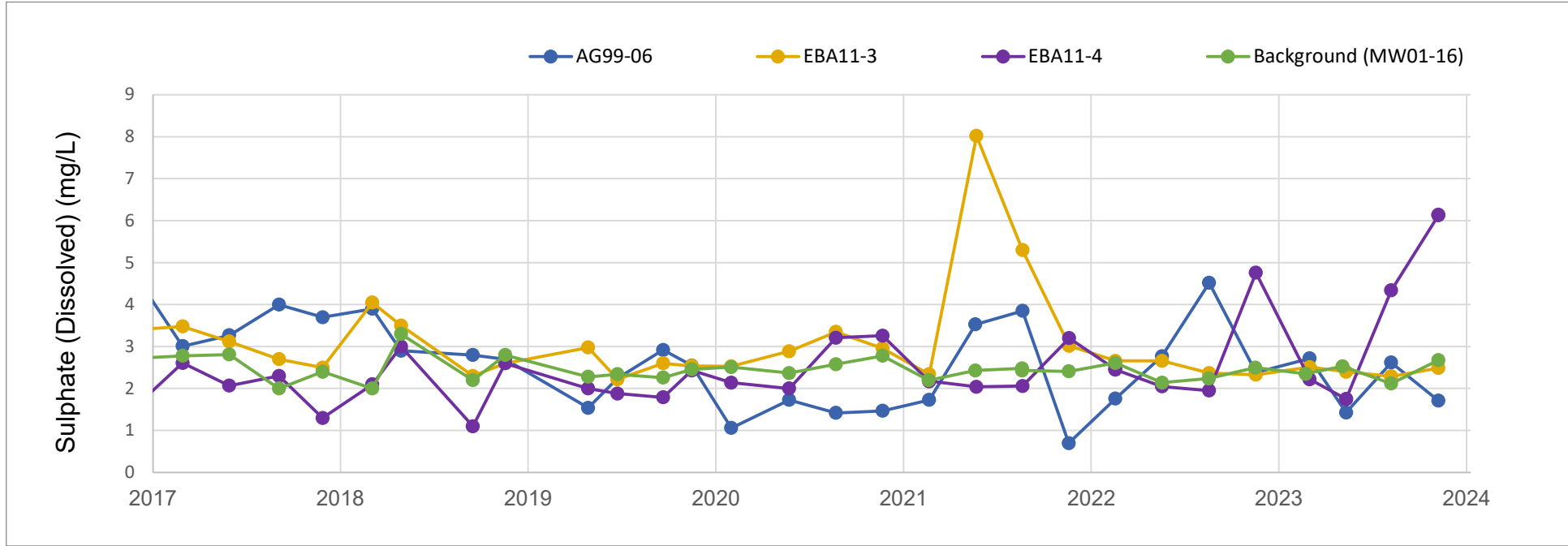
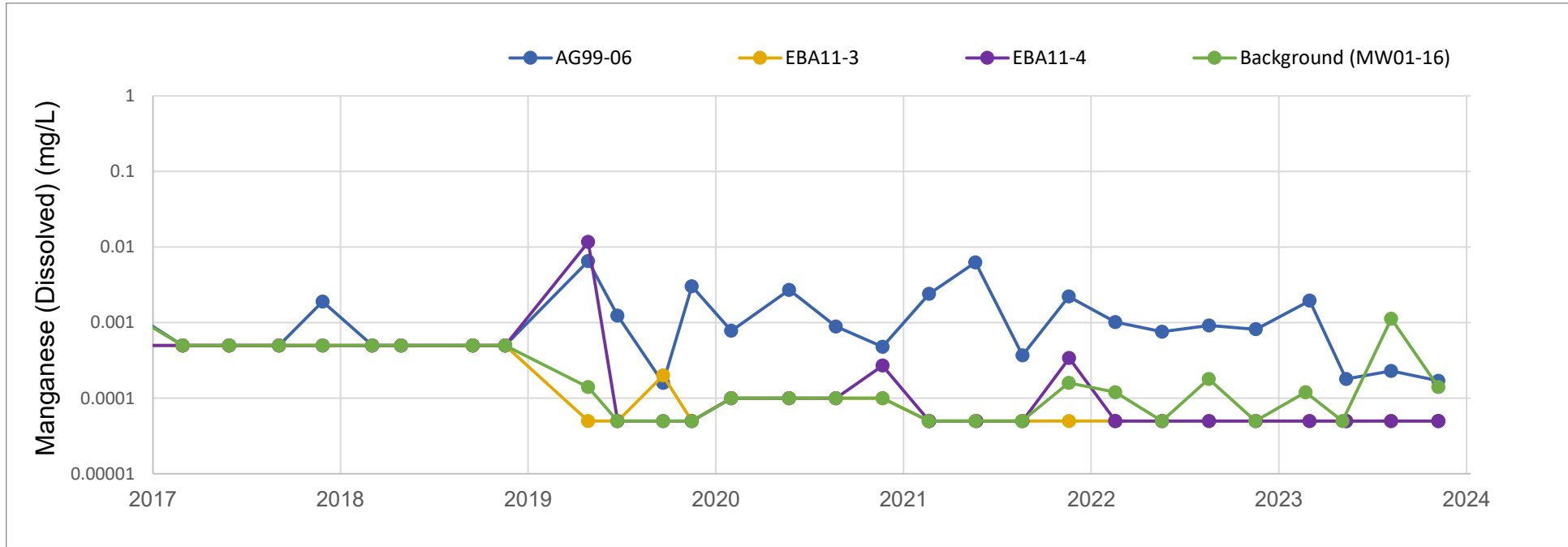
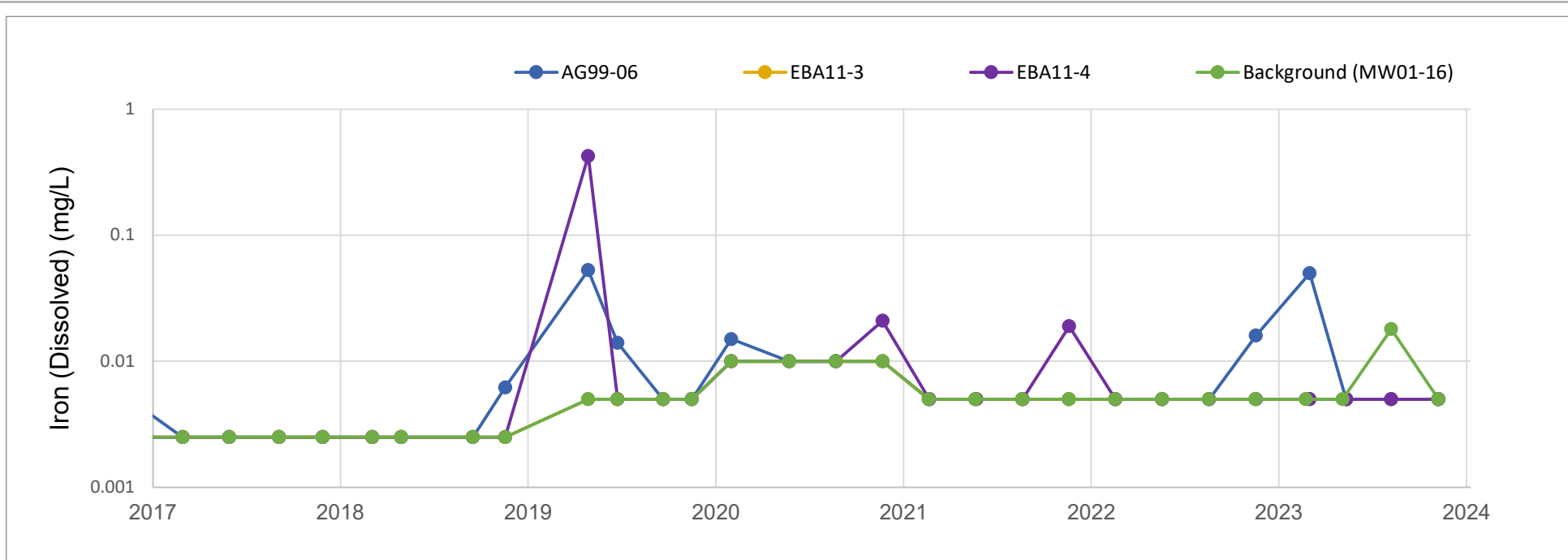


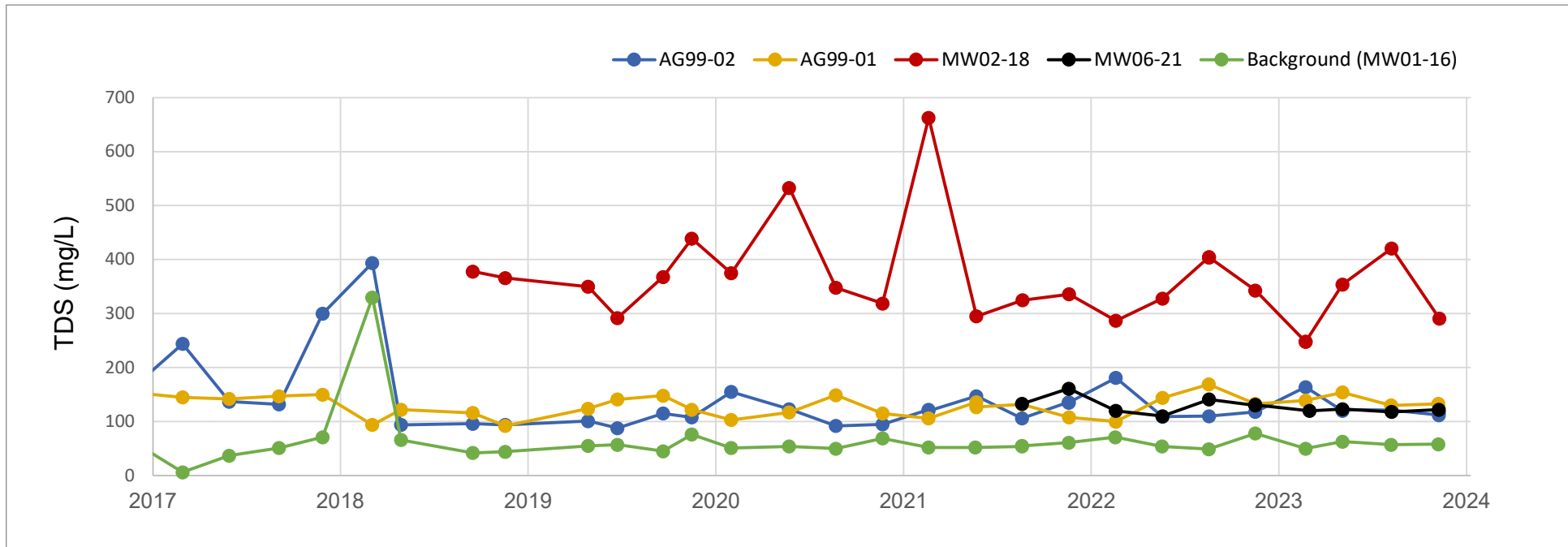
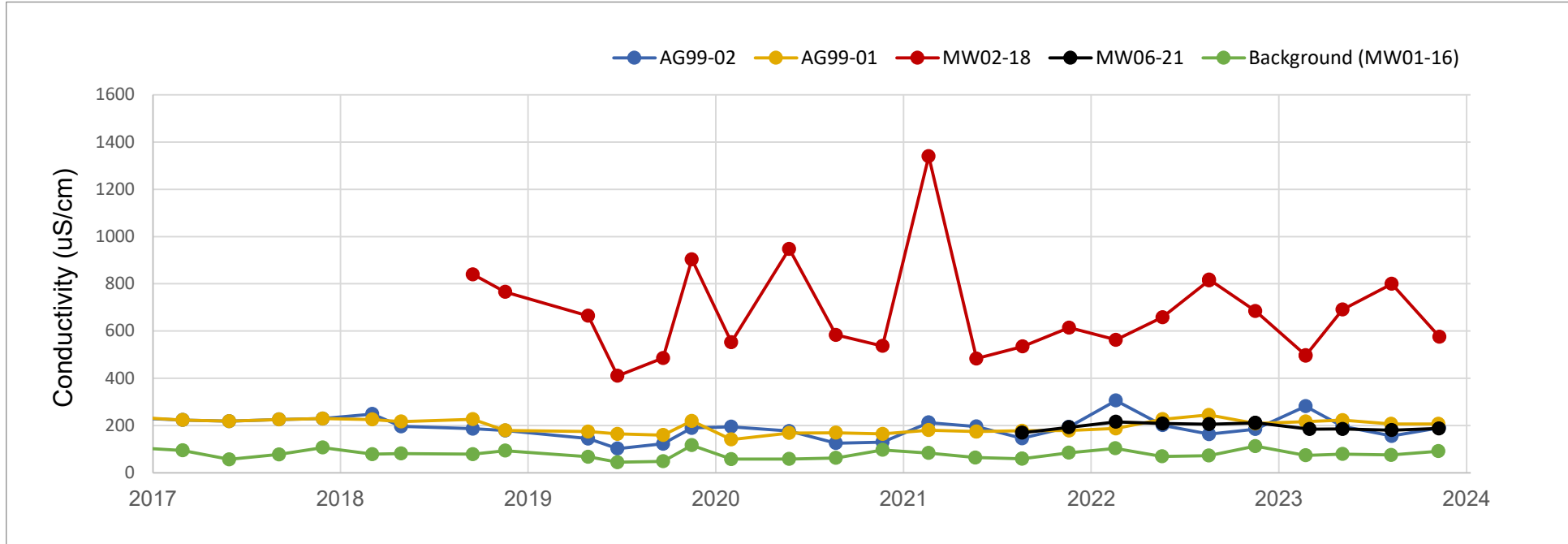
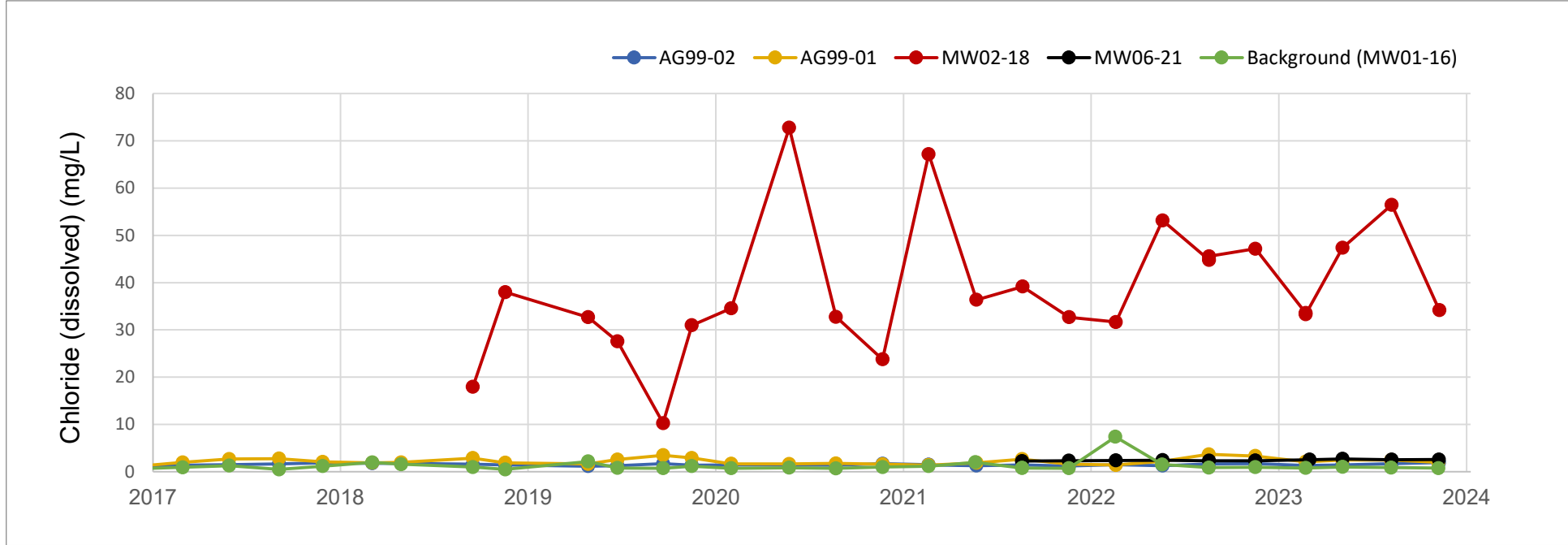
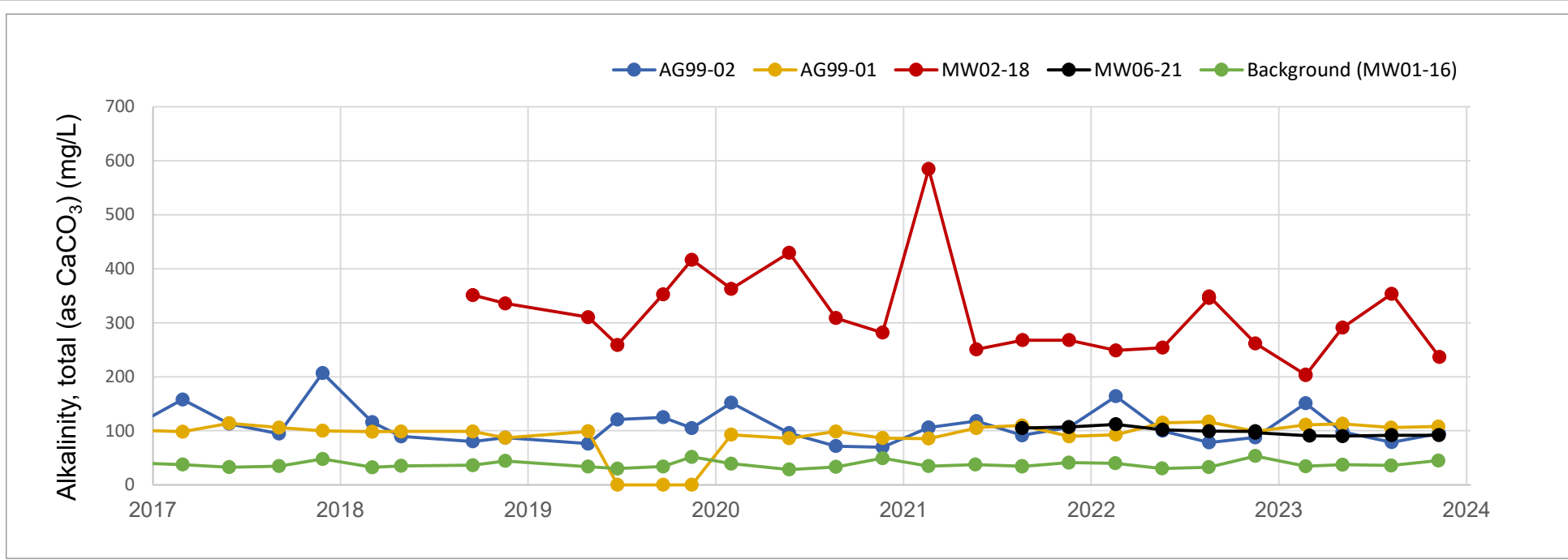


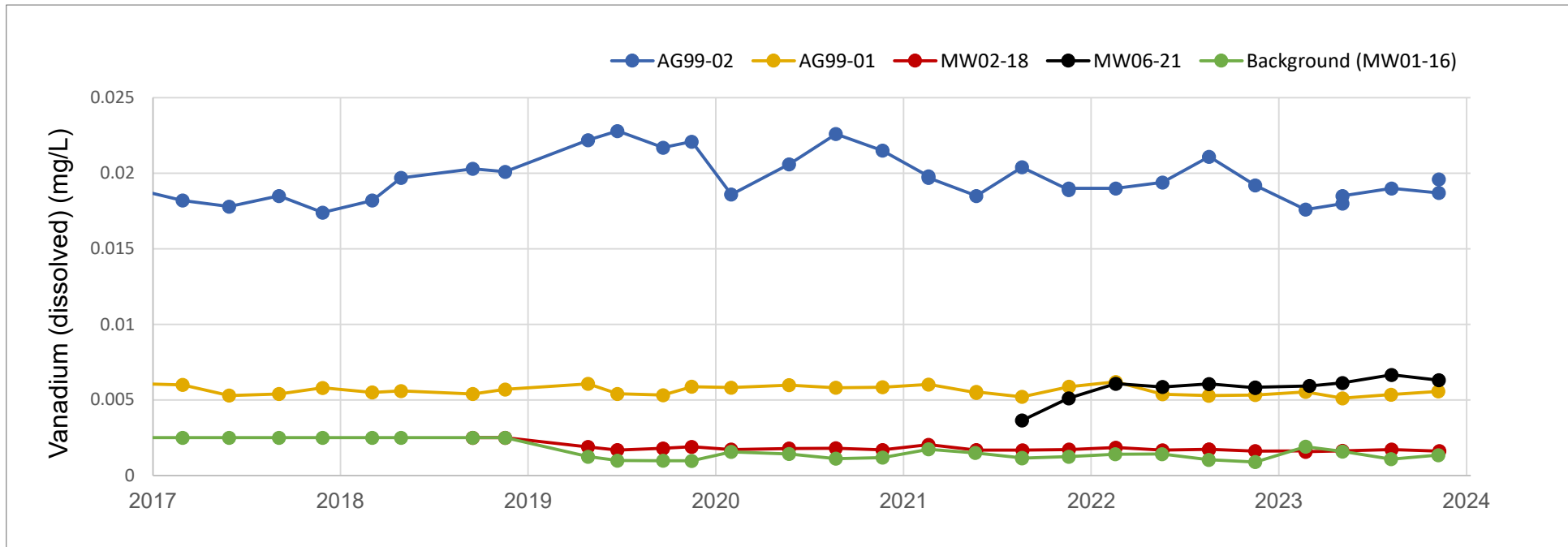
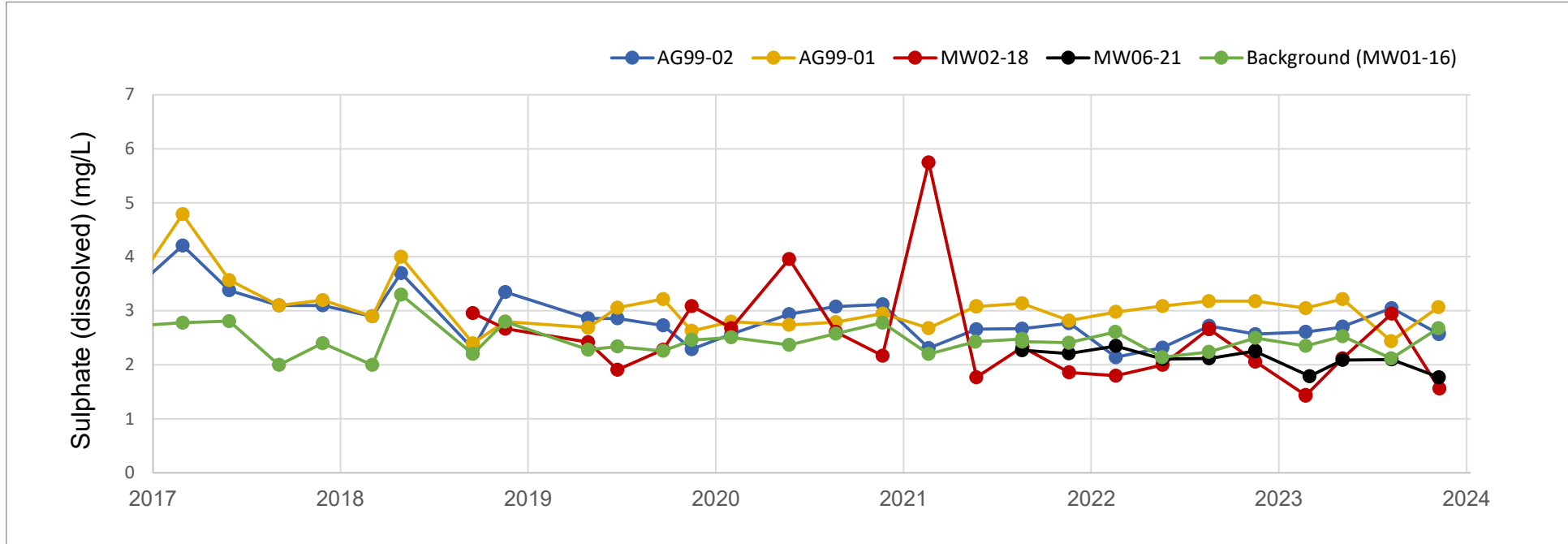
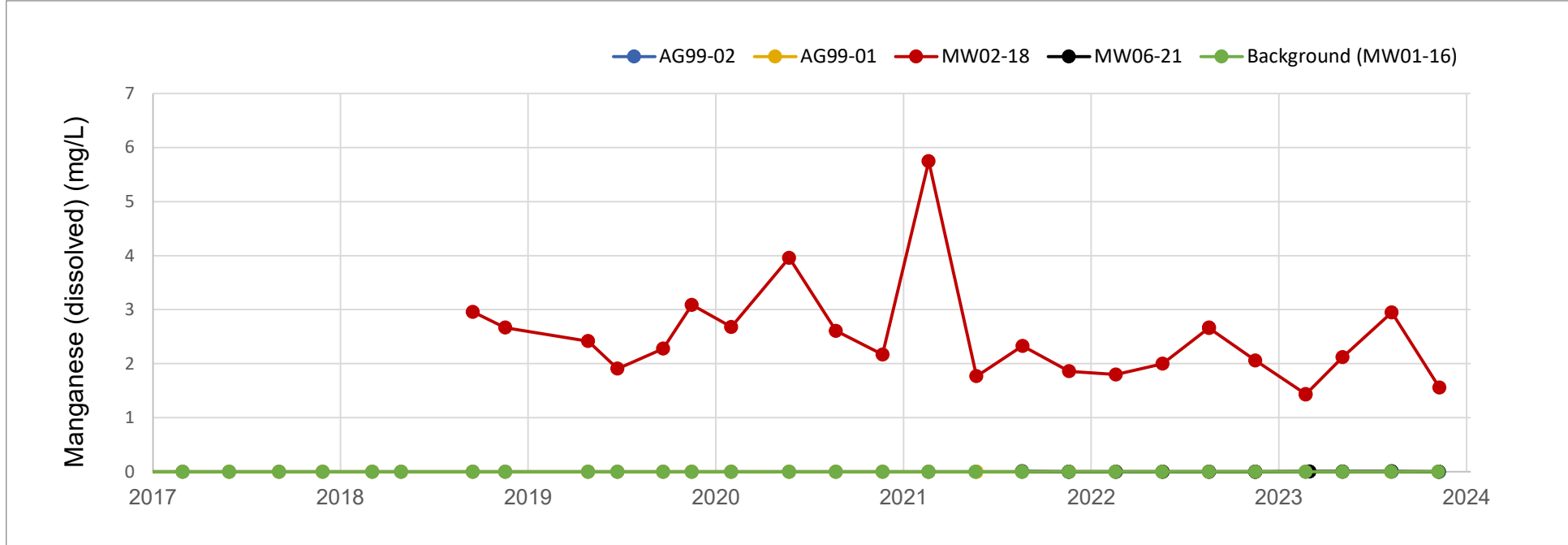
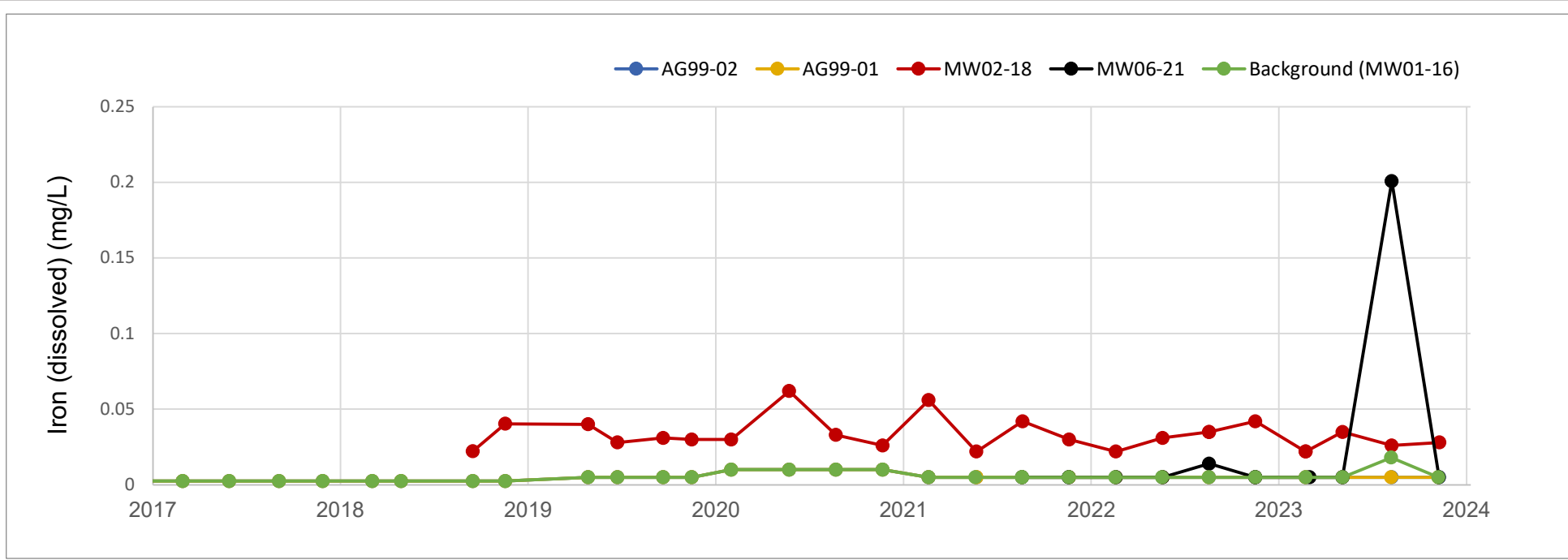


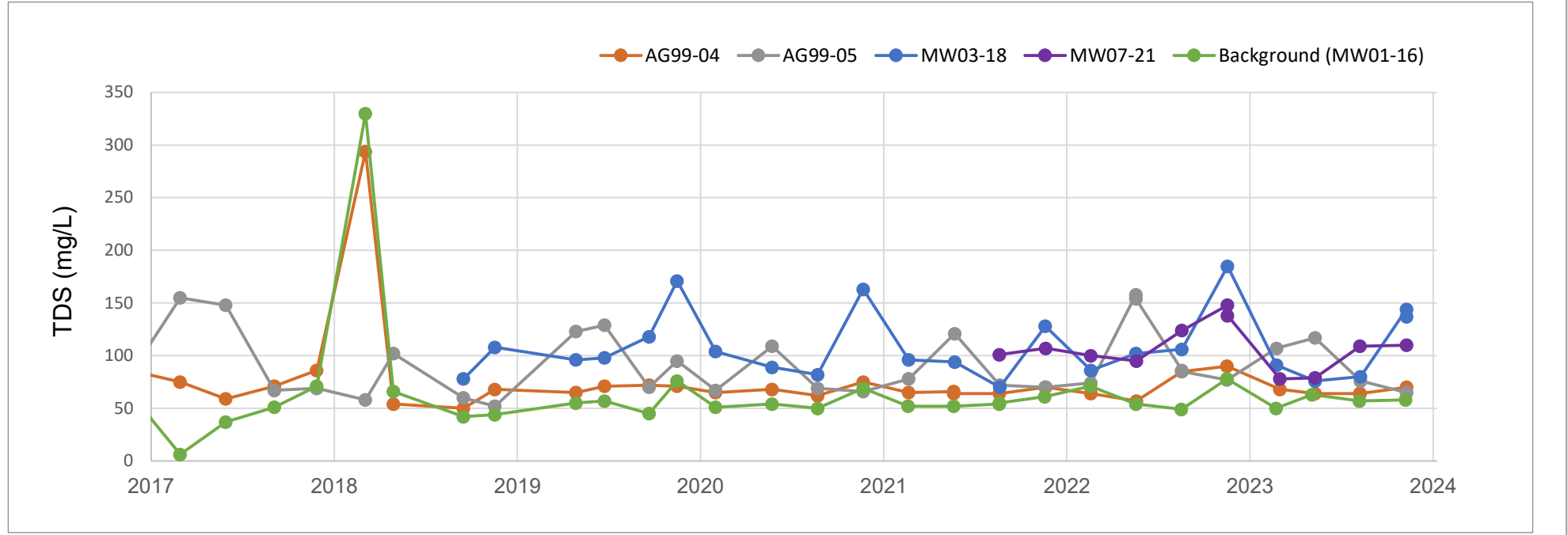
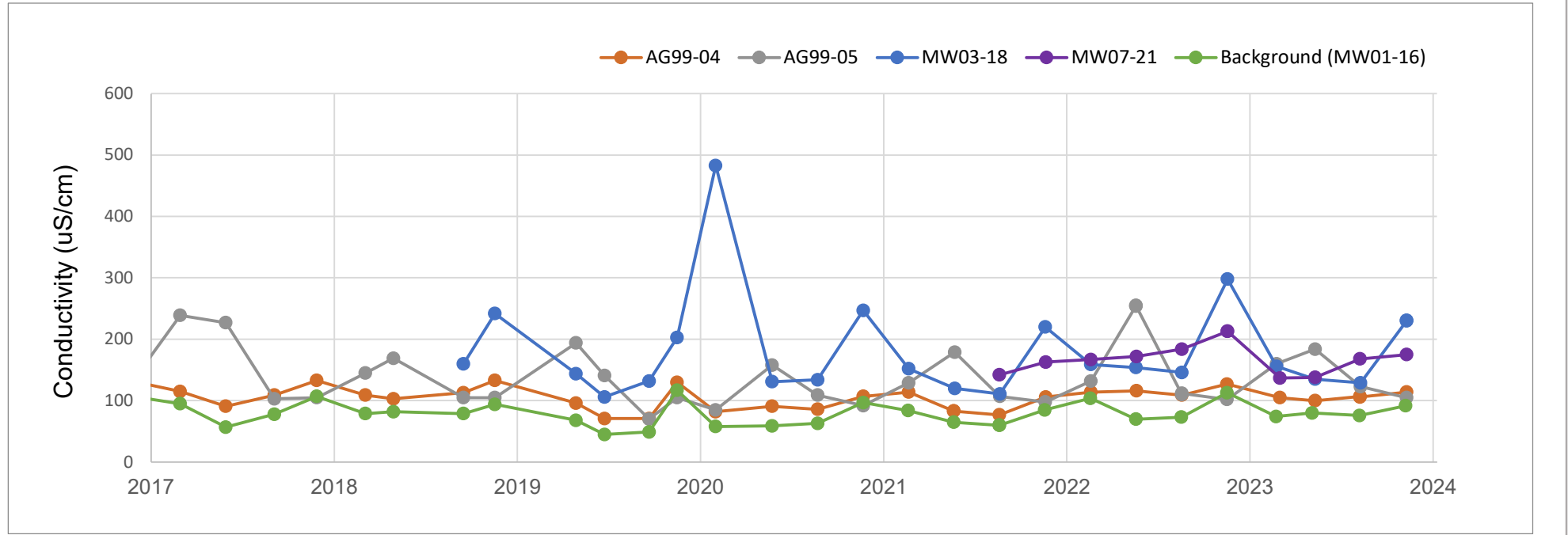
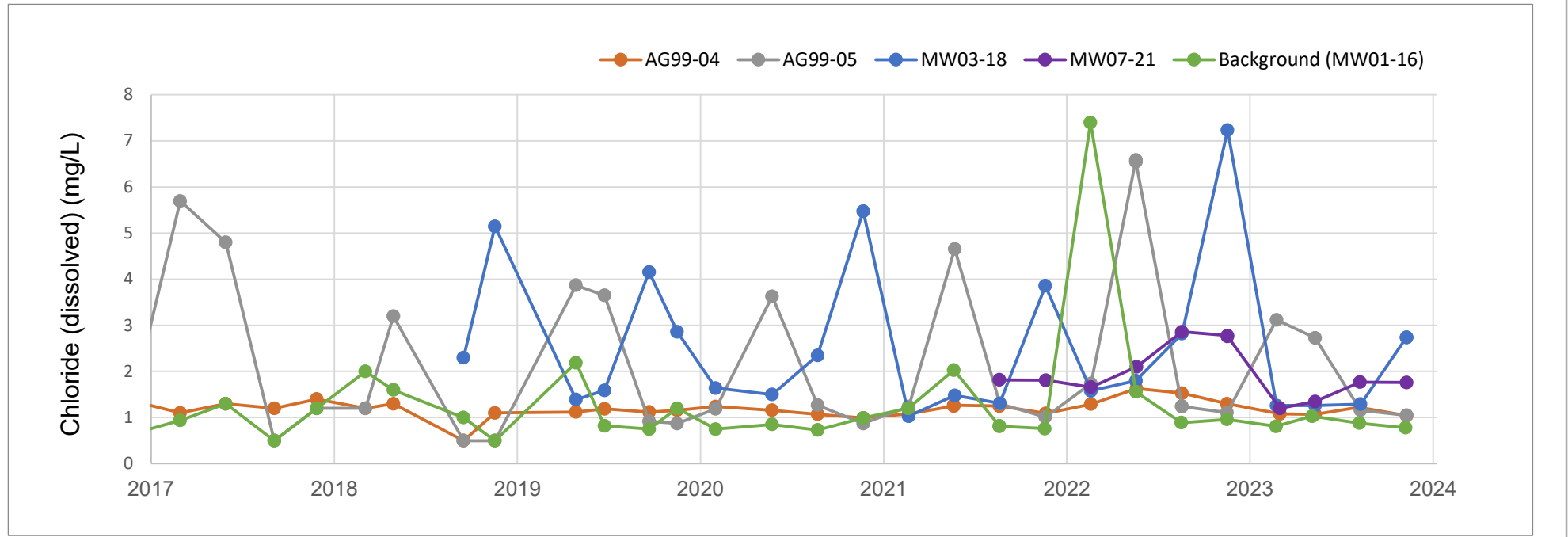
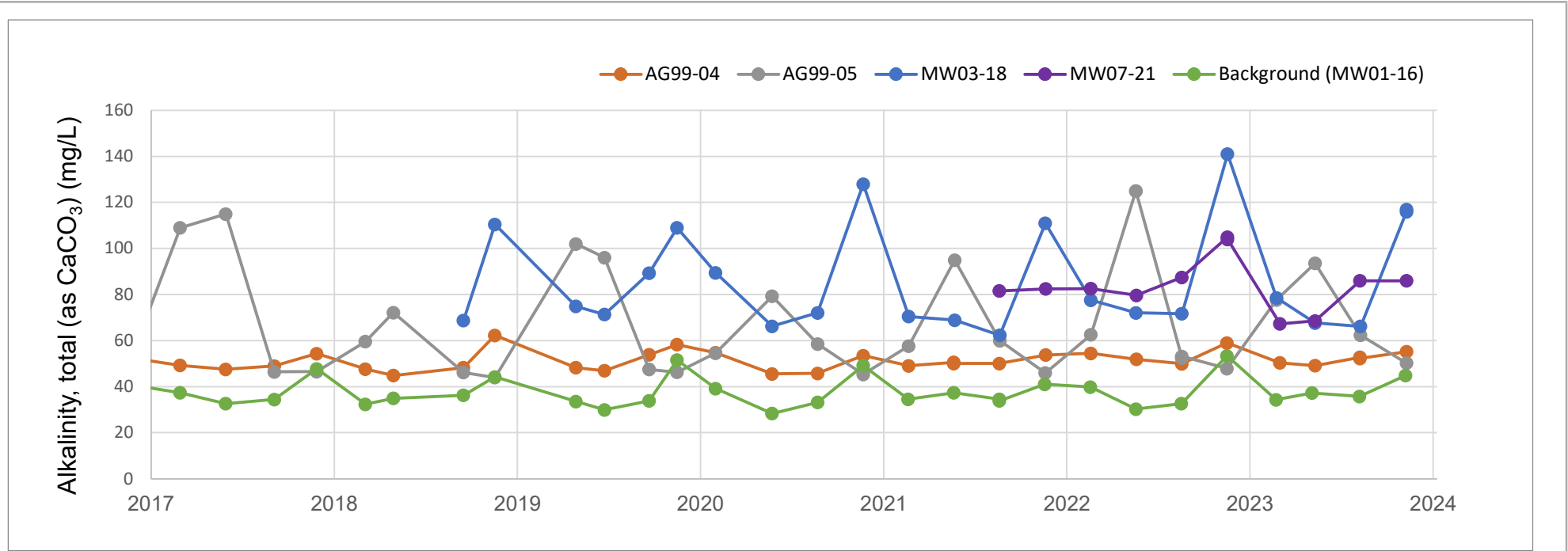


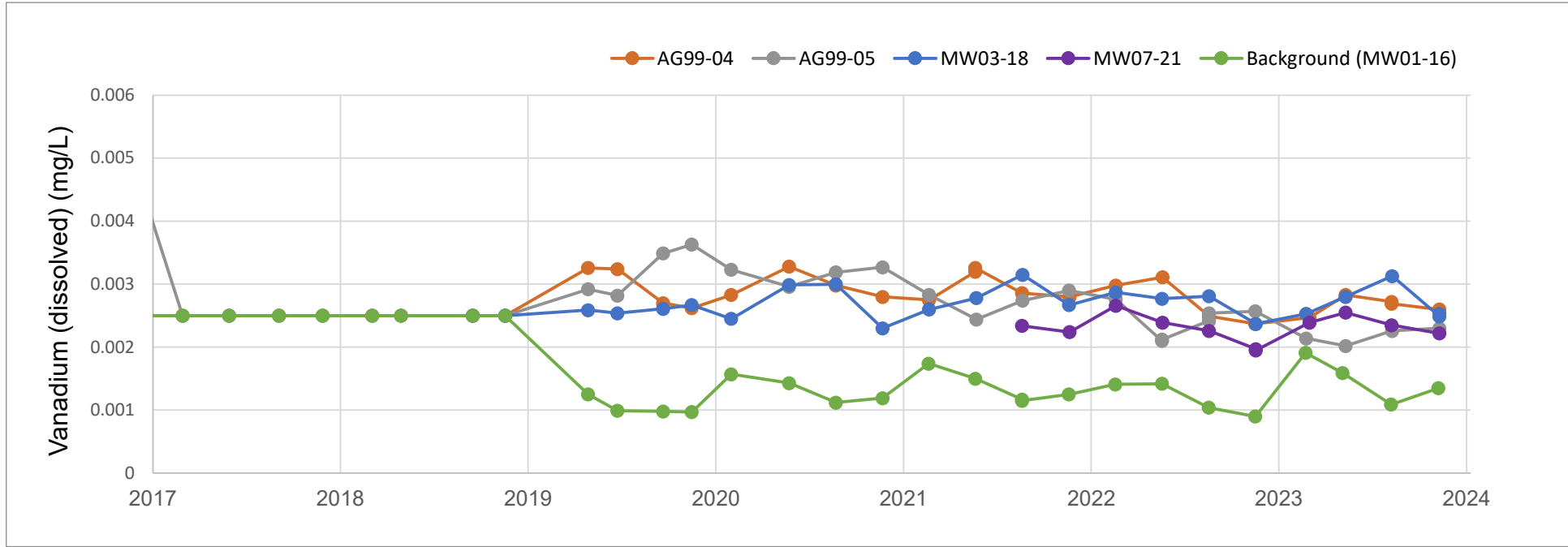
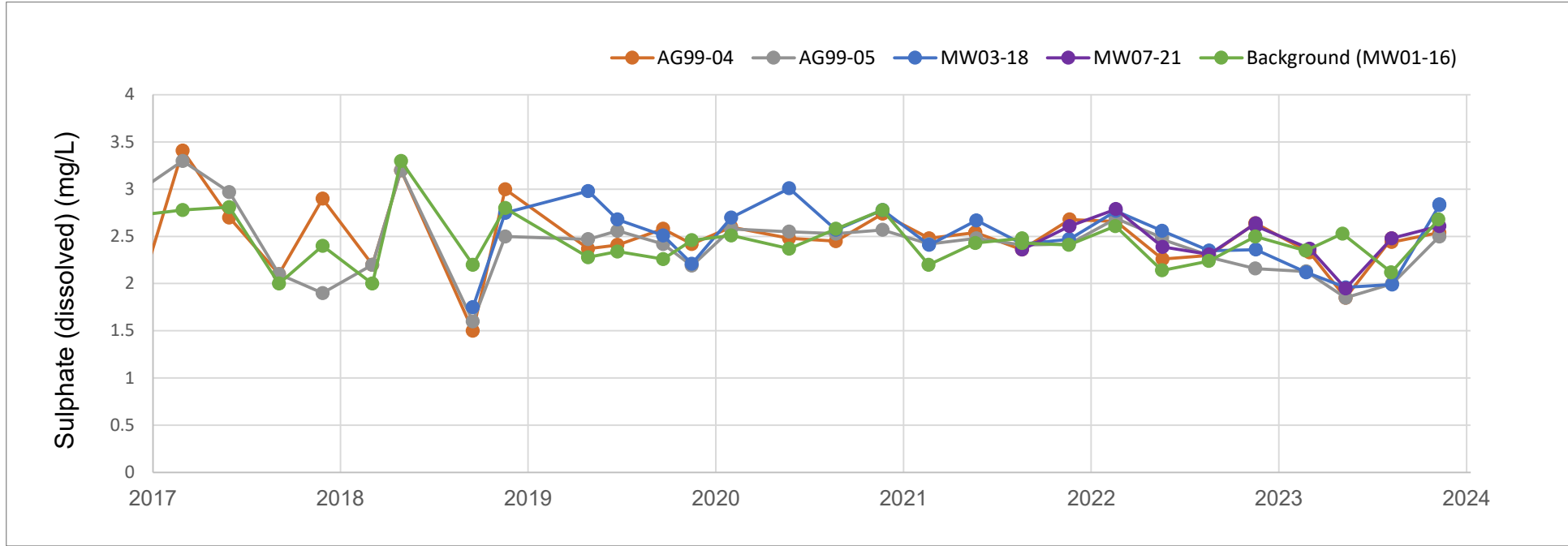
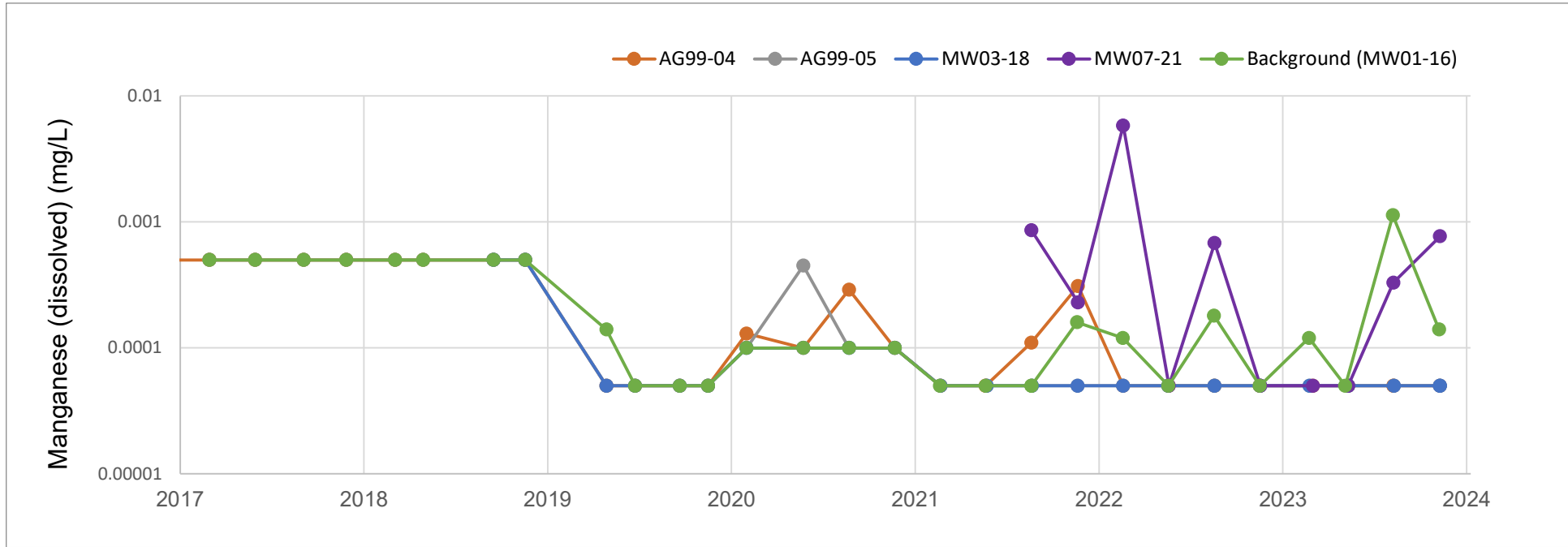
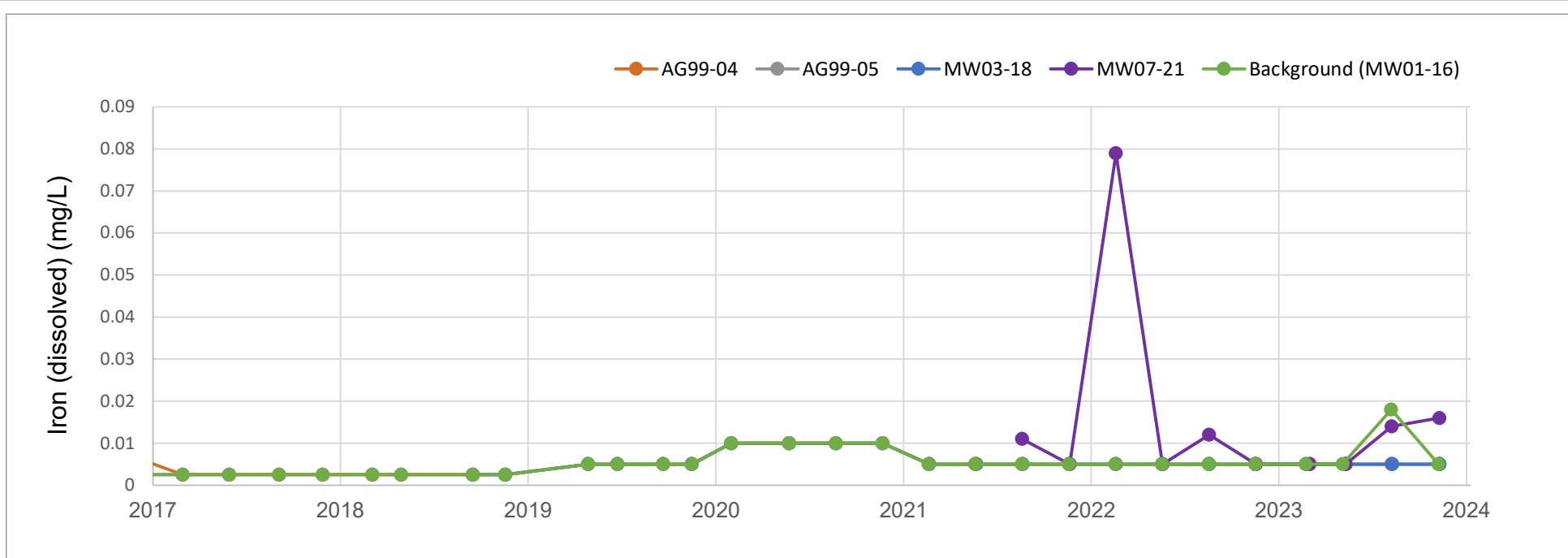




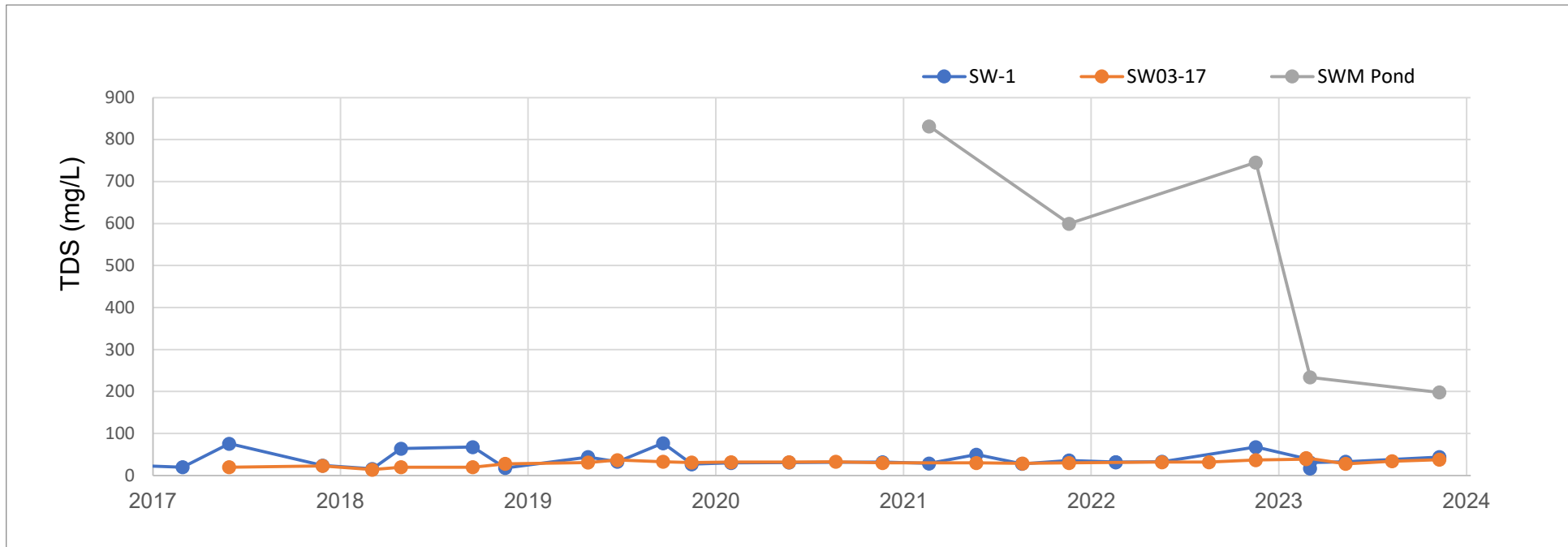
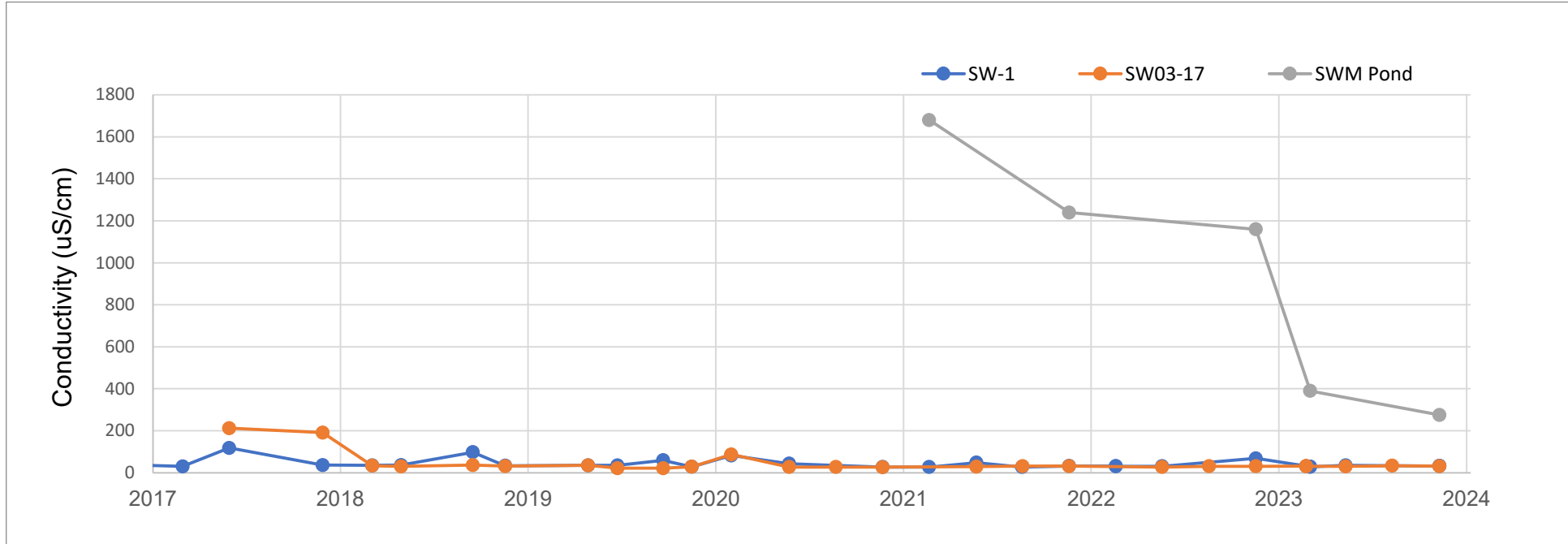
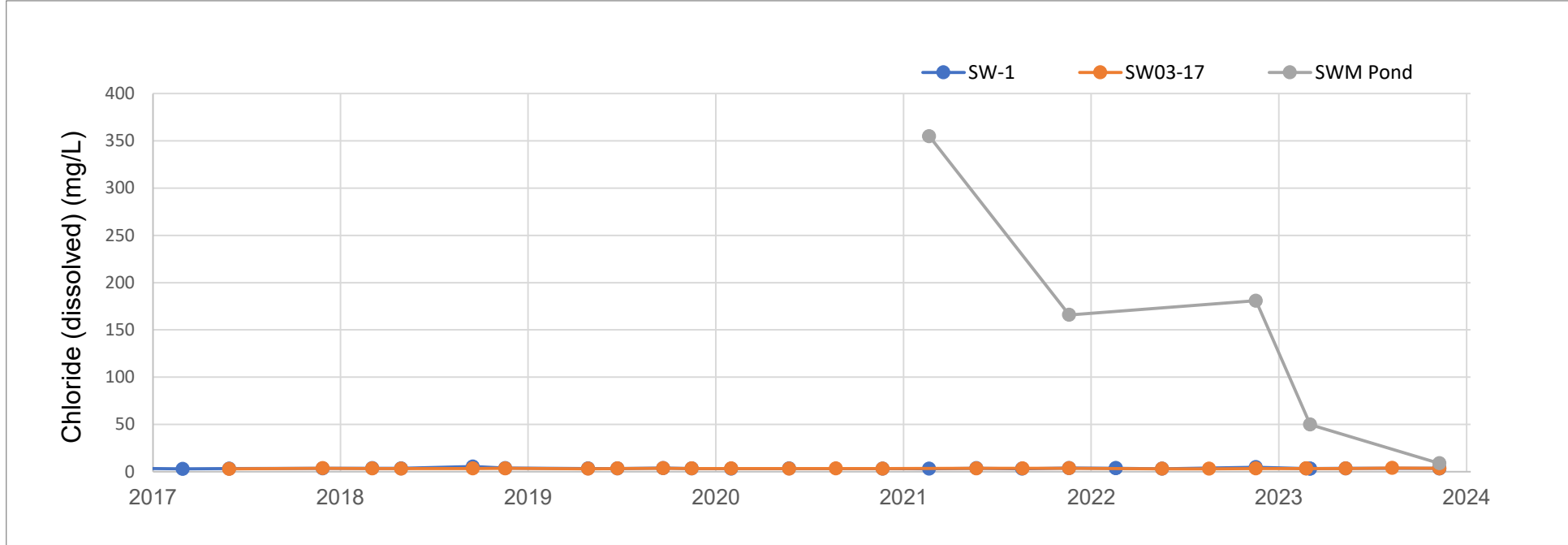
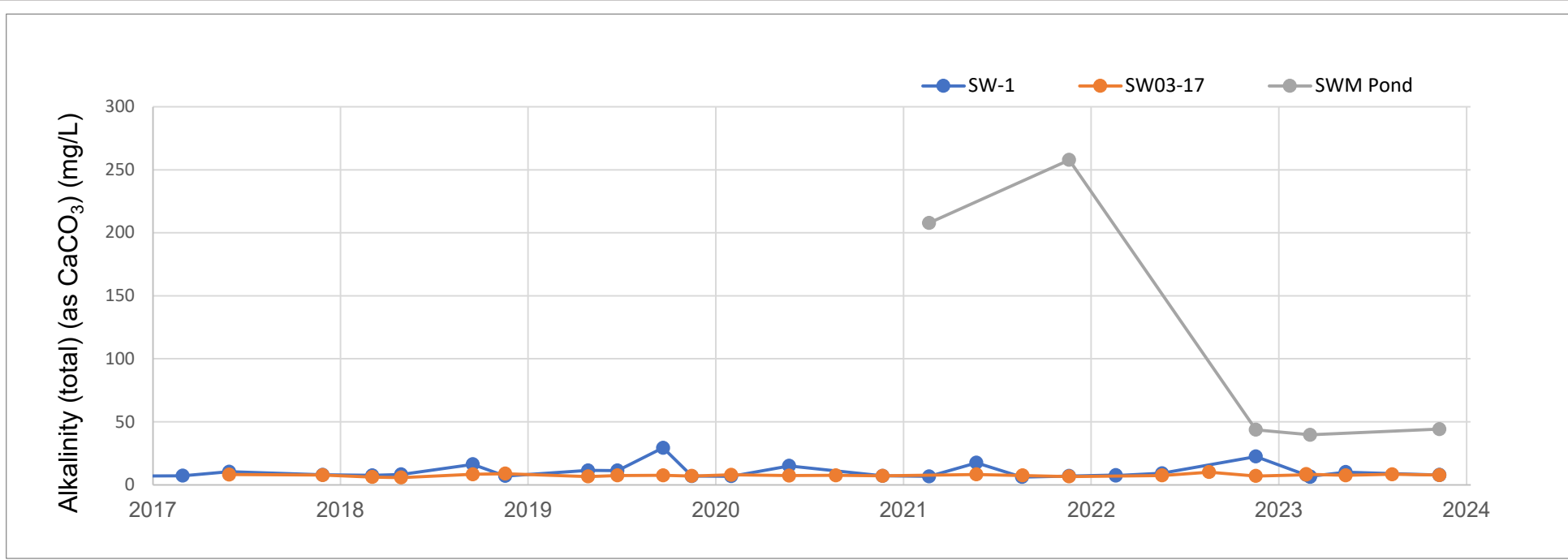


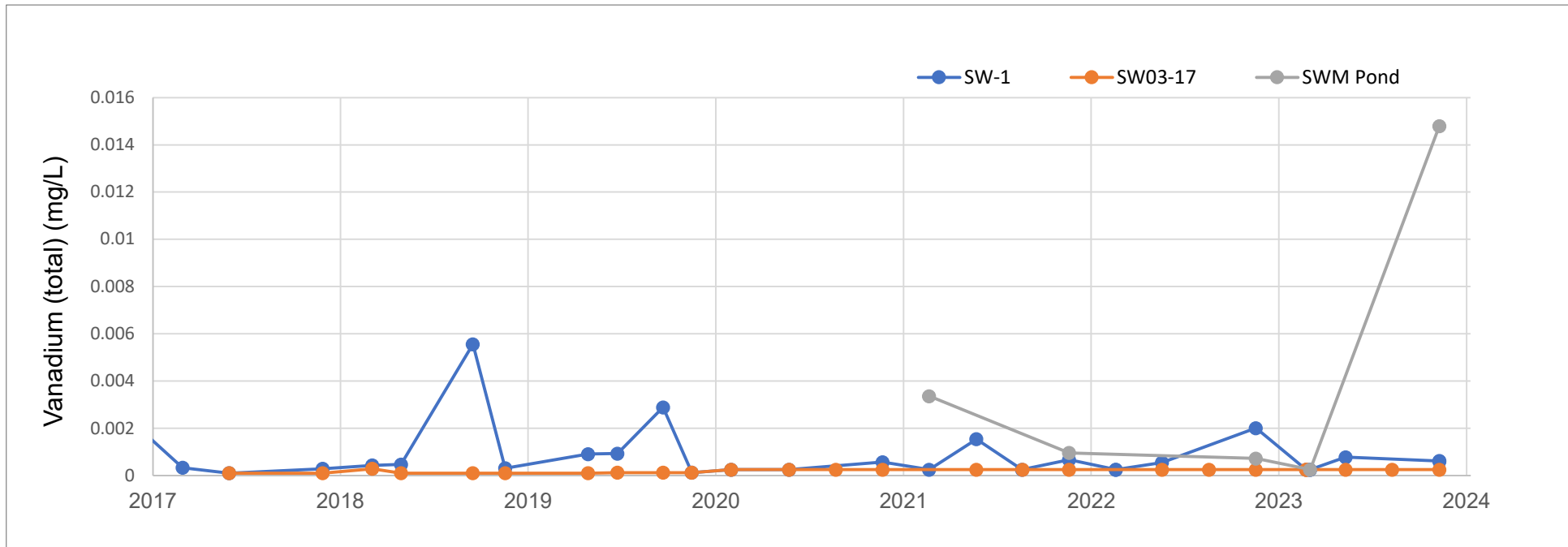
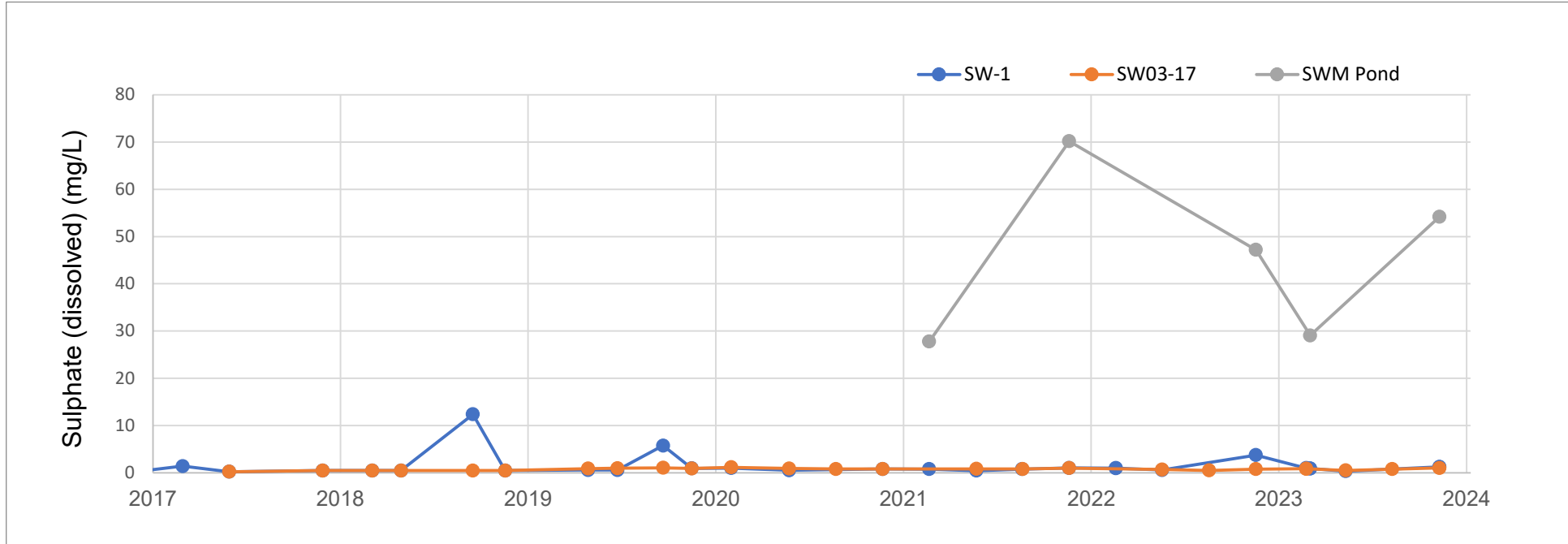
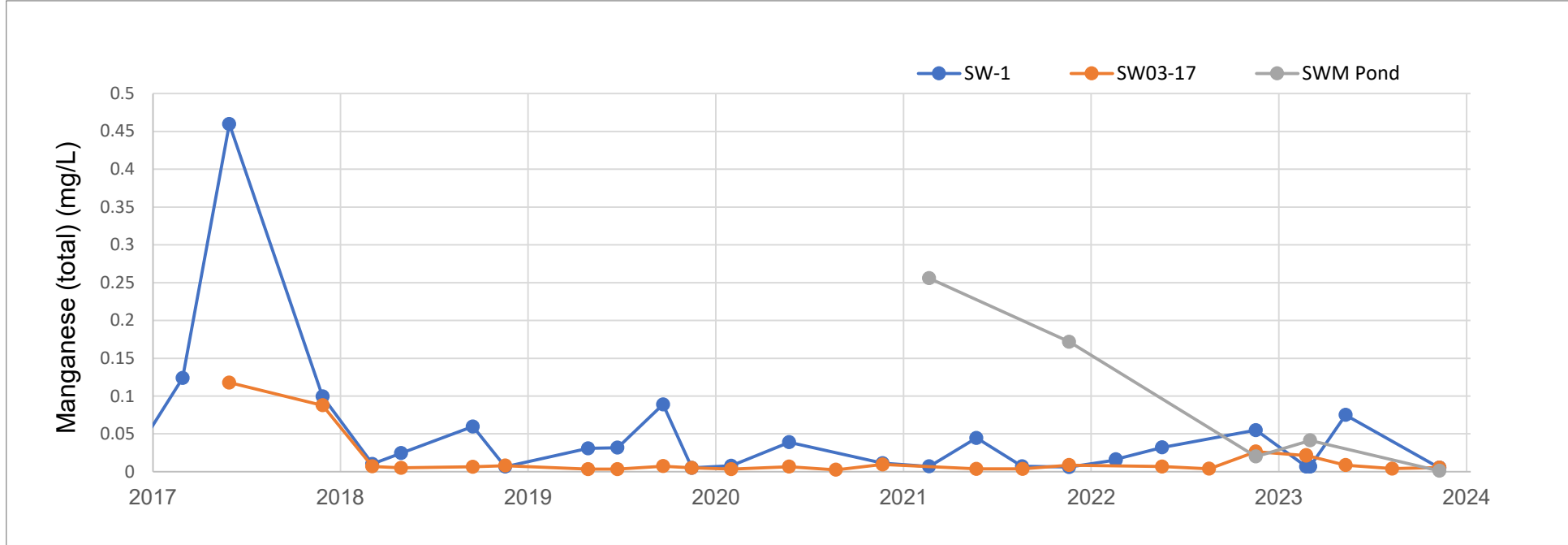
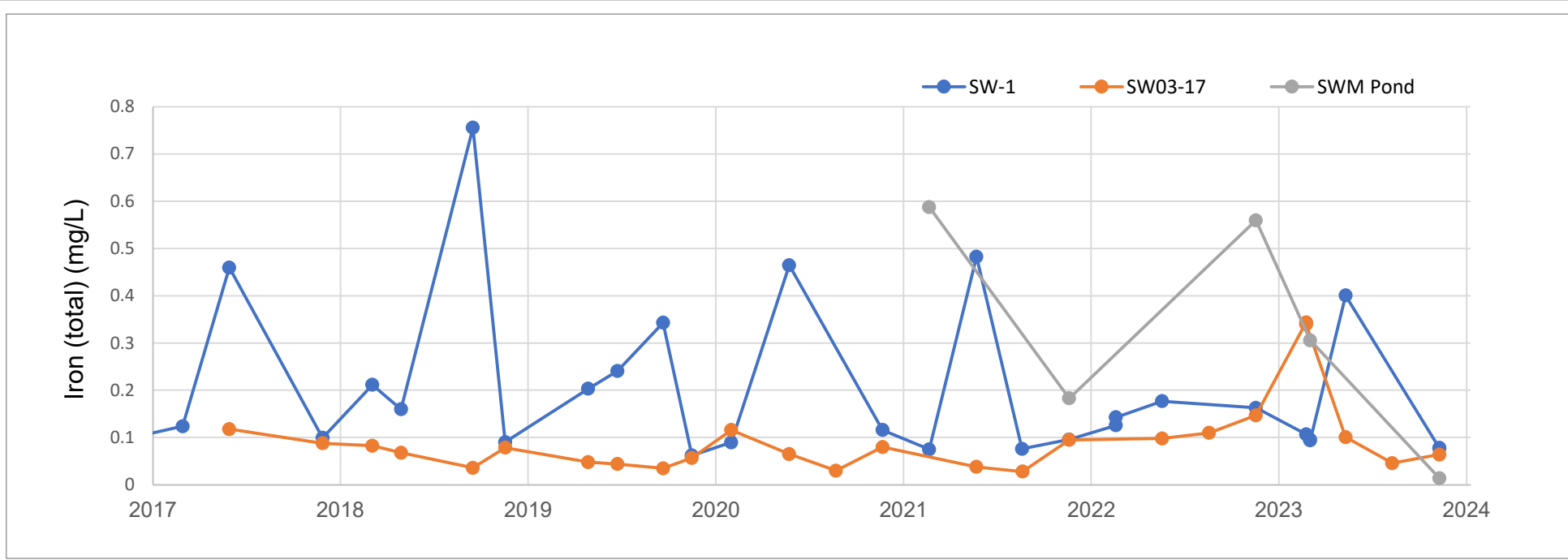












# **Appendix K**

**2024 Environmental Monitoring  
Specification**

## Environmental Monitoring Program Specifications – 2024

**PROJECT:** Comox Strathcona Waste Management  
Campbell River Waste Management Centre

**MONITORING STAFF:** **RESPONSIBILITY**  
Crystal Stuart Field Lead

**LABORATORIES USED:** ALS Environmental, Burnaby, BC

**AUTHORIZATION:** **MONITORING EVENT(S)**  
Feb, May, Aug, Nov

Revision #	Date	Revision	GHD
1	April, 2014	Monitoring spec creation.	MND
2	June, 2014	39950, EBA06-1, and HBT94-4 removed from sampling program. Phosphorus analysis changed to metals analysis instead of colorimetric method.	MND
3	January, 2016	SW-2 added to surface water monitoring program, updated field and database staffing, added WG matrix to field blank.	TE
4	March, 2016	Added dissolved metals analysis to WS schedule to differentiate from total metals when comparing criteria	CR
5	January, 2017	Reduced sampling for VOCs to a semi-annual schedule (February and August).	MND
6	May, 2017	Added SW03-17 and well tag 109728 (domestic well) to the monitoring program. Switched WS metals analyses to low levels analysis.	MND
7	January, 2018	Removed well tag 109728 from monitoring program. Updated project staffing. Added TDS to the parameter list.	NT
8	April, 2019	Removed EBA04-4 and EBA04-3 from monitoring program, as both are inaccessible. Added MW02-18 and MW03-18 to monitoring program (began sampling in August 2018).	NT
9	April, 2020	Added MW04-19 to the monitoring program (began sampling in October 2019). Added sampling the stormwater management pond and recording the water level at Ladore Dam. Updated project staffing.	CT
10	January, 2021	Updated PM. Removed lab pH from the GW and SW monitoring programs due to the 15-minute holding time. Field pH is more representative of sampling conditions.	NT
11	May, 2021	Removed HBT95-4 and GLL93-4 from the groundwater monitoring program, as per the 2020 Annual O&M Report, as they have consistently been dry for years. Removed EBA11-2 from the groundwater monitoring program since the well was found destroyed in Feb 2021.	NT
12	August, 2021	Added MW06-21, MW07-21 and MW08-21 to the groundwater monitoring program. Installation occurred in June 2021 as part of the 2017 DOCP.	NT
13	February, 2022	Added DOC to the SW monitoring program to be able to use the BLM calculator for copper.	NT

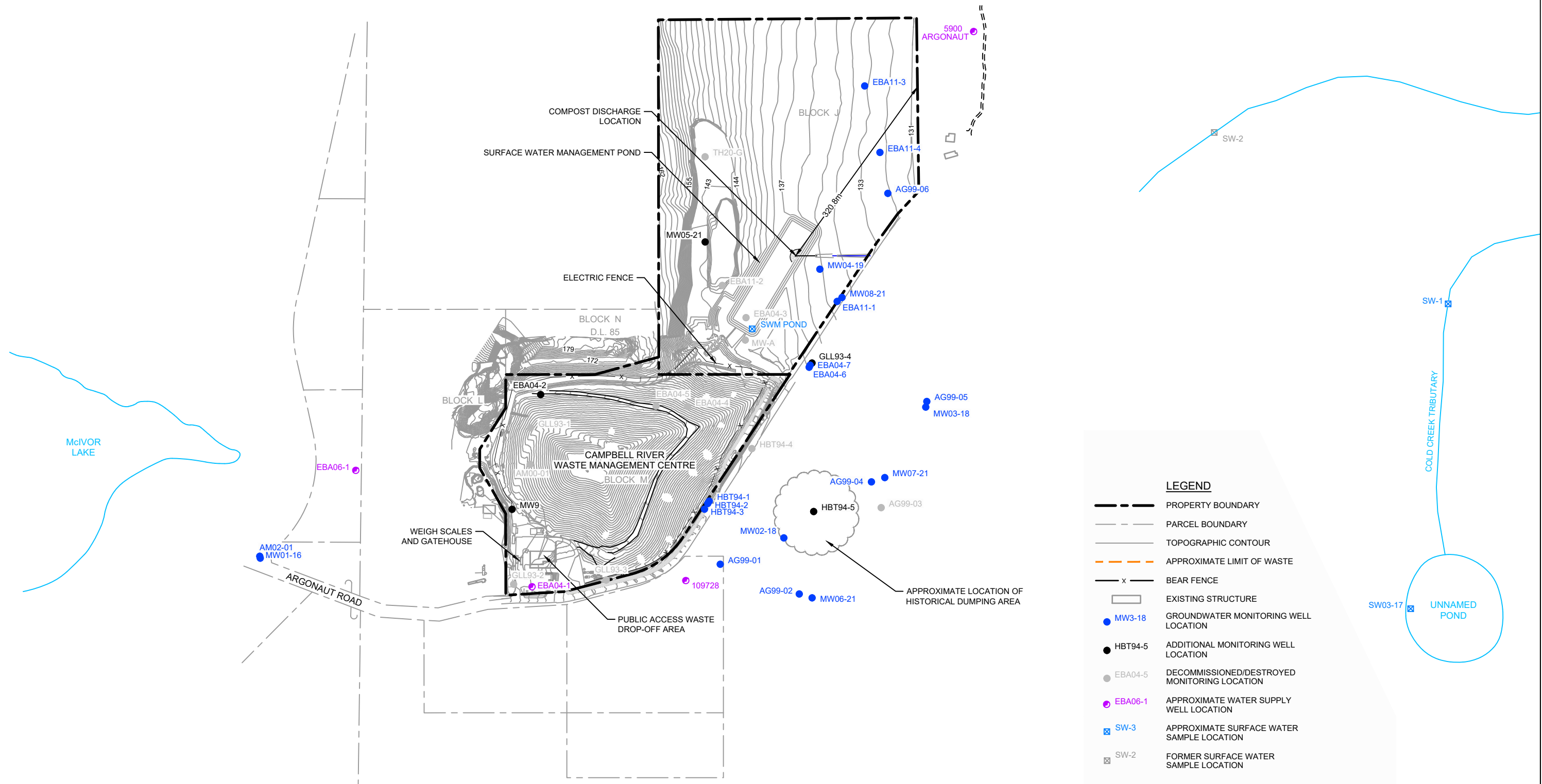
**Sampling Schedule  
Environmental Monitoring Program Specification - 2024**

Monitoring Location	Monitoring Location Purpose	Sample Matrix	Hydraulic Monitoring	Quarterly	Semi-annual
				Feb, May, Aug, Nov	Feb, Aug
<b>Groundwater Monitoring Program (22 locations)</b>					
AG99-01	Monitor downgradient groundwater quality to the east of the Site, off-Site.	WG	√	Schedule A	-
AG99-02	Monitor downgradient groundwater quality to the east of the landfill, off-Site, deep nested well..	WG	√	Schedule A	-
AG99-04	Monitor downgradient groundwater quality to the east of the landfill, off-Site, deep nested well.	WG	√	Schedule A	-
AG99-05	Monitor downgradient groundwater quality to the east of the Site, off-Site, deep nested well.	WG	√	Schedule A	-
AG99-06	Downgradient of the landfill, northeast.	WG	√	Schedule A	Schedule B
MW01-16	Background.	WG	√	Schedule A	Schedule B
AM02-01	Background.	WG	√	Schedule A	Schedule B
EBA04-1	Tap from the building near the scalehouse.	WG	-	Schedule A	-
EBA04-6	Northeast toe of landfill, off-Site.	WG	√	Schedule A	-
EBA04-7	Northeast toe of landfill, off-Site.	WG	√	Schedule A	Schedule B
EBA11-1	Downgradient of the Site to the northeast, off-Site, shallow nested well.	WG	√	Schedule A	Schedule B
EBA11-3	Downgradient of the landfill to the northeast.	WG	√	Schedule A	Schedule B
EBA11-4	Downgradient of the landfill to the northeast.	WG	√	Schedule A	Schedule B
HBT94-1	Downgradient, southeast property line.	WG	√	Schedule A	-
HBT94-2	Downgradient, southeast property line.	WG	√	Schedule A	Schedule B
HBT94-3	Downgradient, southeast property line.	WG	√	Schedule A	-
MW02-18	Downgradient of the Site, east, off-Site.	WG	√	Schedule A	Schedule B
MW03-18	Monitor downgradient groundwater quality to the east of the Site, off-Site, shallow nested well.	WG	√	Schedule A	-
MW04-19	Downgradient of the landfill, northeast.	WG	√	Schedule A	-
MW06-21	Monitor downgradient groundwater quality to the east of the landfill, off-Site, shallow nested well.	WG	√	Schedule A	-
MW07-21	Monitor downgradient groundwater quality to the east of the landfill, off-Site, shallow nested well.	WG	√	Schedule A	-
MW08-21	Downgradient of the Site to the northeast, off-Site, deep nested well.	WG	√	Schedule A	-
<b>Surface Water Monitoring Program (4 locations)</b>					
SW-1	Cold Creek Tributary.	WS	√	Schedule A	-
SW03-17	Unnamed Pond upstream of SW-1.	WS	√	Schedule A	-
SWM Pond	Surface Water Management Pond.	WS	√	Schedule A	-
Ladore Dam	Ladore Dam Reservoir (see link below).	WS	√	-	-
<b>Field Quality Assurance/Quality Control</b>					
Field Blank		WG	-	Schedule A	-
Groundwater Duplicate		WG	-	Schedule A	Schedule B
Surface Water Duplicate		WS	-	Schedule A (Feb only)	-
Trip Blank (VOCs only)		WG	-	-	Schedule B

[https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver\\_island/ladore\\_ldr.html](https://www.bchydro.com/energy-in-bc/operations/transmission-reservoir-data/previous-reservoir-elevations/vancouver_island/ladore_ldr.html)

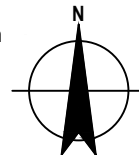
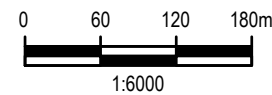
**Analytical Parameters  
Environmental Monitoring Program Specification - 2024**

Schedule A	Groundwater	Surface Water
<b>Hydraulic Monitoring</b>		
Water level	√	-
Depth to bottom of well	√	-
Flow	-	√
<b>Field Parameters</b>		
Dissolved Oxygen (mg/L)	√	√
Oxidation-Reduction Potential (mV)	√	√
pH (s.u.)	√	√
Conductivity (µS/cm)	√	√
Temperature (deg C)	√	√
Total Dissolved Solids (mg/L)	√	√
Turbidity (ntu)	√	√
<b>General Chemistry &amp; Nutrients</b>		
Alkalinity (Speciated)	√	√
Chloride (Dissolved)	√	√
Fluoride	√	√
Conductivity	√	√
Sulphate (Dissolved)	√	√
Total Dissolved Solids (TDS)	√	√
Ammonia-N	√	√
Nitrate (as N)	√	√
Nitrite (as N)	√	√
Nitrate/Nitrite (N+N)	√	√
Dissolved Organic Carbon (DOC)	-	√
<b>Metals</b>		
Dissolved CSR Metals (incl. Hg)	√	√
Dissolved Hardness (as CaCO <sub>3</sub> )	√	√
Total CSR Metals (incl. Hg)	-	√
<b>Schedule B</b>		
VOCs	√	-
<b>Petroleum Hydrocarbons</b>		
Total VH (C6-C10)	√	-
Total VPH (C6-C10) less BTEX	√	-



NOTE: McIVOR LAKE AND COLD CREEK TRIBUTARY LOCATIONS ARE APPROXIMATE.

SOURCE: TOPOGRAPHICAL INFORMATION BASED SURVEY BY McELHANNEY ASSOCIATES DATED DECEMBER 2, 2021.  
 WELL LOCATIONS BASED ON SURVEY DATA PROVIDED BY TETRA TECH EBA.  
 LIMIT OF WASTE FROM SCS ENGINEERS, PHASE I CLOSURE PLAN, JUNE 6, 2013.



COMOX STRATHCONA WASTE MANAGEMENT  
 CAMPBELL RIVER WASTE MANAGEMENT CENTRE  
 2023 OPERATIONS AND MONITORING REPORT

Project No. 11209296  
 Date March 2023

**SITE PLAN AND MONITORING  
 LOCATIONS**

**FIGURE 2**

