Water Resources Audit Report

Ross River Municipal Wastewater Facility (WL MN15-043)

Water Resources Branch
February 2025

Preface

The Water Resources Branch (WRB) works together with various partners to foster a healthy relationship with Yukon's waters. As technical experts in water science, we provide advice for compliance and inspection purposes and conduct reviews of projects undergoing water licensing and environmental assessment processes.

One of WRB's responsibilities is to conduct investigations at various undertakings that use or deposit waste to water. These investigations, called audits, are undertaken to improve our knowledge and understanding of a project's effects on the receiving water environment. Through the audit process we aim to identify emerging issues and build enhanced understanding of water quality and quantity conditions to support input into assessment, licensing, and post-licensing processes. The opinions and recommendations expressed in this report are based on relevant data, reports, field observations, interpretation/analyses of scientific information available to WRB and is subject to evolve as further information becomes available. While most of the findings are based on western science, we strive to recognize diverse ways of knowing and being and intend to create space to learn from both Indigenous and western perspectives side-by-side.

While WRB provides support to inspectors on enforcement and compliance matters related to water licences, it is not WRB's role to determine or enforce compliance. As such, the findings of this report should not be considered a determination of compliance with any existing permit or licence.

Executive summary

The Ross River Municipal Wastewater Treatment Facility (RRMWTF) is located within the traditional territory of the Ross River Dena Council and within the municipal boundary of the community of Ross River. The facility is located approximately 800 meters from the Pelly River to the west of the community. Waste is transported to the facility by truck, and the facility was designed to operate for at least 25 years and accommodate a 20% increase in population over its lifespan. The lagoon design concept is that of a two -cell aerated facultative lagoon. The design criteria stipulates that it must have the capacity to store up to ten months worth of wastewater, account for potential underlying permafrost melt, mitigate odour and the facility must be secured from incidental entry by people, pets, and wildlife. The facility is designed to discharge treated effluent to the neighbouring wetland but to date, there has never been a discharge of effluent to surface. The facility is authorized for the construction, operation and maintenance of the RRMWTF under water use licence MN15-043 held by Yukon Government Community Services.

The objectives of this audit were to:

1. Evaluate current site and water quality conditions by comparing site water quality with upgradient and downgradient water quality; and,
2. Evaluate potential impacts to the receiving environment using water quality data, water balance data and site characteristics.

To achieve these objectives, WRB collected 8 water quality samples:

- 4 from groundwater monitoring wells on site,
- 2 from the lagoons,
- 1 from a nearby natural surface water pond, and
- 1 from the Pelly River downgradient of site.

Sampling at the facility is only required to be conducted immediately prior to, during, and after discharge has occurred. Since the site is relatively new and has never discharged effluent, there is no licence monitoring water quality data available for this site except for a single groundwater sample for each RR-16 and RR-17 in 2020. Samples collected during the October 2023 site audit generally showed that water quality on site was good

with no exceedances of any standard or guidelines relevant to site for any samples collected.
Design documents and reports submitted with YESAB applications indicate that the facility should have needed to discharge effluent by now, which prompted WRB to conduct a water balancing exercise to attempt to understand why discharge has not yet occurred. In reviewing annual reports, WRB found that the influent and stored volumes are poorly quantified or understood.

Based on the findings of this report, WRB makes the following recommendations for the licensee holder:

1. **Record and evaluate lagoon water balance components including:**
    a. **monitoring influent volumes**
    b. **collecting monthly staff gauge readings during open water**
    c. **calculate lagoon stored water volumes annually**

    The lack of discharge to date means the facility water balance has not performed as predicted during design. Evaluating the cause of this requires sufficient monitoring of how much wastewater is entering the system and how the water in storage changes over time. Proper tracking of the water balance will aid in understanding if the system is performing as intended and allow for better planning.

2. **Begin regular groundwater monitoring.**
    The water licence monitoring frequency for groundwater wells is related to the timing of discharge. Since the facility has not discharged, there has not been regular groundwater monitoring. However, this fails to monitor one potential explanation for the lack of discharge, which is the possibility more wastewater is infiltrating to the ground than expected. As such, we recommend sampling all groundwater monitoring wells at a minimum once every two years, regardless of if discharge has occurred.

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1 Introduction/background

Government of Yukon, Department of Environment, Water Resources Branch (WRB) conducted an audit of the Ross River wastewater facility. The purpose of the audit was to learn about the facility and gain familiarity with the site, particularly to identify any potential impacts to the receiving water environment and any implications as it relates to the water licence. The objectives of the audit were to:

1. determine the intended flow path of effluent in the event it should be discharged from the facility, and
2. understand whether residual wastewater persists within the surrounding ponds and groundwater monitoring wells.

WRB visited the facility on October 10 and 11, 2023 to collect water quality samples. WRB also conducted a review of historic site documents, former water licences, and all existing licence water quality and quantity data.

1.1 Facility overview

The current facility was constructed in 2019 and is located west of the community of Ross River within a 220 m x 520 m cleared, fenced area (Figure 1). The facility contains three pre-settling tanks which allow solids to settle in a contained way before discharging these tanks to a two-cell aerated lagoon system. The lagoon design concept is that of a 2-cell aerated facultative lagoon (Yucan Planning 2015) which primarily treats water non-mechanically. Water nearest the surface contains dissolved oxygen due to atmospheric reaeration and algal photosynthesis, and sludge deposited at the bottom of the lagoons support anaerobic organisms. The middle anoxic layer, known as the facultative zone, ranges from aerobic near the top to anaerobic at the bottom (EPA 2002). The primary lagoon cell is intended for initial breakdown of organics and the secondary cell serves to further break down and settle organics. Both cells are aerated to reduce build up of gases and bacteria/viruses.

The lagoons sit atop a low permeability clay-silt zone which design documents claim will prevent significant groundwater contamination. The lagoons also have an integrated bentonite cut-off wall that is intended to protect against lateral exfiltration from the lagoon cells. Annual discharge from this system is intended to occur between mid-July and mid-September each year. Influent occurs from periodic trucked deliveries. The facility contains a sludge drying pad for receiving solid waste from outhouses as well as sludge removed from lagoon cells during regular maintenance, and there is also a diversion ditch surrounding the lagoons intended to reroute any unintentional discharge towards the down gradient wetland.

Figure 1. Ross River municipal wastewater treatment facility relative to Village of Ross River

When lagoon volume thresholds are met, effluent from the secondary cell is transported via a 50 mm header pipe to the wetland west of the site which is discharged through a large riprap discharge pad (Figure 2). The intent is that the wetland provides some

tertiary treatment as well as potential nutrient utilization prior to effluent reaching other surface water bodies (I.e. the Pelly River). The facility overview and sampling locations for the October 2023 audit sampling event are displayed in Figure 3.

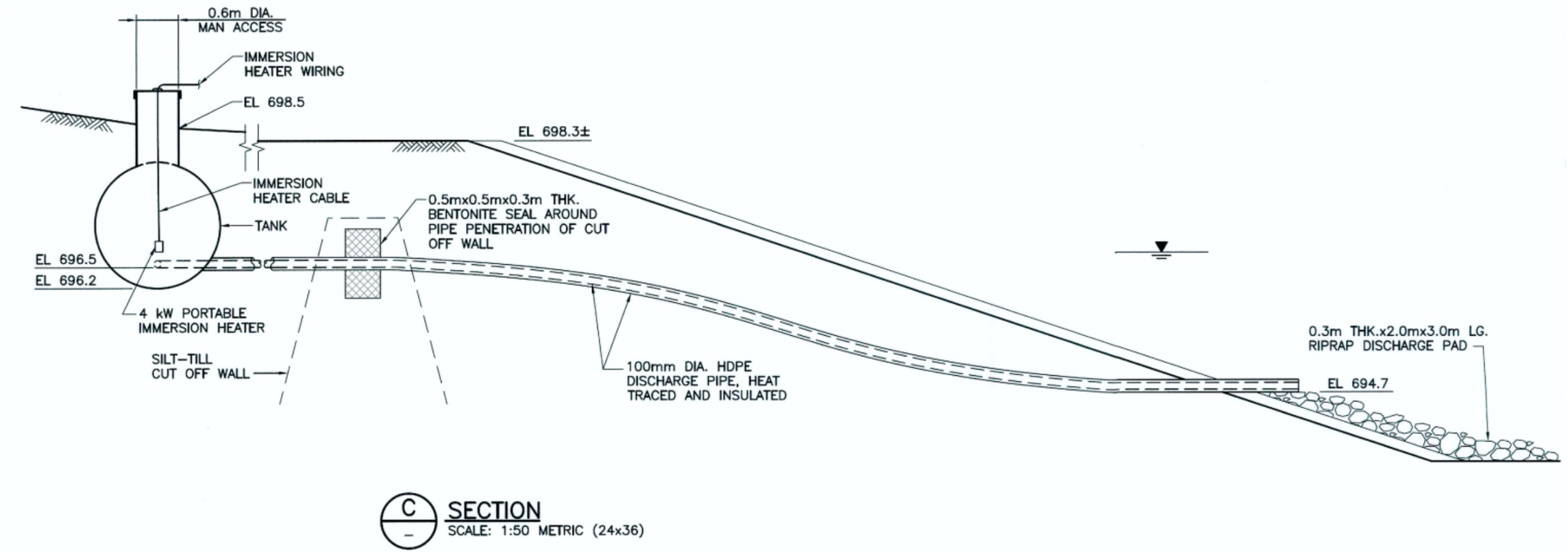
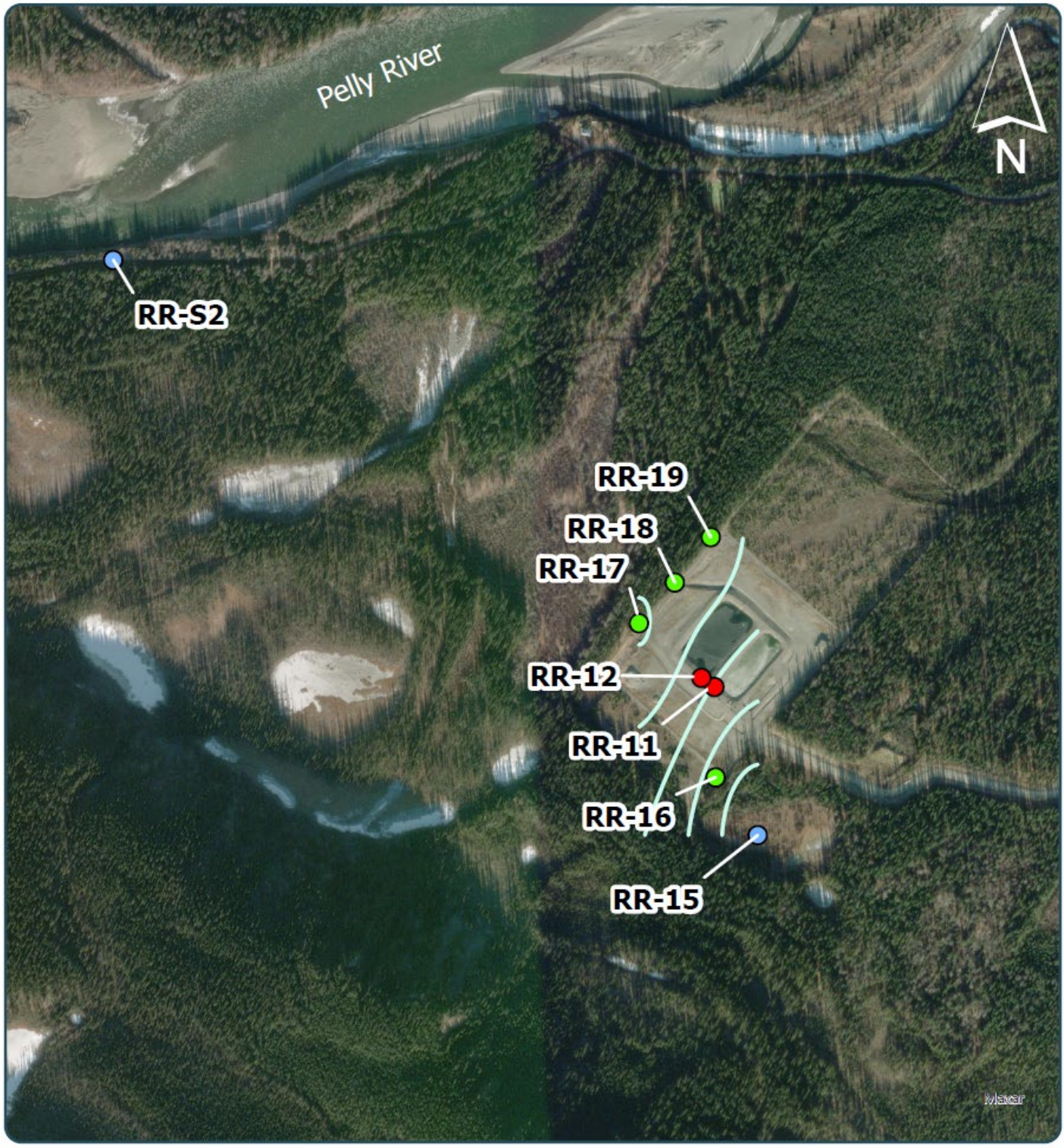


Figure 2. Preliminary design diagram of site infrastructure used to transport treated effluent from secondary cell to adjacent wetland (KGS 2017).



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0 40 80 160 Meters

Overview of sampling locations for the Ross River MWWTF October 2023 site audit.

Figure 3. Sampling overview map

Legend

- Surface Water
- Groundwater Well
- Lagoon Cell
- Inferred Groundwater Equipotential

1.2 Current water use licence MN15-043

The Government of Yukon's Department of Community Services currently holds municipal water licence MN15-043, which allowed/allows for the construction, operation and maintenance of the Ross River Wastewater Treatment Facility (RRWTF), including the collection, treatment and disposal of waste. Under the current water licence MN15-043, the licensee is required to conduct regular water quality and flow monitoring. Monitoring locations outlined in MN15-043, and their descriptions have been summarized in Table 1 below. It should be noted that although this licence includes facility construction, this report focuses on current site water quality and only includes constructed features where necessary to understand site water quality and quantity.

Table 1. MN15-043 monitoring locations and descriptions.

Sampling Station	Description
RR-11	Lagoon #1 – Small (primary) lagoon
RR-12	Lagoon #2 – Large (secondary) lagoon
RR-13	Effluent at discharge pipe
RR-14	Cut-off Trench Sump area west of the lagoon
RR-15	Wetland #1 – small wetland located at SE corner of lagoon site (up-gradient)
RR-16	Well #1 (MW14-01) up-gradient of the lagoon cells
RR-17	Well #3 (MW14-03) west of the lagoon cells
RR-18	New well – down-gradient of lagoons
RR-19	New well – down-gradient of lagoons
RR-20	Water pumped from Pelly River

Water quality monitoring is required at various times depending on the monitoring station. Table 2 outlines the sampling schedule for each monitoring station as listed in MN15-043.

Table 2. MN15-043 monitoring schedule.

Station Analysis	RR-11	RR-12	RR-13	RR-14	RR-15	RR-16. RR-17, RR-18, RR-19	RR-20
pH	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Temperature	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Specific Conductance	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Dissolved Oxygen	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Colour	2DA	2DA	2DD	2DA	2DA	2DA	-

Station Analysis	RR-11	RR-12	RR-13	RR-14	RR-15	RR-16. RR-17, RR-18, RR-19	RR-20
$CBOD_5$	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Total Suspended Solids	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Chloride	2DA	2DA	2DD	2DA	2DA	2DA	-
Un-ionized Ammonia	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Nitrate-N	2DA	2DA	2DD	2DA	2DA	2DA	-
Nitrite-N	2DA	2DA	2DD	2DA	2DA	2DA	-
Total Phosphorus	2DA	2DA	2DD	2DA	2DA	2DA	-
Sulphate	2DA	2DA	2DD	2DA	2DA	2DA	-
Oil & Grease	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Fecal Coliforms	2DA	2DA, 1P	2DD	2DA	2DA	2DA	-
Total Metals	2DA	2DA	2DD	2DA	2DA	2DA	-
Dissolved Metals	2DA	2DA	2DD	2DA	2DA	2DA	-
VOCs	-	-	-	-	-	2DA	-
Water Level Elevation	M	M	-	-	-	2DA	-
Sludge Level	A	A	-	-	-	-	-
Waste Water Influent	C	-	-	-	-	-	-
Volume	-	-	CD	CP	-	-	CP

1 – In-situ and in lab
2 – In-situ
A – Annually
C – Continuously
CD – Continuously during discharge
M – Monthly in summer
1P – Once before discharge (near effluent discharge location) to ensure compliance
CP – Continuously while pumping
2DD – Twice during discharge: first at beginning of discharge period and second mid-way through discharge (discharge to occur from mid-July to mid-September)
2DA – Twice annually during and after discharge (first sample in July/August, second in September/October)

As a requirement of MN15-043, effluent discharged from the treatment lagoons at station RR-13 must meet the Effluent Quality Standards (EQS) outlined in Table 3 below. As displayed in Figure 2, effluent is transported from the secondary cell via an underground pipe to the adjacent downgradient wetland, though it should be noted that to date WRB is not aware of any effluent being discharged from the facility.

Table 3. MN15-043 Effluent Quality Standards for water discharged from compliance monitoring location RR-13.

Licence Parameter	Concentration
pH	6 – 9
Total Suspended Solids	25 mg/L
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	25 mg/L
Un-ionized Ammonia	1.25 mg/L at 15°C ± 1°C
Oil & Grease	5 mg/L
Total residual chlorine	0.02 mg/L
Fecal Coliforms	400 cfu/100 mL

2 Field sampling and methods

To understand potential impacts of the wastewater facility on the receiving water environment, WRB wanted to understand the flow paths of wastewater from the facility and understand whether residual wastewater persists within the surrounding ponds and groundwater monitoring wells. This included assessing whether there are surface-groundwater interactions between the cell lagoons (RR-11 and RR-12), groundwater (RR-16, RR-17, RR-18 and RR-19) and nearby surface water (RR-15 and RR-S2). These locations have been displayed in Figure 3.

WRB conducted surface water sampling over two days. Personnel visited site on October 10, 2023 and collected samples from RR-11 and RR-12. On the following day, personnel completed the remainder of sampling. See Table 4 for details of each sampling location.

Table 4. Surface water samples collected during the October 2023 site audit.

Station Code	Location	Date & Time	Coordinates		Rationale
			Lat	Long	
RR-11	Lagoon #1 – Small (primary) lagoon	2023-Oct-10 14:45	61.98064604	-132.4671063	Characterizing influent
RR-12	Lagoon #2 – Large (secondary) lagoon	2023-Oct-10 14:55	61.98064604	-132.4671063	Characterizing effluent
RR-15	Wetland #1 – Small wetland located at the	2023-Oct-11 11:00	61.97914015	-132.4670116	Reference – sample should reflect unimpacted environment

Station Code	Location	Date & Time	Coordinates Lat	Long	Rationale
	southeast corner of the lagoon site (up-gradient)				
RR-16	Well #1 (MW14-01) up-gradient of the lagoon cells	2023-Oct-11 13:15	61.979323	-132.46823	Reference – sample should reflect unimpacted environment
RR-17	Well #3 (MW14-03) west of the lagoon cells	2023-Oct-11 11:15	61.981299	-132.469688	Down-gradient site, identify potential impacts to receiving environment
RR-18	New well – down-gradient of lagoons	2023-Oct-11 10:30	61.98026764	-132.4680535	Down-gradient site, identify potential impacts to receiving environment
RR-19	New well – down-gradient of lagoons	2023-Oct-11 9:20	61.98139232	-132.4679823	Down-gradient site, identify potential impacts to receiving environment
RR-S2	Pelly River downgradient of site	2023-Oct-11 13:05	61.986541	-132.447123	Down-gradient site, identify potential impacts to receiving environment

Samples were collected by WRB staff following the Water Quality Sampling Protocol for Government of Yukon Monitoring Programs (Government of Yukon 2021) and followed the requirements from the commercial lab conducting the analyses. In-situ water quality field parameters were measured using a YSI ProDSS handheld multimeter. The multimeter was calibrated before going in the field by WRB staff as per manufacturer specifications and best practices. WRB staff collected four surface water samples and four groundwater samples as outlined in Table 4 below. The sampling locations are also presented in Figure 3. Complete results from sample analyses can be found in Appendix A.

Samples collected from the locations in Table 4 above were analysed for a suite of typical water quality parameters, stable water isotopes and artificial sweeteners as tracers of wastewater. These parameters were selected to support site audit objectives and to allow for comparison with the effluent quality standards listed in MN15-043 as well as other relevant guidelines. These sampling parameters have been detailed in Table 5 below. It should be noted that due to low flow and groundwater volumes, RR-18 was not analysed for residual chlorine, dissolved metals, oil & grease, Volatile Organic Carbon

(VOC) or hydrocarbons, and RR-15 and RR-S2 had field parameters, sweeteners, isotopes and fecal coliforms collected only.

Table 5. Analysis performed for samples collected during the October 2023 audit.

Parameter
Field parameters
Major ions (bicarbonate, bromide, calcium, carbonate, chloride, fluoride, hydroxide, magnesium, potassium, sodium, and sulphate)
Nutrients (nitrate, nitrite, nitrate+nitrite, total ammonia, total nitrogen, total phosphorus, dissolved phosphorus, and dissolved phosphorus as phosphate)
VOC
Hydrocarbons
Total suspended/dissolved solids
Turbidity, conductivity, pH
Total Organic Carbon (TOC) and Dissolved Organic Carbon (DOC)
Artificial sweeteners
Stable water isotopes
Total and dissolved metals including mercury
Fecal coliforms

In addition to standard samples collected from site, WRB completed a field blank on site as well as a travel blank as QA/QC samples, which showed good sampling methods with no contamination. It should be noted that due to low flows and volumes of groundwater on site, no replicate sample was completed.

3 Results & discussion

3.1 Comparison with Effluent Quality Standards and guidelines

Water licence MN15-043 outlines EQS for the “end of pipe” discharge location RR-13 only, and other stations only require monitoring during periods surrounding or during effluent discharge at RR-13. Since there has yet to be discharge from the site, water quality monitoring has not yet been required and there is no long-term record for this site. For the same reasons, it should be noted that for the purpose of adhering to licence requirements, EQS only apply to effluent being discharged; therefore, all comparisons

against licence EQS or other guidelines in this report have been made for reference purposes only and do not signify any form of non-compliance.

Due to this lack of data record, October 2022 sample data was compared with site EQS as well as other guidelines including the Canadian Council of Ministers of the Environment guidelines for the Protection of Aquatic Life (CCME PAL), and the Yukon Contaminated Sites Regulation (CSR) to provide some additional basis of comparison for analytical parameters not included in the water licence EQS. Although water quality results from the 2023 audit were compared against these guidelines, they are compared for frame of reference only. Comparing against existing guidelines helps provide understanding of site water quality and station specific quality, and any exceedances of available guidelines have been outlined in Table 6 below.

Table 6. Water quality parameters exceeding available guidelines from the October 2023 sampling event.

Site	Parameter	Measured Value (mg/L)	Guideline Value (mg/L)	Guideline Source
RR-11	Arsenic (Total)	0.00593	0.005	CCME PAL
	Arsenic (Dissolved)	0.00669	0.005	CCME PAL
	CBOD	46.5	25	EQS
	Copper (Total)	0.00933	*Calculated*	CSR, CCME PAL
	Fluoride	0.223	0.12	CCME PAL, CSR
	Unionized Ammonia	0.0634	0.019	CCMA PAL
	Ammonium	4.01	*Calculated*	CSR
RR-12	Arsenic (Total)	0.0124	0.005	CCME PAL
	Arsenic (Dissolved)	0.0123	0.005	CSR, CCME PAL
	Fluoride	0.471	0.12, *Calculated*	CCME PAL, CSR
	Unionized Ammonia	0.0595	0.019	CCME PAL
	Ammonium	2.29	*Calculated*	CSR
	Sulfate	148	100	CSR
RR-16	Fluoride	0.363	0.12, *Calculated*	CCME PAL, CSR
	Sulfate	466	100	CSR
RR-17	Cadmium (Total)	0.000463	*Calculated*	CCME PAL
	Chlorine (Total)	0.12	0.002	CSR
	Cobalt (Total)	0.00103	0.0009	CSR
	Selenium (Dissolved)	0.00741	0.001	CCME
	Selenium (Total)	0.00733	0.001	CCME, CSR
	Sulfate	583	100	CSR
RR-18	Fluoride	0.502	0.12, *Calculated*	CCME, CSR
	Sulfate	409	100	CSR

3.2 Groundwater measurements

WRB staff collected groundwater samples on October 10, 2023, via a low-flow purging method, using a Waterra Spectra Field-Pro peristaltic pump. This sampling method was chosen based on well diameter casing, depth to the groundwater and well recovery rate. Method used and rationale for using that method have been outlined in Table 6.

Table 7. Groundwater sample methods employed and rationale during the October 2023 site audit.

Groundwater Well Code	Sample Collection Method	Rationale
RR-19	Low-flow	Well purged and sampled using Waterra Spectra Field-Pro peristaltic pump. Well went dry due to slow groundwater recharge; limited sampling volume available.
RR-18	Low-flow	Well purged and sampled using Waterra Spectra Field-Pro peristaltic pump. Well went dry due to slow groundwater recharge; limited sampling volume available.
RR-17	Low-flow	Well purged and sampled using Waterra Spectra Field-Pro peristaltic pump until field parameters were observed to stabilize.
RR-16	Low-flow	Well purged and sampled using Waterra Spectra Field-Pro peristaltic pump until field parameters were observed to stabilize.

Standard groundwater well measurements were collected as part of groundwater sampling (Table 7). The top of each groundwater well casing rises above grade a known distance (known as “stick-up”), and subsequent measurements of depth to groundwater and depth to well bottom are relative to stick-up. From these values, the length of the water column and the volume of water in the well can be calculated. WRB uses a Solinst water level tape to measure depth to groundwater and depth to well bottom.

Table 8. Groundwater well measurements collected during the October 2023 site audit.

Groundwater Well Code	Surface Elevation (m)	Stick-up (m)	Depth to Groundwater (mbtoc)	Depth to Well Bottom (mbtoc)	Length of Water Column (m)	Volume of Water in Well (L)
RR-19	Not known	0.90	5.103	5.650	0.547	1.094
RR-18	Not known	0.88	3.660	3.965	0.305	0.61
RR-17	Not known	0.76	3.980	6.250	2.27	4.54
RR-16	Not known	0.67	3.450	5.260	1.81	3.62
mbtoc: metres below top of casing						

3.3 Site stable water isotope characterization

Isotopes are atoms of the same element that have different numbers of neutrons but the same number of protons. Stable isotopes have nuclei that do not decay to other isotopes on geologic timescales but may themselves be produced by the decay of radioactive isotopes. Two stable isotopes of hydrogen (^{1}H and ^{2}H) and three of oxygen (^{16}O, ^{17}O and ^{18}O) occur naturally in waters. We use the phrase "stable water isotopes" to refer to ^{1}H, ^{2}H, ^{16}O, and ^{18}O, which are relatively abundant and can be easily measured by mass spectrometry.

According to Kendall & Doctor (2005), stable water isotopes can be used as tracers of waters in shallow, low-temperature environments because:

i. Waters that were recharged at different times, different locations, or that followed different flow paths are often isotopically distinct; in other words, they have distinctive "fingerprints."
ii. Unlike most chemical tracers, stable water isotopes are relatively conservative, retaining their distinctive fingerprints until they mix with other waters.

Figure 5 shows $\delta^{2}H$ and $\delta^{18}O$ ratios for surface water samples (solid circles) collected during the October 2023 monitoring event and precipitation (hollow circles) collected in Whitehorse from 1960-1990 via the Global Network of Isotopes in Precipitation (GNIP; IAEA 2021). Precipitation that fell between May and September is inferred to be rain (red hollow circles) whereas precipitation that fell between October and April is inferred to be snow (blue hollow circles). A local meteoric water line (LMWL) was generated based on the stable water isotope ratios for precipitation samples collected from the Mayo GNIP station. The LMWL is a line of best fit ($R^2 = 0.93$) that represents the site-specific long-term covariation of hydrogen and oxygen stable isotope ratios.

Typically, groundwater samples plot approximately along the LMWL and have stable water isotope compositions similar to that of weighted average precipitation (Kendall & Doctor, 2005). A weighted average is a calculation that takes into account the varying degrees of importance of the numbers in a data set. It is useful to compare $\delta^{18}O$ and $\delta^{2}H$ values in groundwater to amount-weighted average $\delta^{18}O$ and $\delta^{2}H$ values in precipitation.

This is because larger precipitation events typically contribute disproportionately to groundwater recharge. To calculate amount-weighted average $\delta^{18}O$ or $\delta^{2}H$ values in precipitation, $\delta^{18}O$ or $\delta^{2}H$ values from individual precipitation events are multiplied by the amount of precipitation in the events (expressed in millimetres) before the average is calculated. Note that, in certain circumstances, $\delta^{18}O$ and $\delta^{2}H$ values in groundwater differ from those in annual precipitation due to seasonal biases in recharge. This appears to be true across much of the Yukon, where infiltration of snowmelt (and possibly cool spring rains) recharges aquifers when losses to evapotranspiration are low.

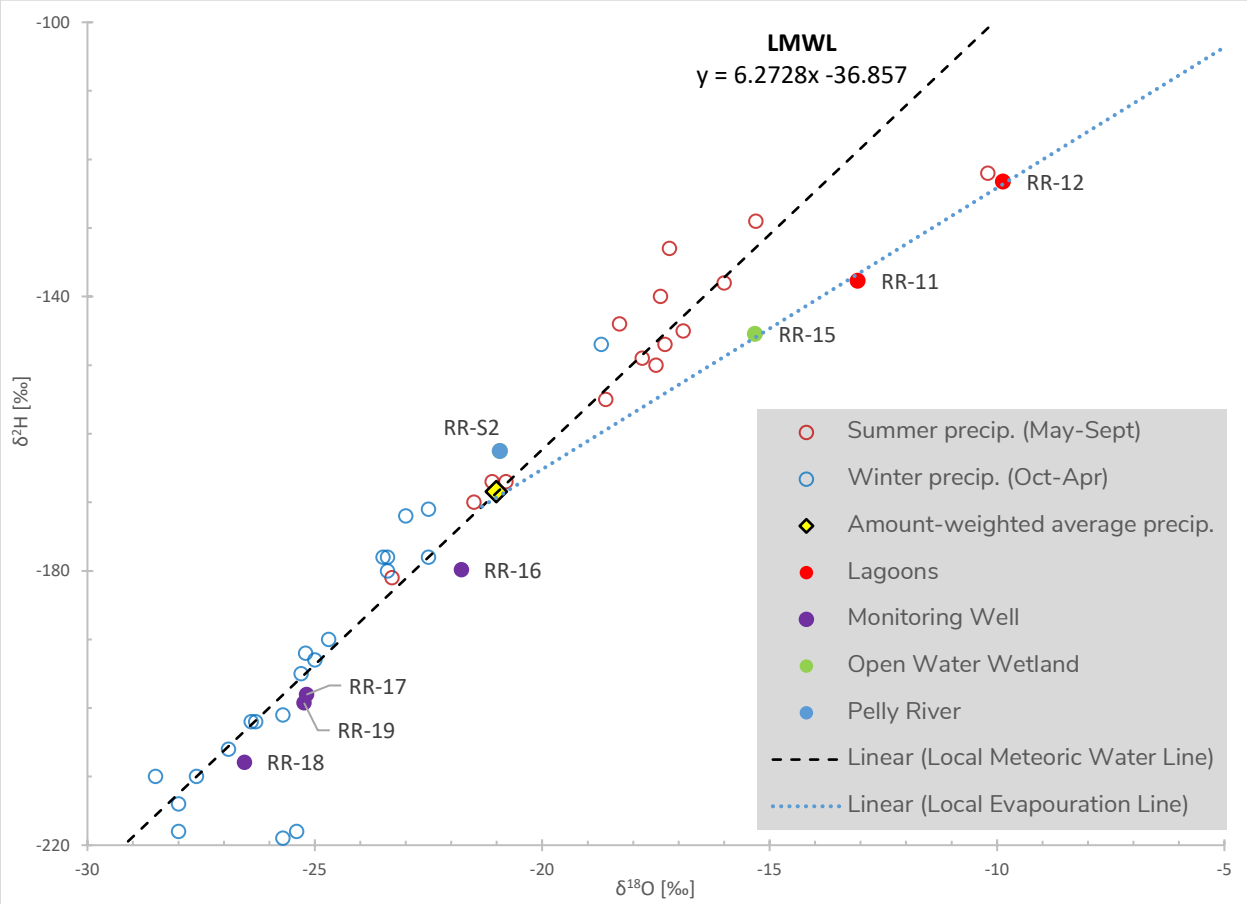

Figure 4. Stable water isotope compositions for samples collected at the Ross River sewage lagoon.

As displayed in Figure 4 above, the sample collected from the Pelly River downgradient of the lagoon site (RR-S2) is similar to the amount-weighted average precipitation. This result suggests that the Pelly River generally represents the average isotopic signature of precipitation in the catchment combined with groundwater discharging to the river. In

contrast, samples collected from surface water at RR-15 (wetland), and RR-11 and RR-12 (lagoons) have experienced significant evaporation, diverging from the LMWL to form a Local Evaporation Line (LEL). Water that has evaporated from open surfaces typically plot below the LMWL with a slope between two and five (Kendall & Doctor, 2005). RR-12 diverges further than RR-11 as it has the longer residence time and experiences more evaporation. Groundwater well RR-16 plots closer to the weighted precipitation average, which indicates it is more influenced by seasonal rains, suggesting it is representative of shallower or newer groundwater, where RR-17, RR-18 and RR-19 would appear to be older, deeper groundwater, though perhaps only marginally.

It would be expected that precipitation-sourced water at the wetland location RR-15 would experience some amount of evaporation before flowing to ground as this pond is a natural feature that likely infiltrates at a relatively significant rate, whereas lined lagoon cells do not. As such, water in RR-11 has a longer residence time and is thus more influenced by evaporation than water in the natural pond RR-15, which plots further from the LMWL. Finally, RR-12 displays the most evaporated water as is to be expected by the time it has reached the second lagoon cell where it has been exposed to the greatest duration of evaporation. RR-12 has the largest surface area, which creates more potential for evaporation.

In Figure 4, the dotted blue “LEL” is based on the isotopic signature of the surface water on site and diverges from the LMWL due to an increasingly longer duration spent evaporating in the different ponds. As such, it is expected that RR-15 has the shortest residence time and is infiltrating to ground at a much greater rate than the lagoon cells. As indicated in Figure 5 below, a hydrogeological assessment indicated groundwater flows generally from south-to-north (Tetra Tech 2015). This supports the hypothesis that RR16 is younger groundwater than RR-17, RR-18, and RR-19, which should be kept in mind when comparing groundwater data up- and down-gradient of the facility.

3.4 Artificial sweetener analysis

Artificial sweeteners are anthropogenic compounds commonly used as food additives. They are widespread in products consumed by humans such as diet beverages,

pharmaceuticals, and toothpaste, and therefore are ubiquitous in domestic wastewater. These compounds have no natural source, are persistent in the natural environment (particularly acesulfame and sucralose) and can be detected at relatively low concentrations (i.e. on the order of nanograms per litre), making them useful as tracers of human wastewater. Four commonly used artificial sweeteners (acesulfame, sucralose, saccharin and cyclamate) are used as a tracer of wastewater in this audit to understand possible flow paths and receptors.

Artificial sweeteners are emerging as useful tracers of wastewater; as Spoelstra et al. (2017) states: "*Numerous studies have now demonstrated that artificial sweeteners are powerful tracers of wastewater in the environment*." Peer-reviewed studies have been published over the last 15 years demonstrating the efficacy of using artificial sweeteners as a tracer of domestic wastewater (Spoelstra et al. 2017). Since 2018, Water Resources Branch has used artificial sweeteners to support audits of several municipal wastewater treatment facilities around the Yukon. Artificial sweetener results are reported in nanograms per litre (ng/L). Figure 6 below shows relative concentrations of artificial sweeteners (depicted using pie charts) and total concentrations (indicated by the size of the pie charts). The data is also presented in Appendix C.

The sweetener results indicate that wastewater from the facility is likely flowing west/north-west from the infiltration cells to groundwater well RR-17 (Figure 6) though sweetener concentrations in groundwater well RR-17 were low and there was no detection in the other downgradient wells RR-18 and RR-19. This suggests that a groundwater plume containing sweeteners may be moving west/north-west and may eventually cause sweetener detections in RR-18 and RR-19, though this would take time. It should be noted that artificial sweeteners themselves are not currently known to be harmful to the environment. The samples collected provide valuable insight to flow paths from the facility, but do not provide a comprehensive understanding of groundwater flow paths. Results from the single sweetener sampling event suggest that groundwater is generally travelling in a west/north-west direction from the facility, and the interpolated groundwater gradient supports this. Additionally, Figure 5 shows pre-construction site assessments that demonstrate a similar general groundwater flow path,

though more northward. It is suspected that this would be altered after the construction and filling of the two infiltration cells.

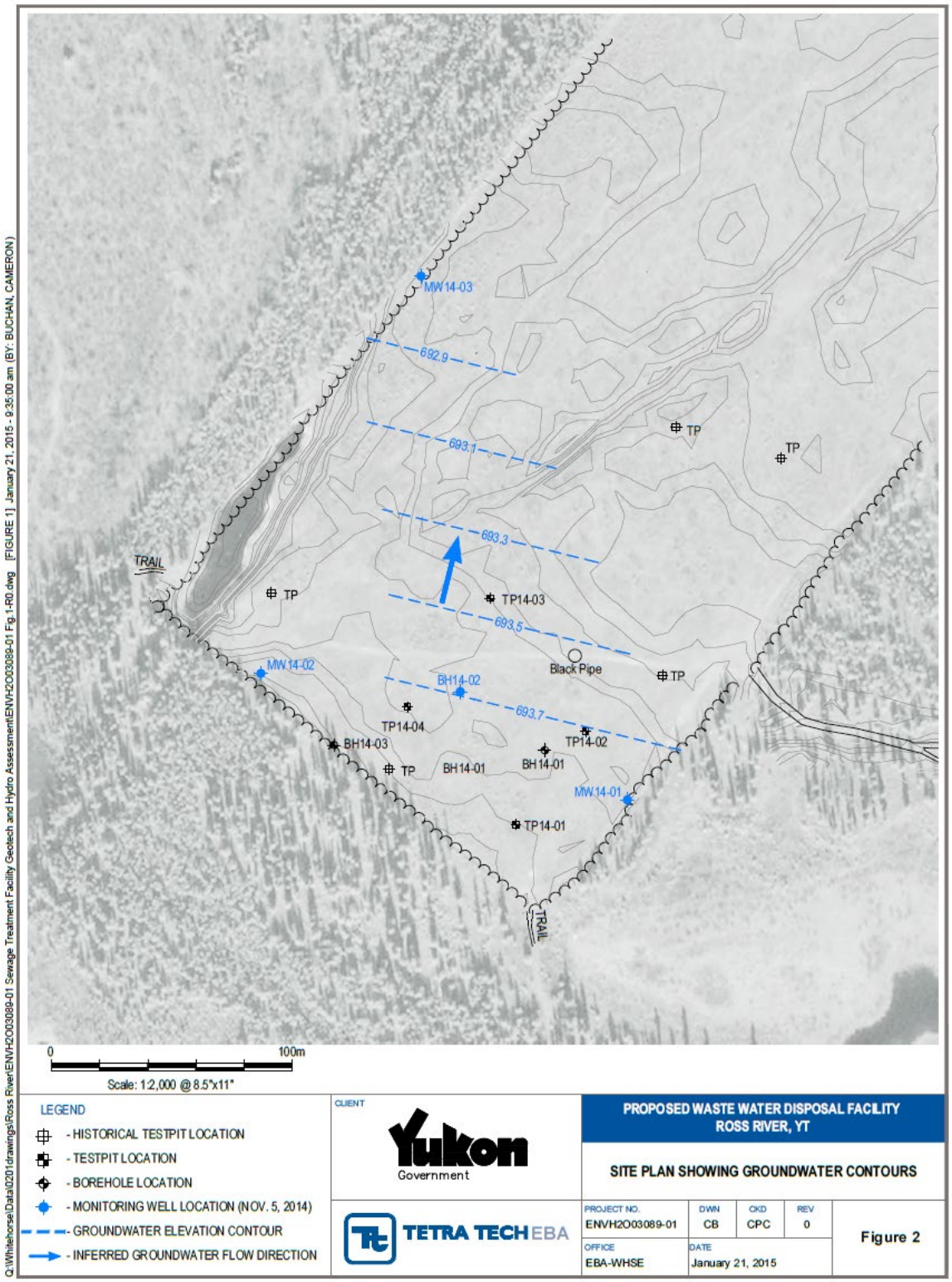

Figure 5. Groundwater contours at RRWWTF determined by pre-construction hydrogeo assessment. (Tetra Tech 2015)

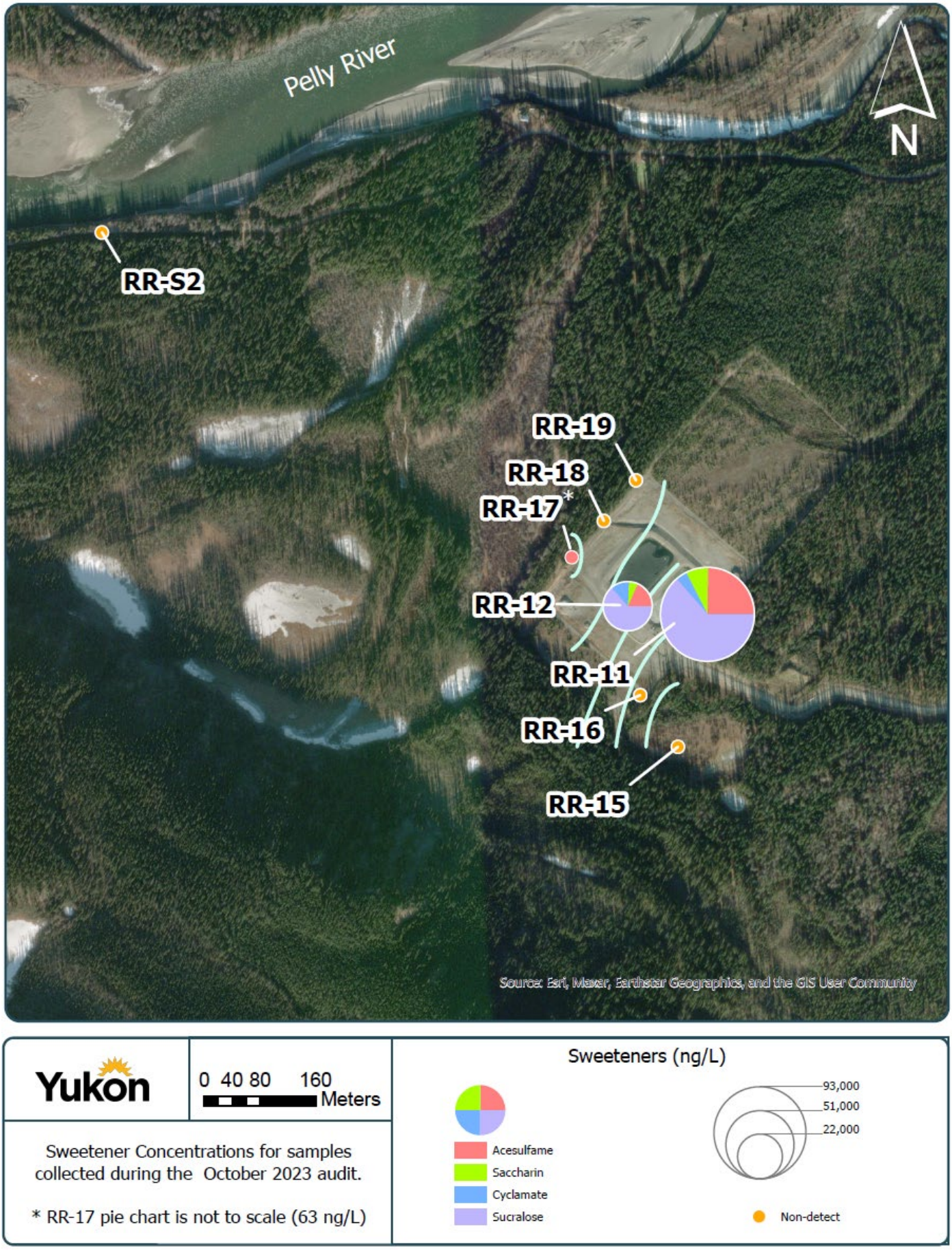

Figure 6. Sweetener sample overview

3.5 Lagoon water balance

Since the facility began operation in 2019, influent volumes and lagoon volumes have not been monitored as per MN15-043 requirements. Table 9 outlines the best available water balance data WRB has for the Ross River sewage lagoons, sourced from annual reports submitted to Waterline. Initial estimates reported in 2019 were based on communications from previous facility monitoring reports or estimates provided directly from the licensee, though it was also expressed in annual reports that these estimates may be inaccurate. Subsequent water balance values could not be calculated due to the lack of monitoring influent volumes or regular staff gauge readings on site.

Table 9. All available water balance data. Design projected values taken from March 2016

Year	Design projected influent (m^3)	Actual influent (m^3)	Design projected effluent (m^3)	Actual effluent (m^3)	Design projected total stored (m^3)	Actual total stored (m^3)
2019	168	1135.62*	0	0	6580**	11199.9*
2020	168	*Unknown*	1100	0	6060	*Unknown*
2021	168	*Unknown*	0	0	6640	*Unknown*
2022	168	*Unknown*	1100	0	6120	*Unknown*

*Extrapolated based on communications recorded in previous monitoring reports or proponent estimate
**Includes initial 6000 m^3 "top-up" to ensure minimum water level in lagoons

Table 9 displays discrepancies between storage estimates and the volumes projected by design documents. As per design documents, the facility was predicted to discharge twice by 2022 (or year 4 of operation); however, based on available reporting and discussions with Environment inspectors, WRB is unaware of any discharge events from the site to date. Additionally, estimated influent and storage volumes would put current storage well above design projections, with almost double the volume in the lagoons than what was projected. In the original YESAA project proposal, the lagoon was originally designed to store 300 days (10 months) of continuous wastewater input (Yucan Planning, 2015). This equates to a maximum storage capacity of 15,000 m^3 (5,500 in the primary cell and 9,500 m^3 in cell two). The design criteria also stipulate that

the facility must provide sufficient capacity to effectively treat wastewater from the current Ross River population (~350) and allow for growth of up to 420 residents.

4 Conclusions & recommendations

There is very little water quality data for the Ross River sewage lagoons because the facility is relatively new, and the licence only requires surface water sampling immediately before, during and after effluent is discharged from the site. For this reason, it is difficult to make any conclusions regarding water quality on site. Based on the single October 2023 sampling event, water quality is good, and lagoon water does not appear to be impacting adjacent surface or groundwater.

In trying to understand when and how the facility discharges effluent, it was found that the site should have had to have discharged by now, but for some reason has not. In investigating this, WRB found that influent has not been adequately monitored and quantified as per MN15-043, making it difficult to understand if the facility is functioning properly and when the site might need to discharge effluent. Additionally, WRB only understands the discharge process based on design documents, which are all indicated to be “preliminary”. It is unclear if ‘as built’ diagrams were ever submitted, though this is a requirement in MN15-043.

These conclusions lead WRB to put forward the following recommendations for the licensee holder:

1. **Record and evaluate lagoon water balance components annually including:**
    a. **Monitoring influent volumes**

    Based on annual reports submitted to Waterline for licence MN15-043, wastewater influent has not been monitored as per the sampling and monitoring schedule in the licence. Current influent and stored volumes are estimates only. Accurate influent measurements are required for investigations into the

functionality of the facility relative to its designs as well as planning for discharge windows outlined in the licence.

b. **Collecting monthly staff gauge readings during open water**

Based on annual reports submitted to Waterline for licence MN15-043, lagoon storage volumes are being calculated using stage elevation, though it is unclear whether water level elevation is being monitored as per the sampling and monitoring schedule in the licence. Accurate staff gauge readings are required for confirming influent volumes and lagoon storage/capacity if volumes are going to be calculated using stage elevation.

c. **Calculate lagoon stored water volumes annually**

Annual calculations should be completed to verify all water balance components. This will allow for confirmation of influent and storage volumes between measured values and design projections.

2. **Begin regular groundwater monitoring.**

   The water licence monitoring frequency for groundwater wells is related to the timing of discharge. Since the facility has not discharged, there has not been regular groundwater monitoring. However, this fails to monitor one potential explanation for the lack of discharge, which is the possibility more wastewater is infiltrating to the ground than expected. As such, we recommend sampling all groundwater monitoring wells at a minimum once every two years regardless of if discharge has occurred.

Authors & contact information

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For more information about this report please contact

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-OR-

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References

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Yucan Planning (2015). Ross River Wastewater Treatment System. Yukon Community Services YESAA Project proposal. Available at: https://www.yukonwaterboard.ca/waterline/

Appendix A – ALS water quality sample results

CERTIFICATE OF ANALYSIS

Work Order	: **WR2301296**	Page	: 1 of 17
Client	: **Government of Yukon**	Laboratory	: ALS Environmental - Whitehorse
Contact	: Water Resources Branch	Account Manager	: Tasnia Tarannum
Address	: Department of Environment, Environmental Protection and Assessment Branch 419 Range Road Whitehorse YT Canada Y1A 3V1	Address	: #12 151 Industrial Road Whitehorse YT Canada Y1A 2V3
Telephone	: ----	Telephone	: +1 867 668 6689
Project	: Ross Audit	Date Samples Received	: 12-Oct-2023 12:08
PO	: ----	Date Analysis Commenced	: 16-Oct-2023
C-O-C number	: 17774146	Issue Date	: 25-Oct-2023 15:52
Sampler	: ----		
Site	: YOWN - Yukon Observation Well Network		
Quote number	: WR22-GYPT100-002		
No. of samples received	: 7		
No. of samples analysed	: 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 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.

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Inorganics, Waterloo, Ontario
Kate Dimitrova	Supervisor - Inorganic	Inorganics, 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
Paul Cushing	Team Leader - Organics	Inorganics, 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
NTU	nephelometric turbidity units
pH units	pH units

<: less than.

>: greater than.

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

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

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

Workorder Comments

Sample(Travel Blank) 007: Oil & Grease Containers not received at laboratory, but requested on Chain of Custody / analytical request form; subsample cannot be obtained from other containers to meet request. The requested analysis cannont be performed.Analysis deleted for Oil & Grease.

Sample Comments

Sample	Client Id	*Comment*
WR2301296-006	Field Blank	Water sample for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

Qualifiers

Qualifier	*Description*

DLCI	*Detection Limit Raised: Chromatographic interference due to co-elution.*
DLDS	*Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*
PEHR	*Parameter exceeded recommended holding time on receipt: Proceeded with analysis as requested.*

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Physical Tests										
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L		298	339	323	318	43.3
Alkalinity, carbonate (as CaCO3)	----	E290/VA	1.0	mg/L		5.0	10.3	<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		304	349	323	318	43.3
Conductivity	----	E100/VA	2.0	µS/cm		871	904	1360	1540	929
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L		390	354	785	889	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L		375	356	787	869	356
pH	----	E108/VA	0.10	pH units		8.31	8.36	8.06	8.10	7.82
pH @ 15°C (WSER)	----	E108A/VA	0.10	pH units		7.99	7.77	7.75	7.87	7.73
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L		597	641	1060	1270	706
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L		5.1	13.1	3.1	<3.0	6.3
Turbidity	----	E121/VA	0.10	NTU		2.21	38.7	2.97	0.90	2.65
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L		2.29	4.01	0.0518	0.0088	0.767
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L		0.0595	0.0634	<0.0010	<0.0010	0.0111
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L		<0.250 DLDS	<0.250 DLDS	<0.250 DLDS	<0.500 DLDS	<0.250 DLDS
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L		17.8	49.4	2.60	5.75	<2.50 DLDS
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L		0.471	0.223	0.363	<0.200 DLDS	0.502
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L		<0.0250 DLDS	0.0377	0.349	0.438	<0.0250 DLDS
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L		<0.0255	0.0429	0.349	0.438	<0.0255
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L		0.0165	0.0052	<0.0050 DLDS	<0.0100 DLDS	0.0080
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L		1.39	5.49	0.0142	0.0063	0.0153
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L		1.40	4.59	0.0046	0.0048	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L		148	66.9	466	583	409
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L		27.6	44.7	10.9	9.67	----
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L		26.8	98.4	9.18	8.75	3.28

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Inorganics										
Chlorine, free	7782-50-5	E327/WT	0.050	mg/L		<0.050 PEHR	<0.050 PEHR	<0.050 PEHR	<0.050 PEHR	----
Chlorine, total	7782-50-5	E326/WT	0.050	mg/L		<0.050 PEHR	<0.050 PEHR	<0.050 PEHR	0.120 PEHR	----
Total Metals										
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L		0.0177	0.0380	0.0980	0.0183	0.0882
Antimony, total	7440-36-0	E420/VA	0.00010	mg/L		0.00070	0.00061	0.00039	0.00054	0.00034
Arsenic, total	7440-38-2	E420/VA	0.00010	mg/L		0.0123	0.00669	0.00065	0.00040	0.00225
Barium, total	7440-39-3	E420/VA	0.00010	mg/L		0.0622	0.0436	0.0483	0.0422	0.0186
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth, total	7440-69-9	E420/VA	0.000050	mg/L		<0.000050	0.00169	<0.000050	<0.000050	<0.000050
Boron, total	7440-42-8	E420/VA	0.010	mg/L		0.029	0.175	0.010	0.012	0.010
Cadmium, total	7440-43-9	E420/VA	0.0000050	mg/L		0.0000087	0.0000353	0.000189	0.000463	<0.0000550 DLM
Calcium, total	7440-70-2	E420/VA	0.050	mg/L		45.6	58.3	180	170	84.4
Cesium, total	7440-46-2	E420/VA	0.000010	mg/L		0.000016	0.000056	0.000018	<0.000010	0.000015
Chromium, total	7440-47-3	E420/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	0.00092
Cobalt, total	7440-48-4	E420/VA	0.00010	mg/L		0.00044	0.00049	0.00036	0.00103	0.00038
Copper, total	7440-50-8	E420/VA	0.00050	mg/L		<0.00050	0.00933	0.00345	0.00173	0.00098
Iron, total	7439-89-6	E420/VA	0.010	mg/L		0.277	0.243	0.209	0.047	0.248
Lead, total	7439-92-1	E420/VA	0.000050	mg/L		0.000120	0.000240	0.000150	<0.000050	0.000156
Lithium, total	7439-93-2	E420/VA	0.0010	mg/L		0.0089	0.0128	0.0090	0.0099	0.0034
Magnesium, total	7439-95-4	E420/VA	0.0050	mg/L		63.4	51.0	81.9	108	35.2
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L		0.293	0.377	0.185	0.432	0.136
Mercury, total	7439-97-6	E508/VA	0.0000050	mg/L		<0.0000050	0.0000091	<0.0000050	<0.0000050	<0.0000050
Molybdenum, total	7439-98-7	E420/VA	0.000050	mg/L		0.00458	0.00266	0.00252	0.00255	0.0378
Nickel, total	7440-02-0	E420/VA	0.00050	mg/L		0.00353	0.00353	0.00425	0.00324	0.00225
Phosphorus, total	7723-14-0	E420/VA	0.050	mg/L		1.50	6.68	<0.050	<0.050	<0.050
Potassium, total	7440-09-7	E420/VA	0.050	mg/L		11.6	21.8	7.20	4.06	1.87
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L		0.00530	0.0158	0.00115	0.00080	0.00099
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L		0.000372	0.000394	0.000486	0.00733	0.000155
Silicon, total	7440-21-3	E420/VA	0.10	mg/L		2.33	6.16	5.84	4.78	2.94
Silver, total	7440-22-4	E420/VA	0.000010	mg/L		<0.000010	0.000022	<0.000010	<0.000010	<0.000010

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Total Metals										
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		43.1	58.1	21.0	43.6	59.4
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		0.324	0.374	0.541	0.653	0.442
Sulfur, total	7704-34-9	E420/VA	0.50	mg/L		56.5	31.7	173	220	150
Tellurium, total	13494-80-9	E420/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium, total	7440-28-0	E420/VA	0.000010	mg/L		<0.000010	<0.000010	0.000024	0.000016	0.000025
Thorium, total	7440-29-1	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin, total	7440-31-5	E420/VA	0.00010	mg/L		<0.00010	0.00078	<0.00010	<0.00010	0.00010
Titanium, total	7440-32-6	E420/VA	0.00030	mg/L		0.00062	0.00074	0.00364	0.00069	0.00629
Tungsten, total	7440-33-7	E420/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	0.00016	0.00037
Uranium, total	7440-61-1	E420/VA	0.000010	mg/L		0.00390	0.00179	0.00499	0.0170	0.000546
Vanadium, total	7440-62-2	E420/VA	0.00050	mg/L		0.00052	0.00054	0.00051	0.00051	<0.00050
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	0.0276	0.0031	0.0037	<0.0030
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	0.00020	0.00030	<0.00020	<0.00020
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L		0.0092	0.0158	<0.0010	0.0015	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		0.00074	0.00052	0.00033	0.00046	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		0.0124	0.00593	0.00051	0.00036	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		0.0646	0.0422	0.0456	0.0416	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	<0.000100	<0.000100	<0.000100	----
Bismuth, dissolved	7440-69-9	E421/VA	0.000050	mg/L		<0.000050	0.000383	<0.000050	<0.000050	----
Boron, dissolved	7440-42-8	E421/VA	0.010	mg/L		0.030	0.168	0.010	0.012	----
Cadmium, dissolved	7440-43-9	E421/VA	0.0000050	mg/L		<0.0000050	0.0000119	0.0000995	0.000136	----
Calcium, dissolved	7440-70-2	E421/VA	0.050	mg/L		46.9	56.3	175	168	----
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L		0.000018	0.000056	<0.000010	<0.000010	----
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		0.00042	0.00035	<0.00010	0.00014	----
Copper, dissolved	7440-50-8	E421/VA	0.00020	mg/L		0.00021	0.00237	0.00309	0.00134	----
Iron, dissolved	7439-89-6	E421/VA	0.010	mg/L		0.213	0.130	<0.010	<0.010	----
Lead, dissolved	7439-92-1	E421/VA	0.000050	mg/L		0.000088	0.000071	<0.000050	<0.000050	----
Lithium, dissolved	7439-93-2	E421/VA	0.0010	mg/L		0.0093	0.0123	0.0084	0.0093	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Dissolved Metals										
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		66.4	51.9	84.6	114	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		0.294	0.357	0.0400	0.0313	----
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		0.00459	0.00216	0.00231	0.00227	----
Nickel, dissolved	7440-02-0	E421/VA	0.00050	mg/L		0.00356	0.00308	0.00310	0.00175	----
Phosphorus, dissolved	7723-14-0	E421/VA	0.050	mg/L		1.42	4.50	<0.050	<0.050	----
Potassium, dissolved	7440-09-7	E421/VA	0.050	mg/L		12.1	21.1	7.49	4.06	----
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L		0.00537	0.0140	0.00108	0.00080	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		0.000334	0.000242	0.000484	0.00741	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		2.42	6.30	5.50	4.88	----
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		43.7	57.0	19.8	43.3	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		0.339	0.374	0.560	0.687	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L		58.4	29.7	179	231	----
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L		<0.00020	<0.00020	<0.00020	<0.00020	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	<0.000010	0.000026	0.000012	----
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Tin, dissolved	7440-31-5	E421/VA	0.00010	mg/L		<0.00010	0.00050	<0.00010	<0.00010	----
Titanium, dissolved	7440-32-6	E421/VA	0.00030	mg/L		0.00048	0.00042	<0.00030	<0.00030	----
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L		<0.00010	<0.00010	<0.00010	<0.00010	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		0.00392	0.00162	0.00510	0.0164	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	<0.00050	<0.00050	<0.00050	----
Zinc, dissolved	7440-66-6	E421/VA	0.0010	mg/L		0.0012	0.0061	0.0015	0.0014	----
Zirconium, dissolved	7440-67-7	E421/VA	0.00020	mg/L		<0.00020	0.00028	<0.00020	<0.00020	----
Dissolved mercury filtration location	----	EP509/VA	-	-		Field	Field	Field	Field	----
Dissolved metals filtration location	----	EP421/VA	-	-		Field	Field	Field	Field	----
Aggregate Organics										
Carbonaceous biochemical oxygen demand [CBOD]	----	E555/VA	2.0	mg/L		4.0	46.5	<2.0	<2.0	----
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		<5.0	<5.0	<5.0	<5.0	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds										
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	----
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	----
Volatile Organic Compounds [Drycleaning]										
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	<1.0	<1.0	<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	----
Volatile Organic Compounds [Fuels]										
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	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Volatile Organic Compounds [Fuels]										
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		0.41	22.7	<0.40	<0.40	----
Xylene, m+p-	179601-23-1	E611C/VA	0.40	µg/L		<0.40	<0.40	<0.40	<0.40	----
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	----
Volatile Organic Compounds [THMs]										
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	----
Hydrocarbons										
EPH (C10-C19)	----	E601A/VA	250	µg/L		<250	<250	<250	<250	----
EPH (C19-C32)	----	E601A/VA	250	µg/L		<250	920	<250	<250	----
HEPHw	----	EC600A/VA	250	µg/L		<250	920	<250	<250	----
LEPHw	----	EC600A/VA	250	µg/L		<250	<250	<250	<250	----
Hydrocarbons Surrogates										
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/VA	1.0	%		89.7	101	81.0	82.6	----
Volatile Organic Compounds Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%		92.0	94.1	95.7	92.3	----
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%		103	103	103	101	----
Polycyclic Aromatic Hydrocarbons										
Acenaphthene	83-32-9	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Acenaphthylene	208-96-8	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Acridine	260-94-6	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Anthracene	120-12-7	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Benz(a)anthracene	56-55-3	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Benzo(a)pyrene	50-32-8	E641A/VA	0.0050	µg/L		<0.0050	<0.0050	<0.0050	<0.0050	----
Benzo(b+j)fluoranthene	n/a	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Benzo(b+j+k)fluoranthene	n/a	E641A/VA	0.015	µg/L		<0.015	<0.015	<0.015	<0.015	----
Benzo(g,h,i)perylene	191-24-2	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	RR-12	RR-11	RR-16	RR-17	RR-18
					Client sampling date / time	10-Oct-2023 14:55	10-Oct-2023 14:45	11-Oct-2023 13:15	11-Oct-2023 11:15	11-Oct-2023 10:30
						WR2301296-001	WR2301296-002	WR2301296-003	WR2301296-004	WR2301296-005
						Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons										
Benzo(k)fluoranthene	207-08-9	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Chrysene	218-01-9	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A/VA	0.0050	µg/L		<0.0050	<0.0050	<0.0050	<0.0050	----
Fluoranthene	206-44-0	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Fluorene	86-73-7	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A/VA	0.010	µg/L		<0.010	<0.010	<0.010	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A/VA	0.010	µg/L		<0.010	0.026	<0.010	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A/VA	0.010	µg/L		<0.010	0.025	0.019	0.019	----
Naphthalene	91-20-3	E641A/VA	0.050	µg/L		<0.050	<0.050	<0.050	<0.050	----
Phenanthrene	85-01-8	E641A/VA	0.020	µg/L		<0.020	<0.020	<0.020	<0.020	----
Pyrene	129-00-0	E641A/VA	0.010	µg/L		<0.010	<0.020 DLCI	<0.010	<0.010	----
Quinoline	91-22-5	E641A/VA	0.050	µg/L		<0.050	<0.100 DLCI	<0.050	<0.050	----
Polycyclic Aromatic Hydrocarbons Surrogates										
Chrysene-d12	1719-03-5	E641A/VA	0.1	%		73.0	101	78.9	79.6	----
Naphthalene-d8	1146-65-2	E641A/VA	0.1	%		102	126	84.5	91.6	----
Phenanthrene-d10	1517-22-2	E641A/VA	0.1	%		113	110	102	108	----

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	Field Blank	Travel Blank	----	----	----
				Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WR2301296-006	WR2301296-007	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
Alkalinity, bicarbonate (as CaCO3)	----	E290/VA	1.0	mg/L	<1.0	<1.0	----	----	----
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	<1.0	<1.0	----	----	----
Conductivity	----	E100/VA	2.0	µS/cm	<2.0	<2.0	----	----	----
Hardness (as CaCO3), dissolved	----	EC100/VA	0.60	mg/L	<0.60	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/VA	0.60	mg/L	<0.60	<0.60	----	----	----
pH	----	E108/VA	0.10	pH units	5.44	5.44	----	----	----
pH @ 15°C (WSER)	----	E108A/VA	0.10	pH units	5.61	5.46	----	----	----
Solids, total dissolved [TDS]	----	E162/VA	10	mg/L	<10	<10	----	----	----
Solids, total suspended [TSS]	----	E160/VA	3.0	mg/L	<3.0	<3.0	----	----	----
Turbidity	----	E121/VA	0.10	NTU	<0.10	<0.10	----	----	----
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	E298/VA	0.0050	mg/L	<0.0050	<0.0050	----	----	----
Ammonia, un-ionized (as N), 15°C (WSER)	7664-41-7	EC298/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Bromide	24959-67-9	E235.Br-L/VA	0.050	mg/L	<0.050	<0.050	----	----	----
Chloride	16887-00-6	E235.Cl/VA	0.50	mg/L	<0.50	<0.50	----	----	----
Fluoride	16984-48-8	E235.F/VA	0.020	mg/L	<0.020	<0.020	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/VA	0.0050	mg/L	<0.0050	<0.0050	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/VA	0.0050	mg/L	<0.0051	<0.0051	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/VA	0.0010	mg/L	<0.0010	<0.0010	----	----	----
Phosphorus, total	7723-14-0	E372-U/VA	0.0020	mg/L	<0.0020	<0.0020	----	----	----
Phosphorus, total dissolved	7723-14-0	E375-T/VA	0.0020	mg/L	<0.0020	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/VA	0.30	mg/L	<0.30	<0.30	----	----	----
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	E358-L/VA	0.50	mg/L	<0.50	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/VA	0.50	mg/L	<0.50	<0.50	----	----	----
Inorganics									

Analytical Results

Sub-Matrix: Water (Matrix: Water)									
Client sample ID					**Field Blank**	**Travel Blank**	**----**	**----**	**----**
Client sampling date / time					11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	**WR2301296-006**	**WR2301296-007**	**--------**	**--------**	**--------**
					Result	Result	----	----	----
Inorganics									
Chlorine, free	7782-50-5	E327/WT	0.050	mg/L	<0.050 PEHR	<0.050 PEHR	----	----	----
Chlorine, total	7782-50-5	E326/WT	0.050	mg/L	<0.050 PEHR	<0.050 PEHR	----	----	----
Total Metals									
Aluminum, total	7429-90-5	E420/VA	0.0030	mg/L	<0.0030	<0.0030	----	----	----
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	<0.00010	<0.00010	----	----	----
Barium, total	7440-39-3	E420/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----
Beryllium, total	7440-41-7	E420/VA	0.000100	mg/L	<0.000100	<0.000100	----	----	----
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	<0.0000050	----	----	----
Calcium, total	7440-70-2	E420/VA	0.050	mg/L	<0.050	<0.050	----	----	----
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	<0.00010	----	----	----
Copper, total	7440-50-8	E420/VA	0.00050	mg/L	<0.00050	<0.00050	----	----	----
Iron, total	7439-89-6	E420/VA	0.010	mg/L	<0.010	<0.010	----	----	----
Lead, total	7439-92-1	E420/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----
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	<0.0050	<0.0050	----	----	----
Manganese, total	7439-96-5	E420/VA	0.00010	mg/L	<0.00010	<0.00010	----	----	----
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	<0.00050	----	----	----
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	<0.050	<0.050	----	----	----
Rubidium, total	7440-17-7	E420/VA	0.00020	mg/L	<0.00020	<0.00020	----	----	----
Selenium, total	7782-49-2	E420/VA	0.000050	mg/L	<0.000050	<0.000050	----	----	----
Silicon, total	7440-21-3	E420/VA	0.10	mg/L	<0.10	<0.10	----	----	----
Silver, total	7440-22-4	E420/VA	0.000010	mg/L	<0.000010	<0.000010	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Field Blank	Travel Blank	----	----	----
					Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
						WR2301296-006	WR2301296-007	--------	--------	--------
						Result	Result	----	----	----
Total Metals										
Sodium, total	7440-23-5	E420/VA	0.050	mg/L		<0.050	<0.050	----	----	----
Strontium, total	7440-24-6	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
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		<0.00030	<0.00030	----	----	----
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	<0.00050	----	----	----
Zinc, total	7440-66-6	E420/VA	0.0030	mg/L		<0.0030	<0.0030	----	----	----
Zirconium, total	7440-67-7	E420/VA	0.00020	mg/L		<0.00020	<0.00020	----	----	----
Dissolved Metals										
Aluminum, dissolved	7429-90-5	E421/VA	0.0010	mg/L		<0.0010	----	----	----	----
Antimony, dissolved	7440-36-0	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Arsenic, dissolved	7440-38-2	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Barium, dissolved	7440-39-3	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Beryllium, dissolved	7440-41-7	E421/VA	0.000100	mg/L		<0.000100	----	----	----	----
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		<0.050	----	----	----	----
Cesium, dissolved	7440-46-2	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
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		<0.00020	----	----	----	----
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	----	----	----	----

Analytical Results

Sub-Matrix: **Water**
(Matrix: **Water**)

Analyte	CAS Number	Method/Lab	LOR	Unit	Client sample ID	Field Blank	Travel Blank	----	----	----
					Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
						WR2301296-006	WR2301296-007	--------	--------	--------
						Result	Result	----	----	----
Dissolved Metals										
Magnesium, dissolved	7439-95-4	E421/VA	0.0050	mg/L		<0.0050	----	----	----	----
Manganese, dissolved	7439-96-5	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Mercury, dissolved	7439-97-6	E509/VA	0.0000050	mg/L		<0.0000050	----	----	----	----
Molybdenum, dissolved	7439-98-7	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
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	0.050	mg/L		<0.050	----	----	----	----
Rubidium, dissolved	7440-17-7	E421/VA	0.00020	mg/L		<0.00020	----	----	----	----
Selenium, dissolved	7782-49-2	E421/VA	0.000050	mg/L		<0.000050	----	----	----	----
Silicon, dissolved	7440-21-3	E421/VA	0.050	mg/L		<0.050	----	----	----	----
Silver, dissolved	7440-22-4	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Sodium, dissolved	7440-23-5	E421/VA	0.050	mg/L		<0.050	----	----	----	----
Strontium, dissolved	7440-24-6	E421/VA	0.00020	mg/L		<0.00020	----	----	----	----
Sulfur, dissolved	7704-34-9	E421/VA	0.50	mg/L		<0.50	----	----	----	----
Tellurium, dissolved	13494-80-9	E421/VA	0.00020	mg/L		<0.00020	----	----	----	----
Thallium, dissolved	7440-28-0	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Thorium, dissolved	7440-29-1	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
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	----	----	----	----
Tungsten, dissolved	7440-33-7	E421/VA	0.00010	mg/L		<0.00010	----	----	----	----
Uranium, dissolved	7440-61-1	E421/VA	0.000010	mg/L		<0.000010	----	----	----	----
Vanadium, dissolved	7440-62-2	E421/VA	0.00050	mg/L		<0.00050	----	----	----	----
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	----	----	----	----
Aggregate Organics										
Carbonaceous biochemical oxygen demand [CBOD]	----	E555/VA	2.0	mg/L		<2.0	<2.0	----	----	----
Oil & grease (gravimetric)	----	E567/VA	5.0	mg/L		<5.0	----	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)									
				Client sample ID	Field Blank	Travel Blank	----	----	----
				Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WR2301296-006	WR2301296-007	--------	--------	--------
					Result	Result	----	----	----
Volatile Organic Compounds									
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	----	----	----
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	----	----	----
Volatile Organic Compounds [Drycleaning]									
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	----	----	----
Volatile Organic Compounds [Fuels]									
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	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)									
				Client sample ID	Field Blank	Travel Blank	----	----	----
				Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WR2301296-006	WR2301296-007	--------	--------	--------
					Result	Result	----	----	----
Volatile Organic Compounds [Fuels]									
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	----	----	----
Xylenes, total	1330-20-7	E611C/VA	0.50	µg/L	<0.50	<0.50	----	----	----
Volatile Organic Compounds [THMs]									
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	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A/VA	250	µg/L	<250	<250	----	----	----
EPH (C19-C32)	----	E601A/VA	250	µg/L	<250	<250	----	----	----
HEPHw	----	EC600A/VA	250	µg/L	<250	<250	----	----	----
LEPHw	----	EC600A/VA	250	µg/L	<250	<250	----	----	----
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/VA	1.0	%	84.6	86.5	----	----	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611C/VA	1.0	%	95.0	97.2	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611C/VA	1.0	%	103	103	----	----	----
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Acenaphthylene	208-96-8	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Acridine	260-94-6	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Anthracene	120-12-7	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Benz(a)anthracene	56-55-3	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Benzo(a)pyrene	50-32-8	E641A/VA	0.0050	µg/L	<0.0050	<0.0050	----	----	----
Benzo(b+j)fluoranthene	n/a	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Benzo(b+j+k)fluoranthene	n/a	E641A/VA	0.015	µg/L	<0.015	<0.015	----	----	----
Benzo(g,h,i)perylene	191-24-2	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----

Analytical Results

Sub-Matrix: Water (Matrix: Water)									
				Client sample ID	Field Blank	Travel Blank	----	----	----
				Client sampling date / time	11-Oct-2023 13:30	11-Oct-2023 00:00	----	----	----
Analyte	CAS Number	Method/Lab	LOR	Unit	WR2301296-006	WR2301296-007	--------	--------	--------
					Result	Result	----	----	----
Polycyclic Aromatic Hydrocarbons									
Benzo(k)fluoranthene	207-08-9	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Chrysene	218-01-9	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Dibenz(a,h)anthracene	53-70-3	E641A/VA	0.0050	µg/L	<0.0050	<0.0050	----	----	----
Fluoranthene	206-44-0	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Fluorene	86-73-7	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Methylnaphthalene, 1-	90-12-0	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Methylnaphthalene, 2-	91-57-6	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Naphthalene	91-20-3	E641A/VA	0.050	µg/L	<0.050	<0.050	----	----	----
Phenanthrene	85-01-8	E641A/VA	0.020	µg/L	<0.020	<0.020	----	----	----
Pyrene	129-00-0	E641A/VA	0.010	µg/L	<0.010	<0.010	----	----	----
Quinoline	91-22-5	E641A/VA	0.050	µg/L	<0.050	<0.050	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
Chrysene-d12	1719-03-5	E641A/VA	0.1	%	85.1	85.7	----	----	----
Naphthalene-d8	1146-65-2	E641A/VA	0.1	%	94.4	92.8	----	----	----
Phenanthrene-d10	1517-22-2	E641A/VA	0.1	%	108	108	----	----	----

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.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WR2301296**	Page	: 1 of 33
Client	: **Government of Yukon**	Laboratory	: ALS Environmental - Whitehorse
Contact	: Water Resources Branch	Account Manager	: Tasnia Tarannum
Address	: Department of Environment, Environmental Protection and Assessment Branch 419 Range Road Whitehorse YT Canada Y1A 3V1	Address	: #12 151 Industrial Road Whitehorse, Yukon Canada Y1A 2V3
Telephone	: ----	Telephone	: +1 867 668 6689
Project	: Ross Audit	Date Samples Received	: 12-Oct-2023 12:08
PO	: ----	Issue Date	: 25-Oct-2023 15:48
C-O-C number	: 17774146		
Sampler	: ----		
Site	: YOWN - Yukon Observation Well Network		
Quote number	: WR22-GYPT100-002		
No. of samples received	: 7		
No. of samples analysed	: 7		

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE Field Blank	E555	11-Oct-2023	----	----	----		16-Oct-2023	3 days	5 days	× EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE RR-16	E555	11-Oct-2023	----	----	----		16-Oct-2023	3 days	5 days	× EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE RR-17	E555	11-Oct-2023	----	----	----		16-Oct-2023	3 days	5 days	× EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE Travel Blank	E555	11-Oct-2023	----	----	----		16-Oct-2023	3 days	5 days	× EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE RR-11	E555	10-Oct-2023	----	----	----		16-Oct-2023	3 days	6 days	× EHT
Aggregate Organics : Biochemical Oxygen Demand (Carbonaceous) - 5 day										
HDPE RR-12	E555	10-Oct-2023	----	----	----		16-Oct-2023	3 days	6 days	× EHT
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid) Field Blank	E567	11-Oct-2023	22-Oct-2023	28 days	11 days	✓	23-Oct-2023	40 days	1 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
RR-16	E567	11-Oct-2023	22-Oct-2023	28 days	11 days	✓	23-Oct-2023	40 days	1 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
RR-17	E567	11-Oct-2023	22-Oct-2023	28 days	11 days	✓	23-Oct-2023	40 days	1 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
RR-11	E567	10-Oct-2023	22-Oct-2023	28 days	12 days	✓	23-Oct-2023	40 days	1 days	✓
Aggregate Organics : Oil & Grease by Gravimetry										
Amber glass (hydrochloric acid)										
RR-12	E567	10-Oct-2023	22-Oct-2023	28 days	12 days	✓	23-Oct-2023	40 days	1 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
Field Blank	E298	11-Oct-2023	20-Oct-2023	28 days	8 days	✓	21-Oct-2023	28 days	9 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
RR-16	E298	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	21-Oct-2023	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
RR-17	E298	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	21-Oct-2023	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
RR-18	E298	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	21-Oct-2023	28 days	10 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
RR-11	E298	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	21-Oct-2023	28 days	11 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) RR-12	E298	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	21-Oct-2023	28 days	11 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (lab preserved) Travel Blank	E298	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Field Blank	E235.Br-L	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RR-16	E235.Br-L	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RR-11	E235.Br-L	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RR-12	E235.Br-L	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RR-17	E235.Br-L	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE RR-18	E235.Br-L	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Travel Blank	E235.Br-L	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Field Blank	E235.Cl	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE RR-16	E235.Cl	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE RR-11	E235.Cl	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE RR-12	E235.Cl	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE RR-17	E235.Cl	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE RR-18	E235.Cl	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Travel Blank	E235.Cl	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Field Blank	E235.F	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RR-16	E235.F	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE RR-11	E235.F	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RR-12	E235.F	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RR-17	E235.F	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE RR-18	E235.F	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Travel Blank	E235.F	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Field Blank	E235.NO3-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RR-16	E235.NO3-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RR-17	E235.NO3-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RR-18	E235.NO3-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO3-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RR-11	E235.NO3-L	10-Oct-2023	16-Oct-2023	3 days	6 days	× EHT	17-Oct-2023	3 days	6 days	× EHT
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE RR-12	E235.NO3-L	10-Oct-2023	16-Oct-2023	3 days	6 days	× EHT	17-Oct-2023	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Field Blank	E235.NO2-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RR-16	E235.NO2-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RR-17	E235.NO2-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RR-18	E235.NO2-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	5 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Travel Blank	E235.NO2-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	17-Oct-2023	3 days	6 days	× EHT
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RR-11	E235.NO2-L	10-Oct-2023	16-Oct-2023	3 days	6 days	× EHT	17-Oct-2023	3 days	6 days	× EHT

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE RR-12	E235.NO2-L	10-Oct-2023	16-Oct-2023	3 days	6 days	× EHT	17-Oct-2023	3 days	6 days	× EHT
Anions and Nutrients : Sulfate in Water by IC										
HDPE Field Blank	E235.SO4	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RR-16	E235.SO4	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RR-11	E235.SO4	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RR-12	E235.SO4	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RR-17	E235.SO4	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE RR-18	E235.SO4	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Travel Blank	E235.SO4	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) Field Blank	E375-T	11-Oct-2023	20-Oct-2023	28 days	8 days	✓	23-Oct-2023	28 days	12 days	✓

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) RR-16	E375-T	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) RR-17	E375-T	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) RR-11	E375-T	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass dissolved (sulfuric acid) RR-12	E375-T	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) Field Blank	E372-U	11-Oct-2023	20-Oct-2023	28 days	8 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) RR-16	E372-U	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) RR-17	E372-U	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) RR-18	E372-U	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	12 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid) RR-11	E372-U	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	13 days	✓

Matrix: **Water**

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Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (sulfuric acid)										
RR-12	E372-U	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	23-Oct-2023	28 days	13 days	✓
Anions and Nutrients : Total Phosphorus by Colourimetry (0.002 mg/L)										
Amber glass total (lab preserved)										
Travel Blank	E372-U	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	18-Oct-2023	28 days	2 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
HDPE dissolved (nitric acid)										
Field Blank	E509	11-Oct-2023	21-Oct-2023	0 hrs	227 hrs	× UCP	21-Oct-2023	0 hrs	227 hrs	× UCP
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
RR-11	E509	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
RR-12	E509	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
RR-16	E509	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Dissolved Metals : Dissolved Mercury in Water by CVAAS										
Glass vial dissolved (hydrochloric acid)										
RR-17	E509	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Field Blank	E421	11-Oct-2023	17-Oct-2023	180 days	6 days	✓	21-Oct-2023	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
RR-16	E421	11-Oct-2023	17-Oct-2023	180 days	6 days	✓	21-Oct-2023	180 days	10 days	✓

Matrix: **Water**

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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*	
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) RR-17	E421	11-Oct-2023	17-Oct-2023	180 days	6 days	✓	21-Oct-2023	180 days	10 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) RR-11	E421	10-Oct-2023	17-Oct-2023	180 days	7 days	✓	21-Oct-2023	180 days	11 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) RR-12	E421	10-Oct-2023	17-Oct-2023	180 days	7 days	✓	21-Oct-2023	180 days	11 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Field Blank	E601A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	24-Oct-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) RR-16	E601A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	24-Oct-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) RR-17	E601A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	24-Oct-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) RR-11	E601A	10-Oct-2023	23-Oct-2023	14 days	13 days	✓	24-Oct-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) RR-12	E601A	10-Oct-2023	23-Oct-2023	14 days	13 days	✓	24-Oct-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Amber glass/Teflon lined cap (sodium bisulfate) Travel Blank	E601A	11-Oct-2023	23-Oct-2023	14 days	13 days	✓	24-Oct-2023	40 days	1 days	✓

Matrix: **Water**

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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	
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE Field Blank	E327	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	280 hrs	× EHTR-FM
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE RR-16	E327	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	280 hrs	× EHTR-FM
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE RR-17	E327	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	282 hrs	× EHTR-FM
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE Travel Blank	E327	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	294 hrs	× EHTR-FM
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE RR-11	E327	10-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	303 hrs	× EHTR-FM
Inorganics : Free Chlorine (Residual) by DPD Colourimetry										
HDPE RR-12	E327	10-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	303 hrs	× EHTR-FM
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE Field Blank	E326	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	280 hrs	× EHTR-FM
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE RR-16	E326	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	280 hrs	× EHTR-FM
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE RR-17	E326	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	282 hrs	× EHTR-FM

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE										
Travel Blank	E326	11-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	294 hrs	× EHTR-FM
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE										
RR-11	E326	10-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	303 hrs	× EHTR-FM
Inorganics : Total Chlorine (Residual) by DPD Colourimetry										
HDPE										
RR-12	E326	10-Oct-2023	----	----	----		23-Oct-2023	0.25 hrs	303 hrs	× EHTR-FM
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
Field Blank	E358-L	11-Oct-2023	20-Oct-2023	28 days	8 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
RR-11	E358-L	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
RR-12	E358-L	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
RR-16	E358-L	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
RR-17	E358-L	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
Field Blank	E355-L	11-Oct-2023	20-Oct-2023	28 days	8 days	✓	20-Oct-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	
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
RR-11	E355-L	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
RR-12	E355-L	10-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	10 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
RR-16	E355-L	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
RR-17	E355-L	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid)										
RR-18	E355-L	11-Oct-2023	20-Oct-2023	28 days	9 days	✓	20-Oct-2023	28 days	9 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (lab preserved)										
Travel Blank	E355-L	11-Oct-2023	16-Oct-2023	3 days	5 days	× EHT	16-Oct-2023	28 days	0 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Field Blank	E290	11-Oct-2023	16-Oct-2023	14 days	5 days	✓	17-Oct-2023	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
RR-16	E290	11-Oct-2023	16-Oct-2023	14 days	5 days	✓	17-Oct-2023	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
RR-17	E290	11-Oct-2023	16-Oct-2023	14 days	6 days	✓	17-Oct-2023	14 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE RR-18	E290	11-Oct-2023	16-Oct-2023	14 days	6 days	✓	17-Oct-2023	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Travel Blank	E290	11-Oct-2023	16-Oct-2023	14 days	6 days	✓	17-Oct-2023	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE RR-11	E290	10-Oct-2023	16-Oct-2023	14 days	6 days	✓	17-Oct-2023	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE RR-12	E290	10-Oct-2023	16-Oct-2023	14 days	6 days	✓	17-Oct-2023	14 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE Field Blank	E100	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE RR-16	E100	11-Oct-2023	16-Oct-2023	28 days	5 days	✓	17-Oct-2023	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE RR-17	E100	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE RR-18	E100	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Travel Blank	E100	11-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE RR-11	E100	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE RR-12	E100	10-Oct-2023	16-Oct-2023	28 days	6 days	✓	17-Oct-2023	28 days	7 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Field Blank	E108A	11-Oct-2023	----	----	----		17-Oct-2023	5 days	5 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE RR-16	E108A	11-Oct-2023	----	----	----		17-Oct-2023	5 days	5 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE RR-17	E108A	11-Oct-2023	----	----	----		17-Oct-2023	5 days	5 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE RR-18	E108A	11-Oct-2023	----	----	----		17-Oct-2023	5 days	5 days	✓
Physical Tests : pH by Meter at 15C (WSER)										
HDPE RR-11	E108A	10-Oct-2023	----	----	----		17-Oct-2023	5 days	6 days	× EHT
Physical Tests : pH by Meter at 15C (WSER)										
HDPE RR-12	E108A	10-Oct-2023	----	----	----		17-Oct-2023	5 days	6 days	× EHT
Physical Tests : pH by Meter at 15C (WSER)										
HDPE Travel Blank	E108A	11-Oct-2023	----	----	----		17-Oct-2023	5 days	6 days	× EHT

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	
Physical Tests : pH by Meter										
HDPE Field Blank	E108	11-Oct-2023	16-Oct-2023	0.25 hrs	130 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	136 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RR-16	E108	11-Oct-2023	16-Oct-2023	0.25 hrs	130 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	136 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RR-17	E108	11-Oct-2023	16-Oct-2023	0.25 hrs	132 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	138 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RR-18	E108	11-Oct-2023	16-Oct-2023	0.25 hrs	133 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	139 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Travel Blank	E108	11-Oct-2023	16-Oct-2023	0.25 hrs	143 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	149 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RR-12	E108	10-Oct-2023	16-Oct-2023	0.25 hrs	152 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	158 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE RR-11	E108	10-Oct-2023	16-Oct-2023	0.25 hrs	153 hrs	× EHTR-FM	17-Oct-2023	0.25 hrs	159 hrs	× EHTR-FM
Physical Tests : TDS by Gravimetry										
HDPE Field Blank	E162	11-Oct-2023	----	----	----		17-Oct-2023	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE RR-16	E162	11-Oct-2023	----	----	----		17-Oct-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TDS by Gravimetry										
HDPE RR-17	E162	11-Oct-2023	----	----	----		17-Oct-2023	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE RR-18	E162	11-Oct-2023	----	----	----		17-Oct-2023	7 days	6 days	✓
Physical Tests : TDS by Gravimetry										
HDPE RR-11	E162	10-Oct-2023	----	----	----		17-Oct-2023	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE RR-12	E162	10-Oct-2023	----	----	----		17-Oct-2023	7 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE Travel Blank	E162	11-Oct-2023	----	----	----		17-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Field Blank	E160	11-Oct-2023	----	----	----		18-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE RR-11	E160	10-Oct-2023	----	----	----		18-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE RR-12	E160	10-Oct-2023	----	----	----		18-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE RR-16	E160	11-Oct-2023	----	----	----		18-Oct-2023	7 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : TSS by Gravimetry										
HDPE RR-17	E160	11-Oct-2023	----	----	----		18-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE RR-18	E160	11-Oct-2023	----	----	----		18-Oct-2023	7 days	7 days	✓
Physical Tests : TSS by Gravimetry										
HDPE Travel Blank	E160	11-Oct-2023	----	----	----		18-Oct-2023	7 days	8 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Field Blank	E121	11-Oct-2023	----	----	----		17-Oct-2023	3 days	5 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE RR-16	E121	11-Oct-2023	----	----	----		17-Oct-2023	3 days	5 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE RR-11	E121	10-Oct-2023	----	----	----		17-Oct-2023	3 days	6 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE RR-12	E121	10-Oct-2023	----	----	----		17-Oct-2023	3 days	6 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE RR-17	E121	11-Oct-2023	----	----	----		17-Oct-2023	3 days	6 days	× EHT
Physical Tests : Turbidity by Nephelometry										
HDPE RR-18	E121	11-Oct-2023	----	----	----		17-Oct-2023	3 days	6 days	× EHT

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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE										
Travel Blank	E121	11-Oct-2023	----	----	----		17-Oct-2023	3 days	6 days	× EHT
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
Field Blank	E641A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	23-Oct-2023	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
RR-16	E641A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	23-Oct-2023	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
RR-17	E641A	11-Oct-2023	23-Oct-2023	14 days	12 days	✓	23-Oct-2023	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
RR-11	E641A	10-Oct-2023	23-Oct-2023	14 days	13 days	✓	23-Oct-2023	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
RR-12	E641A	10-Oct-2023	23-Oct-2023	14 days	13 days	✓	23-Oct-2023	40 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap (sodium bisulfate)										
Travel Blank	E641A	11-Oct-2023	23-Oct-2023	14 days	13 days	✓	23-Oct-2023	40 days	0 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
Field Blank	E508	11-Oct-2023	19-Oct-2023	28 days	8 days	✓	19-Oct-2023	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid)										
RR-16	E508	11-Oct-2023	19-Oct-2023	28 days	8 days	✓	19-Oct-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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) RR-17	E508	11-Oct-2023	19-Oct-2023	28 days	8 days	✓	19-Oct-2023	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) RR-18	E508	11-Oct-2023	19-Oct-2023	28 days	8 days	✓	19-Oct-2023	28 days	8 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) RR-11	E508	10-Oct-2023	19-Oct-2023	28 days	9 days	✓	19-Oct-2023	28 days	9 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) RR-12	E508	10-Oct-2023	19-Oct-2023	28 days	9 days	✓	19-Oct-2023	28 days	9 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial - total (lab preserved) Travel Blank	E508	11-Oct-2023	19-Oct-2023	28 days	9 days	✓	19-Oct-2023	28 days	9 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Field Blank	E420	11-Oct-2023	19-Oct-2023	180 days	8 days	✓	22-Oct-2023	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RR-16	E420	11-Oct-2023	19-Oct-2023	180 days	8 days	✓	22-Oct-2023	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RR-17	E420	11-Oct-2023	19-Oct-2023	180 days	8 days	✓	22-Oct-2023	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RR-18	E420	11-Oct-2023	19-Oct-2023	180 days	8 days	✓	22-Oct-2023	180 days	11 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 Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE - total (lab preserved) Travel Blank	E420	11-Oct-2023	19-Oct-2023	180 days	9 days	✓	22-Oct-2023	180 days	11 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RR-11	E420	10-Oct-2023	19-Oct-2023	180 days	9 days	✓	22-Oct-2023	180 days	12 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) RR-12	E420	10-Oct-2023	19-Oct-2023	180 days	9 days	✓	22-Oct-2023	180 days	12 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) Field Blank	E611C	11-Oct-2023	21-Oct-2023	14 days	10 days	✓	21-Oct-2023	14 days	10 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) RR-16	E611C	11-Oct-2023	21-Oct-2023	14 days	10 days	✓	21-Oct-2023	14 days	10 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) RR-17	E611C	11-Oct-2023	21-Oct-2023	14 days	10 days	✓	21-Oct-2023	14 days	10 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) Travel Blank	E611C	11-Oct-2023	21-Oct-2023	14 days	10 days	✓	21-Oct-2023	14 days	10 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) RR-11	E611C	10-Oct-2023	21-Oct-2023	14 days	11 days	✓	21-Oct-2023	14 days	11 days	✓
Volatile Organic Compounds : VOCs (BC List) by Headspace GC-MS										
Glass vial (sodium bisulfate) RR-12	E611C	10-Oct-2023	21-Oct-2023	14 days	11 days	✓	21-Oct-2023	14 days	11 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

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			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1188466	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1188202	2	29	6.9	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1188116	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1188470	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1188469	1	19	5.2	5.0	✓
Conductivity in Water	E100	1188467	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1195979	2	37	5.4	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1189487	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1195921	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1188468	1	19	5.2	5.0	✓
Free Chlorine (Residual) by DPD Colourimetry	E327	1199976	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1188471	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1188472	1	19	5.2	5.0	✓
pH by Meter	E108	1188465	1	19	5.2	5.0	✓
pH by Meter at 15C (WSER)	E108A	1189086	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1188473	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1189863	1	7	14.2	5.0	✓
Total Chlorine (Residual) by DPD Colourimetry	E326	1199975	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1195919	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1195163	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1189116	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1188203	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1188204	2	24	8.3	5.0	✓
TSS by Gravimetry	E160	1189854	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	1189670	1	17	5.8	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	1198247	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1188466	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1188202	2	29	6.9	5.0	✓
BC PHCs - EPH by GC-FID	E601A	1200591	1	15	6.6	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1188116	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1188470	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1188469	1	19	5.2	5.0	✓
Conductivity in Water	E100	1188467	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1195979	2	37	5.4	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1189487	1	19	5.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1195921	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1188468	1	19	5.2	5.0	✓
Free Chlorine (Residual) by DPD Colourimetry	E327	1199976	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1188471	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1188472	1	19	5.2	5.0	✓
Oil & Grease by Gravimetry	E567	1199467	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	1200592	1	14	7.1	5.0	✓
pH by Meter	E108	1188465	1	19	5.2	5.0	✓
pH by Meter at 15C (WSER)	E108A	1189086	1	7	14.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1188473	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1189863	1	7	14.2	5.0	✓
Total Chlorine (Residual) by DPD Colourimetry	E326	1199975	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1195919	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1195163	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1189116	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1188203	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1188204	2	24	8.3	5.0	✓
TSS by Gravimetry	E160	1189854	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	1189670	1	17	5.8	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	1198247	1	9	11.1	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1188466	1	19	5.2	5.0	✓
Ammonia by Fluorescence	E298	1188202	2	29	6.9	5.0	✓
BC PHCs - EPH by GC-FID	E601A	1200591	1	15	6.6	5.0	✓
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555	1188116	1	7	14.2	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1188470	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1188469	1	19	5.2	5.0	✓
Conductivity in Water	E100	1188467	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1195979	2	37	5.4	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1189487	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1195921	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1188468	1	19	5.2	5.0	✓
Free Chlorine (Residual) by DPD Colourimetry	E327	1199976	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1188471	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1188472	1	19	5.2	5.0	✓
Oil & Grease by Gravimetry	E567	1199467	1	8	12.5	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	1200592	1	14	7.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1188473	1	19	5.2	5.0	✓
TDS by Gravimetry	E162	1189863	1	7	14.2	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Total Chlorine (Residual) by DPD Colourimetry	E326	1199975	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1195919	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1195163	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1189116	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1188203	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1188204	2	24	8.3	5.0	✓
TSS by Gravimetry	E160	1189854	1	13	7.6	5.0	✓
Turbidity by Nephelometry	E121	1189670	1	17	5.8	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	1198247	1	9	11.1	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1188202	2	29	6.9	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1188470	1	19	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1188469	1	19	5.2	5.0	✓
Dissolved Mercury in Water by CVAAS	E509	1195979	2	37	5.4	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1189487	1	19	5.2	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1195921	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1188468	1	19	5.2	5.0	✓
Free Chlorine (Residual) by DPD Colourimetry	E327	1199976	1	6	16.6	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1188471	1	19	5.2	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1188472	1	19	5.2	5.0	✓
Sulfate in Water by IC	E235.SO4	1188473	1	19	5.2	5.0	✓
Total Chlorine (Residual) by DPD Colourimetry	E326	1199975	1	6	16.6	5.0	✓
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T	1195919	1	10	10.0	5.0	✓
Total Mercury in Water by CVAAS	E508	1195163	2	40	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1189116	1	20	5.0	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1188203	2	14	14.2	5.0	✓
Total Phosphorus by Colourimetry (0.002 mg/L)	E372-U	1188204	2	24	8.3	5.0	✓
VOCs (BC List) by Headspace GC-MS	E611C	1198247	1	9	11.1	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.
pH by Meter	E108 ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
pH by Meter at 15C (WSER)	E108A ALS Environmental - Vancouver	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at 15 ± 1°C, and is used to calculate Un-Ionized Ammonia for the federal Wastewater Systems Effluent Regulation.
Turbidity by Nephelometry	E121 ALS Environmental - Vancouver	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TSS by Gravimetry	E160 ALS Environmental - Vancouver	Water	APHA 2540 D (mod)	Total Suspended Solids (TSS) are determined by filtering a sample through a glass fibre filter, following by drying of the filter at 104 ± 1°C, with gravimetric measurement of the filtered solids. Samples containing very high dissolved solid content (i.e. seawaters, brackish waters) may produce a positive bias by this method. Alternate analysis methods are available for these types of samples.
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.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Vancouver	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
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)
Total Chlorine (Residual) by DPD Colourimetry	E326 ALS Environmental - Waterloo	Water	APHA 4500-Cl G (mod)	Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for this test is 15 minutes and field testing is recommended when determining Chlorine concentrations at the time of sampling. Chlorine if present in a sample container after sampling can be rapidly consumed by any inorganic or organic matter in the sample and dissipates rapidly into headspace. Laboratory results may be requested when chlorine concentrations that may be present at the time of laboratory analysis are required for the interpretation of other laboratory analysis where the presence of Chlorine may affect results. e.g. laboratory toxicity testing
Free Chlorine (Residual) by DPD Colourimetry	E327 ALS Environmental - Waterloo	Water	APHA 4500-Cl G (mod)	Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for this test is 15 minutes and field testing is recommended when determining Chlorine concentrations at the time of sampling. Chlorine if present in a sample container after sampling can be rapidly consumed by any inorganic or organic matter in the sample and dissipates rapidly into headspace. Laboratory results may be requested when chlorine concentrations that may be present at the time of laboratory analysis are required for the interpretation of other laboratory analysis where the presence of Chlorine may affect results. e.g. laboratory toxicity testing

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
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_2. 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 Phosphorus by Colourimetry (0.002 mg/L)	E372-U ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Phosphorus is determined colourimetrically using a discrete analyzer after heated persulfate digestion of the sample.
Total Dissolved Phosphorus by Colourimetry (0.002 mg/L)	E375-T ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Total Dissolved Phosphorus is determined colourimetrically using a discrete analyzer after filtration through a 0.45 micron filter followed by heated persulfate digestion of the sample.
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.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Biochemical Oxygen Demand (Carbonaceous) - 5 day	E555 ALS Environmental - Vancouver	Water	APHA 5210 B (mod)	Samples are diluted and incubated for a specified time period, after which the oxygen depletion is measured using a dissolved oxygen meter. Nitrification inhibitor is added to samples to prevent nitrogenous compounds from consuming oxygen resulting in only carbonaceous oxygen demand being reported by this method. Free chlorine is a negative interference in the BOD method; please advise ALS when free chlorine is present in samples.
Oil & Grease by Gravimetry	E567 ALS Environmental - Vancouver	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane and the extract is evaporated to dryness. The residue is then weighed to determine Oil and Grease.
BC PHCs - EPH by GC-FID	E601A ALS Environmental - Vancouver	Water	BC MOE Lab Manual	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
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.
PAHs by Hexane LVI GC-MS	E641A ALS Environmental - Vancouver	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Vancouver	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in $CaCO_3$ 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 CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ 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).
Un-ionized Ammonia at 15°C, WSER	EC298 ALS Environmental - Vancouver	Water	WSER 29June2012	Un-ionized Ammonia at 15C is calculated from test results for Total Ammonia and for pH at 15C, as per the federal Wastewater Systems Effluent Regulation, and is expressed in units of mg/L "as N".

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
LEPH and HEPH: EPH-PAH	EC600A ALS Environmental - Vancouver	Water	BC MOE Lab Manual (LEPH and HEPH)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Acenaphthene, Acridine, Anthracene, Fluorene, Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(a)pyrene, Fluoranthene, and Pyrene.

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.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Vancouver	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Vancouver	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
Digestion for Total Phosphorus in water	EP372 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are heated with a persulfate digestion reagent.
Digestion for Dissolved Phosphorus in water	EP375 ALS Environmental - Vancouver	Water	APHA 4500-P E (mod).	Samples are filtered through a 0.45 micron membrane filter and then heated with a persulfate digestion reagent.
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.
Oil & Grease Extraction for Gravimetry	EP567 ALS Environmental - Vancouver	Water	BC MOE Lab Manual (Oil & Grease) (mod)	The entire water sample is extracted with hexane by liquid-liquid extraction.
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.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane Extraction	EP601 ALS Environmental - Vancouver	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.

QUALITY CONTROL REPORT

Work Order	: **WR2301296**	Page	: 1 of 25
Client	: Government of Yukon	Laboratory	: ALS Environmental - Whitehorse
Contact	: Water Resources Branch	Account Manager	: Tasnia Tarannum
Address	: Department of Environment, Environmental Protection and Assessment Branch 419 Range Road Whitehorse YT Canada Y1A 3V1	Address	: #12 151 Industrial Road Whitehorse, Yukon Canada Y1A 2V3
Telephone	:	Telephone	: +1 867 668 6689
Project	: Ross Audit	Date Samples Received	: 12-Oct-2023 12:08
PO	: ----	Date Analysis Commenced	: 16-Oct-2023
C-O-C number	: 17774146	Issue Date	: 25-Oct-2023 15:53
Sampler	: ---- ----		
Site	: YOWN - Yukon Observation Well Network		
Quote number	: WR22-GYPT100-002		
No. of samples received	: 7		
No. of samples analysed	: 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.

Signatories	*Position*	*Laboratory Department*
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Jon Fisher	Production Manager, Environmental	Waterloo Inorganics, Waterloo, Ontario
Kate Dimitrova	Supervisor - Inorganic	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
Owen Cheng		Vancouver Metals, Burnaby, British Columbia
Paul Cushing	Team Leader - Organics	Vancouver Inorganics, Burnaby, British Columbia
Sukhman Khosa	Lab Assistant	Vancouver Metals, Burnaby, British Columbia

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

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

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
Physical Tests (QC Lot: 1188465)											
WR2301291-003	Anonymous	pH	----	E108	0.10	pH units	7.98	8.00	0.250%	4%	----
Physical Tests (QC Lot: 1188466)											
WR2301291-003	Anonymous	Alkalinity, bicarbonate (as CaCO3)	----	E290	1.0	mg/L	69.7	69.3	0.581%	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	69.7	69.3	0.581%	20%	----
Physical Tests (QC Lot: 1188467)											
WR2301291-003	Anonymous	Conductivity	----	E100	2.0	µS/cm	247	246	0.406%	10%	----
Physical Tests (QC Lot: 1189086)											
WR2301296-001	RR-12	pH @ 15°C (WSER)	----	E108A	0.10	pH units	7.99	8.00	0.125%	4%	----
Physical Tests (QC Lot: 1189670)											
VA23C4581-007	Anonymous	Turbidity	----	E121	0.10	NTU	0.23	0.28	0.05	Diff <2x LOR	----
Physical Tests (QC Lot: 1189854)											
WR2301296-001	RR-12	Solids, total suspended [TSS]	----	E160	3.0	mg/L	5.1	5.3	0.2	Diff <2x LOR	----
Physical Tests (QC Lot: 1189863)											
WR2301296-001	RR-12	Solids, total dissolved [TDS]	----	E162	20	mg/L	597	574	3.93%	20%	----
Anions and Nutrients (QC Lot: 1188202)											
FJ2302694-015	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	<0.0050	<0.0050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1188204)											
FJ2302694-015	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0020	mg/L	<0.0020	<0.0020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1188468)											
WR2301291-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.044	0.042	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1188469)											
WR2301291-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1188470)											
WR2301291-001	Anonymous	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1188471)											
WR2301291-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.0565	0.0563	0.266%	20%	----
Anions and Nutrients (QC Lot: 1188472)											
WR2301291-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	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*
Anions and Nutrients (QC Lot: 1188473)											
WR2301291-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	52.8	52.8	0.119%	20%	----
Anions and Nutrients (QC Lot: 1195918)											
KS2304031-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0200	mg/L	0.118	0.121	0.0030	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1195919)											
KS2304031-001	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0020	mg/L	0.0979	0.0988	0.946%	20%	----
Anions and Nutrients (QC Lot: 1195923)											
KS2304031-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.126	0.126	0.612%	20%	----
Organic / Inorganic Carbon (QC Lot: 1188203)											
FJ2302694-015	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 1195921)											
KS2304031-001	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	15.6	16.6	6.38%	20%	----
Organic / Inorganic Carbon (QC Lot: 1195922)											
KS2304031-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	16.1	16.8	4.39%	20%	----
Inorganics (QC Lot: 1199975)											
WR2301296-001	RR-12	Chlorine, total	7782-50-5	E326	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Inorganics (QC Lot: 1199976)											
WR2301296-001	RR-12	Chlorine, free	7782-50-5	E327	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1189116)											
FJ2302713-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0060	mg/L	0.0100	0.0086	0.0013	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00020	mg/L	0.00621	0.00638	2.78%	20%	----
		Barium, total	7440-39-3	E420	0.00020	mg/L	1.03	1.06	2.82%	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	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.020	mg/L	0.195	0.195	0.00007	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000250	mg/L	<0.0000250	<0.0000250	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.100	mg/L	24.1	24.4	1.20%	20%	----
		Cesium, total	7440-46-2	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00061	0.00058	0.00003	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00020	mg/L	0.00268	0.00275	2.50%	20%	----
		Copper, total	7440-50-8	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.020	mg/L	5.38	5.44	1.17%	20%	----
		Lead, total	7439-92-1	E420	0.000100	mg/L	<0.000100	<0.000100	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0020	mg/L	0.0901	0.0885	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*
Total Metals (QC Lot: 1189116) - continued											
FJ2302713-001	Anonymous	Magnesium, total	7439-95-4	E420	0.0100	mg/L	8.90	8.94	0.410%	20%	----
		Manganese, total	7439-96-5	E420	0.00020	mg/L	0.0201	0.0202	0.769%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000100	mg/L	0.0822	0.0844	2.62%	20%	----
		Nickel, total	7440-02-0	E420	0.00100	mg/L	<0.00100	<0.00100	0	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.100	mg/L	1.70	1.73	1.47%	20%	----
		Potassium, total	7440-09-7	E420	0.100	mg/L	3.76	3.81	1.35%	20%	----
		Rubidium, total	7440-17-7	E420	0.00040	mg/L	0.00117	0.00111	0.00006	Diff <2x LOR	----
		Selenium, total	7782-49-2	E420	0.000100	mg/L	0.000560	0.000587	0.000027	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.20	mg/L	3.12	3.20	2.56%	20%	----
		Silver, total	7440-22-4	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.100	mg/L	516	516	0.0232%	20%	----
		Strontium, total	7440-24-6	E420	0.00040	mg/L	0.276	0.281	1.89%	20%	----
		Sulfur, total	7704-34-9	E420	1.00	mg/L	1.59	1.59	0.004	Diff <2x LOR	----
		Tellurium, total	13494-80-9	E420	0.00040	mg/L	<0.00040	<0.00040	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Tin, total	7440-31-5	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00060	mg/L	<0.00060	<0.00060	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000020	mg/L	0.000036	0.000037	0.000001	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00100	mg/L	0.00153	0.00160	0.00006	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0060	mg/L	<0.0060	<0.0060	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00040	mg/L	0.00047	0.00044	0.00003	Diff <2x LOR	----
Total Metals (QC Lot: 1195163)											
VA23C4636-001	Anonymous	Mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 1195164)											
WR2301296-002	RR-11	Mercury, total	7439-97-6	E508	0.0000050	mg/L	0.0000091	0.0000086	0.0000006	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1189487)											
VA23C4500-001	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.0010	mg/L	0.0096	0.0082	0.0014	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	0.00015	0.00015	0.0000007	Diff <2x LOR	----
		Barium, dissolved	7440-39-3	E421	0.00010	mg/L	0.0282	0.0277	1.68%	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	----

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*
Dissolved Metals (QC Lot: 1189487) - continued											
VA23C4500-001	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	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, dissolved	7440-70-2	E421	0.050	mg/L	21.3	21.1	0.777%	20%	----
		Cesium, dissolved	7440-46-2	E421	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Chromium, dissolved	7440-47-3	E421	0.00050	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	0.00241	0.00237	1.43%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.016	0.016	0.0002	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	2.66	2.66	0.230%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00045	0.00047	0.00003	Diff <2x LOR	----
		Molybdenum, dissolved	7439-98-7	E421	0.000050	mg/L	0.00152	0.00150	0.990%	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	0.100	mg/L	0.256	0.250	0.005	Diff <2x LOR	----
		Rubidium, dissolved	7440-17-7	E421	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Selenium, dissolved	7782-49-2	E421	0.000050	mg/L	0.000128	0.000113	0.000015	Diff <2x LOR	----
		Silicon, dissolved	7440-21-3	E421	0.050	mg/L	4.30	4.29	0.315%	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	2.19	2.17	1.04%	20%	----
		Strontium, dissolved	7440-24-6	E421	0.00020	mg/L	0.0796	0.0780	2.05%	20%	----
		Sulfur, dissolved	7704-34-9	E421	0.50	mg/L	7.18	7.09	1.23%	20%	----
		Tellurium, dissolved	13494-80-9	E421	0.00020	mg/L	<0.00020	<0.00020	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	0.00010	mg/L	<0.00010	<0.00010	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	----
		Tungsten, dissolved	7440-33-7	E421	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Uranium, dissolved	7440-61-1	E421	0.000010	mg/L	0.000100	0.000094	0.000005	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	----
Dissolved Metals (QC Lot: 1195979)											

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*
Dissolved Metals (QC Lot: 1195979) - continued											
VA23C4632-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1198156)											
VA23C4353-006	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1188116)											
WR2301296-006	Field Blank	Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2.0	mg/L	<2.0	<2.0	0.0%	30%	----
Volatile Organic Compounds (QC Lot: 1198247)											
FJ2302713-001	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	----
		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	----

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*
Volatile Organic Compounds (QC Lot: 1198247) - continued											
FJ2302713-001	Anonymous	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	----

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
Physical Tests (QCLot: 1188466)						
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	----
Physical Tests (QCLot: 1188467)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1189670)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1189854)						
Solids, total suspended [TSS]	----	E160	3	mg/L	<3.0	----
Physical Tests (QCLot: 1189863)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Anions and Nutrients (QCLot: 1188202)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1188204)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1188468)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1188469)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1188470)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1188471)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1188472)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1188473)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1195918)						
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	<0.0020	----
Anions and Nutrients (QCLot: 1195919)						
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	<0.0020	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Anions and Nutrients (QCLot: 1195923)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 1188203)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1195921)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1195922)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Inorganics (QCLot: 1199975)						
Chlorine, total	7782-50-5	E326	0.05	mg/L	<0.050	----
Inorganics (QCLot: 1199976)						
Chlorine, free	7782-50-5	E327	0.05	mg/L	<0.050	----
Total Metals (QCLot: 1189116)						
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	----
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1189116) - continued						
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	----
Total Metals (QCLot: 1195163)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 1195164)						
Mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1189487)						
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	----
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	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1189487) - continued						
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	----
Dissolved Metals (QCLot: 1195979)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Dissolved Metals (QCLot: 1198156)						
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	<0.0000050	----
Aggregate Organics (QCLot: 1188116)						
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	<2.0	----
Aggregate Organics (QCLot: 1199467)						
Oil & grease (gravimetric)	----	E567	5	mg/L	<5.0	----
Volatile Organic Compounds (QCLot: 1198247)						
Benzene	71-43-2	E611C	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 1198247) - continued						
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	----
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	----
Hydrocarbons (QCLot: 1200591)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Hydrocarbons (QCLot: 1200591) - continued						
EPH (C10-C19)	----	E601A	250	µg/L	<250	----
EPH (C19-C32)	----	E601A	250	µg/L	<250	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1200592)						
Acenaphthene	83-32-9	E641A	0.01	µg/L	<0.010	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	<0.010	----
Acridine	260-94-6	E641A	0.01	µg/L	<0.010	----
Anthracene	120-12-7	E641A	0.01	µg/L	<0.010	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	<0.010	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	<0.010	----
Chrysene	218-01-9	E641A	0.01	µg/L	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	<0.0050	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	<0.010	----
Fluorene	86-73-7	E641A	0.01	µg/L	<0.010	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	<0.010	----
Naphthalene	91-20-3	E641A	0.05	µg/L	<0.050	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	<0.020	----
Pyrene	129-00-0	E641A	0.01	µg/L	<0.010	----
Quinoline	91-22-5	E641A	0.05	µg/L	<0.050	----

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
Physical Tests (QCLot: 1188465)									
pH	----	E108	----	pH units	7 pH units	100	98.0	102	----
Physical Tests (QCLot: 1188466)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	110	85.0	115	----
Physical Tests (QCLot: 1188467)									
Conductivity	----	E100	1	µS/cm	146.9 µS/cm	98.9	90.0	110	----
Physical Tests (QCLot: 1189086)									
pH @ 15°C (WSER)	----	E108A	----	pH units	7 pH units	99.4	98.0	102	----
Physical Tests (QCLot: 1189670)									
Turbidity	----	E121	0.1	NTU	200 NTU	99.4	85.0	115	----
Physical Tests (QCLot: 1189854)									
Solids, total suspended [TSS]	----	E160	3	mg/L	150 mg/L	91.2	85.0	115	----
Physical Tests (QCLot: 1189863)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1188202)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.0	85.0	115	----
Anions and Nutrients (QCLot: 1188204)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	91.5	80.0	120	----
Anions and Nutrients (QCLot: 1188468)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1188469)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 1188470)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	106	85.0	115	----
Anions and Nutrients (QCLot: 1188471)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	98.0	90.0	110	----
Anions and Nutrients (QCLot: 1188472)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	97.6	90.0	110	----
Anions and Nutrients (QCLot: 1188473)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.4	90.0	110	----
Anions and Nutrients (QCLot: 1195918)									
Phosphorus, total	7723-14-0	E372-U	0.002	mg/L	0.05 mg/L	97.6	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1195919)									
Phosphorus, total dissolved	7723-14-0	E375-T	0.002	mg/L	0.05 mg/L	98.1	80.0	120	----
Anions and Nutrients (QCLot: 1195923)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	110	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1188203)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	110	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1195921)									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	101	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1195922)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	103	80.0	120	----
Inorganics (QCLot: 1199975)									
Chlorine, total	7782-50-5	E326	0.05	mg/L	0.27619 mg/L	105	75.0	125	----
Inorganics (QCLot: 1199976)									
Chlorine, free	7782-50-5	E327	0.05	mg/L	0.27619 mg/L	97.8	75.0	125	----
Total Metals (QCLot: 1189116)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.7	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	107	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	108	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	106	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	96.0	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	109	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	103	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	104	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	101	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	103	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	101	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	105	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	111	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	98.9	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	100	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	105	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Total Metals (QCLot: 1189116) - continued									
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	102	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	106	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	103	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	104	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	100	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	107	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	84.7	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	107	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	110	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	103	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	105	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	104	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	104	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	103	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	106	80.0	120	----
Total Metals (QCLot: 1195163)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	97.1	80.0	120	----
Total Metals (QCLot: 1195164)									
Mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	98.2	80.0	120	----
Dissolved Metals (QCLot: 1189487)									
Aluminum, dissolved	7429-90-5	E421	0.001	mg/L	2 mg/L	104	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	105	80.0	120	----
Barium, dissolved	7440-39-3	E421	0.0001	mg/L	0.25 mg/L	104	80.0	120	----
Beryllium, dissolved	7440-41-7	E421	0.00002	mg/L	0.1 mg/L	99.6	80.0	120	----
Bismuth, dissolved	7440-69-9	E421	0.00005	mg/L	1 mg/L	101	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	103	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	110	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Dissolved Metals (QCLot: 1189487) - continued									
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	102	80.0	120	----
Copper, dissolved	7440-50-8	E421	0.0002	mg/L	0.25 mg/L	99.6	80.0	120	----
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	102	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	102	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	100	80.0	120	----
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	104	80.0	120	----
Rubidium, dissolved	7440-17-7	E421	0.0002	mg/L	0.1 mg/L	102	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	105	80.0	120	----
Silver, dissolved	7440-22-4	E421	0.00001	mg/L	0.1 mg/L	99.7	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	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	97.2	80.0	120	----
Tellurium, dissolved	13494-80-9	E421	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Thallium, dissolved	7440-28-0	E421	0.00001	mg/L	1 mg/L	102	80.0	120	----
Thorium, dissolved	7440-29-1	E421	0.0001	mg/L	0.1 mg/L	104	80.0	120	----
Tin, dissolved	7440-31-5	E421	0.0001	mg/L	0.5 mg/L	104	80.0	120	----
Titanium, dissolved	7440-32-6	E421	0.0003	mg/L	0.25 mg/L	96.8	80.0	120	----
Tungsten, dissolved	7440-33-7	E421	0.0001	mg/L	0.1 mg/L	104	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	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	101	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	95.1	80.0	120	----
Mercury, dissolved	7439-97-6	E509	0.000005	mg/L	0.0001 mg/L	97.5	80.0	120	----
Aggregate Organics (QCLot: 1188116)									
Carbonaceous biochemical oxygen demand [CBOD]	----	E555	2	mg/L	198 mg/L	94.1	85.0	115	----
Aggregate Organics (QCLot: 1199467)									
Oil & grease (gravimetric)	----	E567	5	mg/L	100 mg/L	96.0	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1198247)									
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	96.4	70.0	130	----
Bromoform	75-25-2	E611C	0.5	µg/L	100 µg/L	82.8	70.0	130	----
Carbon tetrachloride	56-23-5	E611C	0.5	µg/L	100 µg/L	110	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	113	60.0	140	----
Chloroform	67-66-3	E611C	0.5	µg/L	100 µg/L	104	70.0	130	----
Chloromethane	74-87-3	E611C	5	µg/L	100 µg/L	110	60.0	140	----
Dibromochloromethane	124-48-1	E611C	0.5	µg/L	100 µg/L	92.4	70.0	130	----
Dichlorobenzene, 1,2-	95-50-1	E611C	0.5	µg/L	100 µg/L	102	70.0	130	----
Dichlorobenzene, 1,3-	541-73-1	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichlorobenzene, 1,4-	106-46-7	E611C	0.5	µg/L	100 µg/L	109	70.0	130	----
Dichloroethane, 1,1-	75-34-3	E611C	0.5	µg/L	100 µg/L	101	70.0	130	----
Dichloroethane, 1,2-	107-06-2	E611C	0.5	µg/L	100 µg/L	94.7	70.0	130	----
Dichloroethylene, 1,1-	75-35-4	E611C	0.5	µg/L	100 µg/L	108	70.0	130	----
Dichloroethylene, cis-1,2-	156-59-2	E611C	0.5	µg/L	100 µg/L	99.9	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	99.4	70.0	130	----
Dichloropropane, 1,2-	78-87-5	E611C	0.5	µg/L	100 µg/L	97.3	70.0	130	----
Dichloropropylene, cis-1,3-	10061-01-5	E611C	0.5	µg/L	100 µg/L	96.9	70.0	130	----
Dichloropropylene, trans-1,3-	10061-02-6	E611C	0.5	µg/L	100 µg/L	86.0	70.0	130	----
Ethylbenzene	100-41-4	E611C	0.5	µg/L	100 µg/L	108	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	98.1	70.0	130	----
Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	0.5	µg/L	100 µg/L	96.2	70.0	130	----
Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	0.2	µg/L	100 µg/L	86.3	70.0	130	----
Tetrachloroethylene	127-18-4	E611C	0.5	µg/L	100 µg/L	112	70.0	130	----
Toluene	108-88-3	E611C	0.4	µg/L	100 µg/L	105	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	90.0	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	121	60.0	140	----
Vinyl chloride	75-01-4	E611C	0.4	µg/L	100 µg/L	117	60.0	140	----
Xylene, m+p-	179601-23-1	E611C	0.4	µg/L	200 µg/L	113	70.0	130	----
Xylene, o-	95-47-6	E611C	0.3	µg/L	100 µg/L	106	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Hydrocarbons (QCLot: 1200591)									
EPH (C10-C19)	----	E601A	250	µg/L	6491 µg/L	105	70.0	130	----
EPH (C19-C32)	----	E601A	250	µg/L	3363 µg/L	102	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1200592)									
Acenaphthene	83-32-9	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
Acenaphthylene	208-96-8	E641A	0.01	µg/L	0.5 µg/L	101	60.0	130	----
Acridine	260-94-6	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
Anthracene	120-12-7	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
Benz(a)anthracene	56-55-3	E641A	0.01	µg/L	0.5 µg/L	104	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5 µg/L	92.6	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A	0.01	µg/L	0.5 µg/L	94.8	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A	0.01	µg/L	0.5 µg/L	113	60.0	130	----
Benzo(k)fluoranthene	207-08-9	E641A	0.01	µg/L	0.5 µg/L	99.0	60.0	130	----
Chrysene	218-01-9	E641A	0.01	µg/L	0.5 µg/L	107	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A	0.005	µg/L	0.5 µg/L	106	60.0	130	----
Fluoranthene	206-44-0	E641A	0.01	µg/L	0.5 µg/L	100	60.0	130	----
Fluorene	86-73-7	E641A	0.01	µg/L	0.5 µg/L	99.2	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A	0.01	µg/L	0.5 µg/L	102	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A	0.01	µg/L	0.5 µg/L	105	60.0	130	----
Naphthalene	91-20-3	E641A	0.05	µg/L	0.5 µg/L	104	50.0	130	----
Phenanthrene	85-01-8	E641A	0.02	µg/L	0.5 µg/L	104	60.0	130	----
Pyrene	129-00-0	E641A	0.01	µg/L	0.5 µg/L	103	60.0	130	----
Quinoline	91-22-5	E641A	0.05	µg/L	0.5 µg/L	117	60.0	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
Anions and Nutrients (QCLot: 1188202)										
VA23C4040-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0995 mg/L	0.1 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 1188204)										
KS2303881-001	Anonymous	Phosphorus, total	7723-14-0	E372-U	0.0446 mg/L	0.05 mg/L	89.2	70.0	130	----
Anions and Nutrients (QCLot: 1188468)										
WR2301291-002	Anonymous	Fluoride	16984-48-8	E235.F	1.00 mg/L	1 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1188469)										
WR2301291-002	Anonymous	Chloride	16887-00-6	E235.Cl	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1188470)										
WR2301291-002	Anonymous	Bromide	24959-67-9	E235.Br-L	0.529 mg/L	0.5 mg/L	106	75.0	125	----
Anions and Nutrients (QCLot: 1188471)										
WR2301291-002	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3-L	2.50 mg/L	2.5 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1188472)										
WR2301291-002	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2-L	0.492 mg/L	0.5 mg/L	98.3	75.0	125	----
Anions and Nutrients (QCLot: 1188473)										
WR2301291-002	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	97.9 mg/L	100 mg/L	97.9	75.0	125	----
Anions and Nutrients (QCLot: 1195918)										
KS2304031-002	Anonymous	Phosphorus, total	7723-14-0	E372-U	ND mg/L	0.05 mg/L	ND	70.0	130	----
Anions and Nutrients (QCLot: 1195919)										
KS2304031-002	Anonymous	Phosphorus, total dissolved	7723-14-0	E375-T	0.0488 mg/L	0.05 mg/L	97.7	70.0	130	----
Anions and Nutrients (QCLot: 1195923)										
KS2304031-002	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0875 mg/L	0.1 mg/L	87.5	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1188203)										
WR2301296-007	Travel Blank	Carbon, total organic [TOC]	----	E355-L	5.04 mg/L	5 mg/L	101	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1195921)										
KS2304031-002	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	5 mg/L	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1195922)										
KS2304031-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	5 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
Inorganics (QCLot: 1199975)										
WR2301296-001	RR-12	Chlorine, total	7782-50-5	E326	0.300 mg/L	0.27619 mg/L	109	70.0	130	----
Inorganics (QCLot: 1199976)										
WR2301296-001	RR-12	Chlorine, free	7782-50-5	E327	0.220 mg/L	0.27619 mg/L	79.6	70.0	130	----
Total Metals (QCLot: 1189116)										
FJ2302713-002	Anonymous	Aluminum, total	7429-90-5	E420	0.375 mg/L	0.4 mg/L	93.7	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0391 mg/L	0.04 mg/L	97.8	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0385 mg/L	0.04 mg/L	96.3	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0744 mg/L	0.08 mg/L	93.0	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0194 mg/L	0.02 mg/L	97.2	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	0.2 mg/L	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00746 mg/L	0.008 mg/L	93.2	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	8 mg/L	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0196 mg/L	0.02 mg/L	97.9	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0790 mg/L	0.08 mg/L	98.7	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0374 mg/L	0.04 mg/L	93.6	70.0	130	----
		Copper, total	7440-50-8	E420	0.0357 mg/L	0.04 mg/L	89.3	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0383 mg/L	0.04 mg/L	95.8	70.0	130	----
		Lithium, total	7439-93-2	E420	0.186 mg/L	0.2 mg/L	92.9	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	2 mg/L	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0384 mg/L	0.04 mg/L	95.9	70.0	130	----
		Molybdenum, total	7439-98-7	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0739 mg/L	0.08 mg/L	92.4	70.0	130	----
		Phosphorus, total	7723-14-0	E420	20.2 mg/L	20 mg/L	101	70.0	130	----
		Potassium, total	7440-09-7	E420	7.55 mg/L	8 mg/L	94.4	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.0386 mg/L	0.04 mg/L	96.4	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0802 mg/L	0.08 mg/L	100	70.0	130	----
		Silicon, total	7440-21-3	E420	19.6 mg/L	20 mg/L	98.1	70.0	130	----
		Silver, total	7440-22-4	E420	0.00726 mg/L	0.008 mg/L	90.7	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	4 mg/L	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	0.04 mg/L	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	40.2 mg/L	40 mg/L	100	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0745 mg/L	0.08 mg/L	93.1	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00739 mg/L	0.008 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
Total Metals (QCLot: 1189116) - continued										
FJ2302713-002	Anonymous	Thorium, total	7440-29-1	E420	0.0392 mg/L	0.04 mg/L	98.0	70.0	130	----
		Tin, total	7440-31-5	E420	0.0385 mg/L	0.04 mg/L	96.2	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0823 mg/L	0.08 mg/L	103	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0406 mg/L	0.04 mg/L	102	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00781 mg/L	0.008 mg/L	97.6	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.202 mg/L	0.2 mg/L	101	70.0	130	----
		Zinc, total	7440-66-6	E420	0.730 mg/L	0.8 mg/L	91.2	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0822 mg/L	0.08 mg/L	103	70.0	130	----
Total Metals (QCLot: 1195163)										
VA23C4636-002	Anonymous	Mercury, total	7439-97-6	E508	0.0000997 mg/L	0.0001 mg/L	99.7	70.0	130	----
Total Metals (QCLot: 1195164)										
WR2301296-003	RR-16	Mercury, total	7439-97-6	E508	0.000101 mg/L	0.0001 mg/L	101	70.0	130	----
Dissolved Metals (QCLot: 1189487)										
VA23C4500-008	Anonymous	Aluminum, dissolved	7429-90-5	E421	0.198 mg/L	0.2 mg/L	99.0	70.0	130	----
		Antimony, dissolved	7440-36-0	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Arsenic, dissolved	7440-38-2	E421	0.0199 mg/L	0.02 mg/L	99.7	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	0.0380 mg/L	0.04 mg/L	95.1	70.0	130	----
		Bismuth, dissolved	7440-69-9	E421	0.00956 mg/L	0.01 mg/L	95.6	70.0	130	----
		Boron, dissolved	7440-42-8	E421	0.093 mg/L	0.1 mg/L	93.5	70.0	130	----
		Cadmium, dissolved	7440-43-9	E421	0.00397 mg/L	0.004 mg/L	99.2	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	0.0106 mg/L	0.01 mg/L	106	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	0.0196 mg/L	0.02 mg/L	98.3	70.0	130	----
		Copper, dissolved	7440-50-8	E421	0.0190 mg/L	0.02 mg/L	95.2	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.93 mg/L	2 mg/L	96.7	70.0	130	----
		Lead, dissolved	7439-92-1	E421	0.0191 mg/L	0.02 mg/L	95.7	70.0	130	----
		Lithium, dissolved	7439-93-2	E421	0.0947 mg/L	0.1 mg/L	94.7	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	0.0193 mg/L	0.02 mg/L	96.7	70.0	130	----
		Molybdenum, dissolved	7439-98-7	E421	0.0196 mg/L	0.02 mg/L	98.3	70.0	130	----
		Nickel, dissolved	7440-02-0	E421	0.0387 mg/L	0.04 mg/L	96.7	70.0	130	----
		Phosphorus, dissolved	7723-14-0	E421	10.3 mg/L	10 mg/L	103	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
Dissolved Metals (QCLot: 1189487) - continued										
VA23C4500-008	Anonymous	Potassium, dissolved	7440-09-7	E421	4.01 mg/L	4 mg/L	100	70.0	130	----
		Rubidium, dissolved	7440-17-7	E421	0.0196 mg/L	0.02 mg/L	97.8	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	9.77 mg/L	10 mg/L	97.7	70.0	130	----
		Silver, dissolved	7440-22-4	E421	0.00395 mg/L	0.004 mg/L	98.7	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	----
		Tellurium, dissolved	13494-80-9	E421	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, dissolved	7440-28-0	E421	0.00382 mg/L	0.004 mg/L	95.6	70.0	130	----
		Thorium, dissolved	7440-29-1	E421	0.0205 mg/L	0.02 mg/L	102	70.0	130	----
		Tin, dissolved	7440-31-5	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Titanium, dissolved	7440-32-6	E421	0.0402 mg/L	0.04 mg/L	100	70.0	130	----
		Tungsten, dissolved	7440-33-7	E421	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Uranium, dissolved	7440-61-1	E421	0.00400 mg/L	0.004 mg/L	100	70.0	130	----
		Vanadium, dissolved	7440-62-2	E421	0.102 mg/L	0.1 mg/L	102	70.0	130	----
		Zinc, dissolved	7440-66-6	E421	0.392 mg/L	0.4 mg/L	97.9	70.0	130	----
		Zirconium, dissolved	7440-67-7	E421	0.0408 mg/L	0.04 mg/L	102	70.0	130	----
Dissolved Metals (QCLot: 1195979)										
VA23C4632-002	Anonymous	Mercury, dissolved	7439-97-6	E509	0.000103 mg/L	0.0001 mg/L	103	70.0	130	----
Dissolved Metals (QCLot: 1198156)										
VA23C4636-001	Anonymous	Mercury, dissolved	7439-97-6	E509	0.0000977 mg/L	0.0001 mg/L	97.7	70.0	130	----
Volatile Organic Compounds (QCLot: 1198247)										
FJ2302713-002	Anonymous	Benzene	71-43-2	E611C	110 µg/L	100 µg/L	110	60.0	140	----
		Bromodichloromethane	75-27-4	E611C	104 µg/L	100 µg/L	104	60.0	140	----
		Bromoform	75-25-2	E611C	83.5 µg/L	100 µg/L	83.5	60.0	140	----
		Carbon tetrachloride	56-23-5	E611C	123 µg/L	100 µg/L	123	60.0	140	----
		Chlorobenzene	108-90-7	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Chloroethane	75-00-3	E611C	123 µg/L	100 µg/L	123	50.0	150	----
		Chloroform	67-66-3	E611C	114 µg/L	100 µg/L	114	60.0	140	----
		Chloromethane	74-87-3	E611C	120 µg/L	100 µg/L	120	50.0	150	----
		Dibromochloromethane	124-48-1	E611C	96.8 µg/L	100 µg/L	96.8	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	115 µg/L	100 µg/L	115	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
Volatile Organic Compounds (QCLot: 1198247) - continued										
FJ2302713-002	Anonymous	Dichlorobenzene, 1,4-	106-46-7	E611C	115 µg/L	100 µg/L	115	60.0	140	----
		Dichloroethane, 1,1-	75-34-3	E611C	110 µg/L	100 µg/L	110	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	119 µg/L	100 µg/L	119	60.0	140	----
		Dichloroethylene, cis-1,2-	156-59-2	E611C	107 µg/L	100 µg/L	107	60.0	140	----
		Dichloroethylene, trans-1,2-	156-60-5	E611C	120 µg/L	100 µg/L	120	60.0	140	----
		Dichloromethane	75-09-2	E611C	108 µg/L	100 µg/L	108	60.0	140	----
		Dichloropropane, 1,2-	78-87-5	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Dichloropropylene, cis-1,3-	10061-01-5	E611C	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		Dichloropropylene, trans-1,3-	10061-02-6	E611C	88.3 µg/L	100 µg/L	88.3	60.0	140	----
		Ethylbenzene	100-41-4	E611C	111 µg/L	100 µg/L	111	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	99.2 µg/L	100 µg/L	99.2	60.0	140	----
		Tetrachloroethane, 1,1,1,2-	630-20-6	E611C	102 µg/L	100 µg/L	102	60.0	140	----
		Tetrachloroethane, 1,1,2,2-	79-34-5	E611C	83.8 µg/L	100 µg/L	83.8	60.0	140	----
		Tetrachloroethylene	127-18-4	E611C	122 µg/L	100 µg/L	122	60.0	140	----
		Toluene	108-88-3	E611C	109 µg/L	100 µg/L	109	60.0	140	----
		Trichloroethane, 1,1,1-	71-55-6	E611C	119 µg/L	100 µg/L	119	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	121 µg/L	100 µg/L	121	60.0	140	----
		Trichlorofluoromethane	75-69-4	E611C	138 µg/L	100 µg/L	138	50.0	150	----
		Vinyl chloride	75-01-4	E611C	127 µg/L	100 µg/L	127	50.0	150	----
		Xylene, m+p-	179601-23-1	E611C	243 µg/L	200 µg/L	122	60.0	140	----
		Xylene, o-	95-47-6	E611C	109 µg/L	100 µg/L	109	60.0	140	----

ALS Environmental

www.alsglobal.com

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 - 774146

1296

Environmental Division Whitehorse

Work Order Reference WR2301296

Telephone : +1 867 668 6689

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM
Company:	Water Resources Branch	Select Report Format:	PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3
Contact:	Devon O'Connor	Quality Control (QC) Report with Report	YES NO	PRIORITY (Business Days): 4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] — EMERGENCY: 1 Busines / Same Day (Laborator
Phone:	867-689-1894	Compare Results to Criteria on Report - provide details below if box checked		
	Company address below will appear on the final report	Select Distribution:	EMAIL MAIL FAX	Date and Time Required for all E&P TATs:
Street:	419 Range Rd Suite 210	Email 1 or Fax	Devon.OConnor@Yukon.ca	For tests that can not be performed according to the service level select
City/Province:	Whitehorse YT	Email 2	WaterResources@Yukon.ca	Analysis
Postal Code:	Y1A 3T8	Email 3		
Invoice To	Same as Report To YES NO	Invoice Distribution		
	Copy of Invoice with Report YES NO	Select Invoice Distribution:	EMAIL MAIL FAX	
Company:		Email 1 or Fax	Same Two As Above	
Contact:		Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Water Resources / YG Quote	AFE/Cost Center:	PO#
Job #:	Ross Audit	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	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	NUMBER OF CONTAINERS	Major Ions / Cations	TSS / TDS	Nitrate, Nitrite, Un-ionized Ammonia, Nutrients (phosphorus, sulphur)	Oil & Grease	Total / Dissolved Metals	Total Residual Chlorine	Hardness, Alkalinity	CBODS	Chloride	Hydrocarbons, VOC	TOC / DOC	Physical (pH, Turbidity)	SAMPLES ON HO
	RR-12	10-Oct-23	14:55	Water	14	X											X	
	RR-11	10-Oct-23	14:45		14	X											X	
	RR-16	11-Oct-23	13:15		14	X											X	
	RR-17	11-Oct-23	11:15		14	X											X	
	RR-18	11-Oct-23	10:30		4					X		X				X	X	
	Field Blank	11-Oct-23	13:30		14	X											X	
	Travel Blank				11	X											X	

SUSPECTED HAZARD (see Special Instructions)

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	RR-18 Total metals only, Total Carbon only, Hardness and whatever else volume allows in that order.
Are samples for human consumption/ use? YES NO	- No dissolved for Travel blank

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ N ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ N ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPER/			
6	6						

2

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by: MP	Date: OCT 12	Time: 12:08	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Appendix B – Water isotope sample results

Client: O'Connor/Yukon Water Resources Branch
Project: Ross River MWWTF

ISO# 2023720
Location: A3
8 for 18O, 2H

Environmental Isotope Lab
2023-11-06

#	Sample	Date	Lab#	$\delta^{18}O$	Result	Repeat	$\delta^{2}H$	Result	Repeat		pH	EC	AZD
				H_2O	VSMOW	± 0.2‰	H_2O	VSMOW	± 0.8‰			SPC us/cm	
1	RR-11	10-Oct-23	515905	X	-13.07	-12.96	X	-137.71	-137.48	15ml	8.08	927	
2	RR-12	10-Oct-23	515906	X	-9.87		X	-123.21		15ml	7.91	885	
3	RR-15	11-Oct-23	515907	X	-15.33		X	-145.43		15ml	6.96	3274	
4	RR-16	11-Oct-23	515908	X	-21.78	-21.75	X	-179.82	-180.19	15ml	7.02	1374	
5	RR-17	11-Oct-23	515909	X	-25.19		X	-198.04		15ml	7.14	1604	
6	RR-18	11-Oct-23	515910	X	-26.55		X	-207.93		15ml	7.45	951	
7	RR-19	11-Oct-23	515911	X	-25.24		X	-199.25		15ml	7.22	1070	
8	Pelly	11-Oct-23	515912	X	-20.93	-20.87	X	-162.52	-161.99	15ml	8.06	369	

BAL= Below Analytical Limit
NA= Not Attempted (concentrations too low)
NES= Not Enough Sample
ND= Non-detect

ENVIRONMENTAL ISOTOPE LABORATORY

Appendix C – Artificial sweetener sample results

2023-RiverAuditsPRIORITY-YT-ICMSMS-SCRep.xlsx 23-Apr-24

submitted by | John Spoelstra |

Method: IC/ESI/MS/MS, ACS500 suppressor
Analyst: Pam Collins
Reported: Pam Collins

flags
mdl minimum detection limit
pql practical quantitation limit
j indicates >mdl but < pql
mb method blank
RV re vialed sample

	Artifical Sweeteners (AS)			
	Acesulfame	Saccharin	Cyclamate	Sucralose
	ng/L	ng/L	ng/L	ng/L
mdl	2	2	3	20
pql	6	6	8	60

Sample Code	Sample Name	Other Info	Town	Province	Date Sampled	Analysis Batch Name	Analysis Sample Name	Acesulfame ng/L ACE	Saccharin ng/L SAC	Cyclamate ng/L CYC	Sucralose ng/L SUC
20230829	(RR)RR-11	Ross River Audit - Priority		YT	10-Oct-23	Jan 31 2024	20230829	28100	8670	4400	71800
20230830	(RR)RR-12	Ross River Audit - Priority		YT	10-Oct-23	Jan 31 2024	20230830	5700	1800	3790	19700
20230831	(RR)RR-15	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230831	<mdl	<mdl	<mdl	<mdl
20230832	(RR)RR-16	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230832	<mdl	<mdl	<mdl	<mdl
20230833	(RR)RR-17	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230833	63	<mdl	<mdl	<mdl
20230834	(RR)RR-18	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230834	<mdl	<mdl	<mdl	<mdl
20230835	(RR)RR-19	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230835	<mdl	<mdl	<mdl	<mdl
20230836	(RR)Pelly	Ross River Audit - Priority		YT	11-Oct-23	Jan 31 2024	20230836	<mdl	<mdl	<mdl	<mdl

Appendix D – Photo log

Appendix C

Photo 1. RR-11
Primary (eastern) lagoon cell.

Photo 2. RR-12
Secondary (western) lagoon cell.

Appendix C

Photo 3. RR-15
Natural wetland upgradient (south) of site. Very little surface water, ice covered. Looking northwest.

Photo 4. RR-16
Well at southern corner of facility.

Appendix C

Photo 5. RR-17
Western-most monitoring well.

Photo 6. RR-18
Looking east, monitoring well on western edge of facility.

Appendix C

Photo 7. RR-19
Monitoring well at northern most corner of site.

Photo 8. ACX
Pelly River sample location, looking upstream.

Appendix C

Photo 9. Effluent discharge pad
Stone/cobble pad through which effluent is discharged. Looking east/upgradient toward site.

Photo 10. Effluent discharge pad
Looking west/downgradient towards effluent discharge pad and adjacent wetland.