Associated Environmental

REPORT

Town of Onoway

Groundwater Assessment for Closed Onoway Landfill 09-35-054-02 W5M

OCTOBER 2024

2024-8636

EXECUTIVE SUMMARY

The Town of Onoway (the Town) retained Associated Environmental Consultants Inc. (Associated) to install groundwater monitoring wells at the closed landfill (the Site) located at 09-35-054-02 W5M in Onoway, Alberta. The Town requested shallow groundwater monitoring and quality data to support proposed developments that may be within the default 300 m setback of the closed landfill to meet their requirements under the Alberta 2022 Guideline for Setback Reviews [Waste Facility] and Matters Related to Subdivision and Development Regulation under the *Municipal Government Act*.

There is a closed wastewater lagoon adjacent/west of the landfill. Both the landfill and former sewage lagoon are owned by the Town and have not been used in more than 30 years. Both sites are backfilled and re-vegetated. The landfill has not been in use since 1986.

Associated completed the following for the Site:

- Drilling and installing four groundwater monitoring wells (24MW01 through 24MW04) around the estimated perimeter of the buried waste;
- Developing all monitoring wells;
- Collecting groundwater samples and submitting them to a laboratory for analysis; and
- Providing findings and recommendations in a report.

Soil was highly variable and heterogenous, consisting of a mix of fine- and coarse-grained soil. The dominant soil types were as follows:

- Silty fine-grained sand with trace clay and trace organics.
- Silt with varying amounts of sand and clay, trace gravel, trace oxides, and coal pieces.
- Silty clay with varying amounts of sand, occasional silt pockets.

On July 25, 2024, static groundwater depths ranged between 4.57 metres below ground surface (mbgs) (24MW02) and 11.14 mbgs (24MW01). Observed soil conditions at the deepest well, 24MW01, varied from moist to dry, whereas soil at the other three boreholes was wet between approximately 4.0 to 6.0 mbgs. Due to the high variation in groundwater depth between the wells and the heterogeneity of the soil, there is likely a perched water table at the Site. Therefore, the direction of groundwater flow was inconclusive.

Groundwater parameters exceeding the 2024 Alberta Tier 1 Soil and Groundwater Remediation Guidelines included pH, total dissolved solids (TDS), chloride, sodium, sulphate, and dissolved metals (arsenic, iron, and manganese). Based on the presence of elevated chloride and sodium, it is likely that the landfill or former sewage lagoon has impacted groundwater on Site. The proximity of the groundwater monitoring wells to buried waste suggests that the salinity impacts are primarily from the landfill. The elevated arsenic, iron, and manganese concentrations likely represent natural conditions, but additional sampling events are required to confirm this. Detectable benzene, 1,2-dichloroethane, and naphthalene in 24MW03 are not currently a concern as the concentrations are below AT1 Guidelines, but it is likely from buried waste, and hydrocarbon concentrations should continue to be monitored.

Although the groundwater flow direction could not be confirmed due to suspected perched water table conditions and heterogeneous soil profiles, it is likely that some of the groundwater flows south, as 24MW03 had the highest chloride and sodium concentrations, along with detectable organic compounds that were not detected in other wells.

Associated recommends the following:

1) The Town should keep the zoning of adjacent properties within 300 m of the landfill to industrial and not permit the construction of schools, hospitals, or residences. Commercial and industrial businesses and on-slab buildings with no basements may be permitted at the Town's discretion as the subdivision and development authority.
2) If a school, hospital, or residence is proposed to be within 300 m of the landfill, gather the required information listed in the Guideline for Setback Reviews [Waste Facility] Appendix 4: Checklist for Landfills of the Guideline and have it summarized in a report prepared by a qualified professional. Additional required information includes: landfill gas monitoring results, confirmed groundwater conditions and flow direction, historical records on landfill operations, and landfill cell construction and cap construction details. The gathered information can inform proposed mitigative measures and an opinion on whether encroachment and setback variance are feasible.
3) The Town should establish mitigation measures including:
    a. Conducting annual groundwater and soil vapour monitoring and sampling for a minimum of four years to establish baseline groundwater conditions, quality, and concentration trends.
    b. Implementing a bylaw that all proposed and new developments within 300 m of the landfill require potable water to be supplied from a municipal system and that no water wells or dugouts be constructed within 300 m. The bylaw should be in place permanently or until there is sufficient data to show that the landfill is not an environmental concern, or if the 300 m setback is varied based on a qualified professional's recommendations stemming from the information gathered in recommendation 1.

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1 INTRODUCTION

The Town of Onoway (the Town) retained Associated Environmental Consultants Inc. (Associated) to install groundwater monitoring wells at the closed landfill (the Site) located at 9-35-054-02 W5M in Onoway, Alberta (Figure 1, Appendix A). The Town requires shallow groundwater monitoring and quality data, to support proposed developments that may be within the default 300 m setback of the closed landfill, to meet their requirements under the Alberta 2022 Guideline for Setback Reviews [Waste Facility] and Matters Related to Subdivision and Development Regulation under the *Municipal Government Act*.

2 BACKGROUND

The landfill is in the east part of town and is currently used as a dog park (Roth Cust Dog Park). The Site is flat, covered in grass, and contains a loop road. There is a closed wastewater lagoon adjacent/west of the landfill, which is backfilled and vegetated. The lagoon is at a lower elevation compared to the landfill, and there is a deep creek valley to the west and north of the closed wastewater lagoon. The landfill stopped operating in 1986, after which it was backfilled. Both the landfill and former sewage lagoon are owned by the Town and have not been used in more than 30 years (Associated 2023).

In 2023, Associated conducted a desktop review of the non-operating landfill to determine whether there is a risk to the nearby MAD House Daycare located in NE-35-054-02 W5M (Associated 2023). Proposed developments for the daycare needed a minimum setback distance of 300 m from the sewage lagoon and landfill, per the Guideline for Setback Reviews [Waste Facility] document. An environmental site assessment had not been completed for the Site.

3 SCOPE OF WORK

The scope of work included the following:

- Drilling and installing four groundwater monitoring wells around the estimated perimeter of the buried waste;
- Developing all monitoring wells;
- Collecting groundwater samples and submitting them to a laboratory for analysis;
- Reporting findings in a report; and
- Providing further recommendations.

4 REGULATORY FRAMEWORK

The Site is owned by the Town; therefore, provincial jurisdiction and standards/guidelines apply. Associated used the 2024 Alberta Tier 1 Guidelines for Soil and Groundwater Remediation (AT1 Guidelines) to compare analytical results and interpret environmental risk (AEPA 2024). The AT1 Guidelines consider all human exposure pathways (direct soil contact, potable water, and vapour inhalation) and ecological exposure pathways (direct soil contact and aquatic) and are a conservative first step in defining soil and groundwater contamination.

The AT1 Guidelines consider the current and the intended land uses of a site and the adjacent land uses. Currently, the closed landfill is an open grass field that is zoned as parks and recreation and is used as a dog park, and for recreation and camping. There is agricultural land use to the east, greater than 30 m from the installed monitoring wells. Adjacent zoning to the north, west, and south is industrial. Based on the zoning and land use,

residential/parkland land use guidelines apply. Soil grain size was a combination of fine and coarse; therefore, the most stringent guidelines are considered for the Site.

Proposed school, hospital, and residential developments within 300 m of the landfill need to meet requirements under the Alberta 2022 Guideline for Setback Reviews [Waste Facility] and Matters Related to Subdivision and Development Regulation under the *Municipal Government Act*. The Town, acting as the subdivision and development authority, needs to ensure they have sufficient information gathered and reported by a qualified professional to determine if granting a setback variance is feasible for a proposed subdivision or development.

5 METHODS

5.1 Safety

Before commencing any fieldwork, a Utility Safety Partners (formerly Alberta One Call) ticket was submitted (20242800112). A private locator conducted underground facility locates prior to ground disturbance.

On all fieldwork days, pre-job safety and toolbox meetings were conducted by Associated with all on-site personnel to outline the scope of work, on-site hazards, required personal protective equipment, and safety procedures when working around mechanical equipment.

5.2 Drilling and Soil Logging

On July 17, 2024, four boreholes (24BH01 through 21BH04) were advanced and completed as groundwater monitoring wells using a track-mounted solid stem drill rig operated by CP Drilling Inc (Figure 1, Appendix A).

One composite soil sample was collected from the cuttings and submitted for laboratory analysis for Alberta Class II Landfill Characterization for the landfill application for disposal. Four soil samples were selected for grain size analysis to determine the appropriate guidelines to use for the Site.

At each borehole location, observations were recorded including but not limited to:

- Soil textures and changes (depths) in soil stratigraphy;
- Sample intervals for field screening of organic vapours and electrical conductivity (EC);
- Field indicators of contamination (e.g., odour, discoloration, staining, sheen, if applicable); and
- Field screening results.

The field sampling procedure for collecting soil samples was as follows:

- The outer 5 mm of the auger flight core was scraped off and discarded, and a sample was collected directly from the inner portion;
- The sampler used a dedicated pair of nitrile gloves for each sample to prevent cross-contamination;
- The soil samples were placed in sealed laboratory-supplied plastic bags; and
- Soil samples were field screened for organic vapour using an Eagle 2 photo-ionization detector, and for EC using a FieldScout Direct Soil EC probe.

Soils were logged in general accordance with the unified soil classification system as provided in the *American Society for Testing and Materials Standard D2488* (2017). Soil logging, sampling, and preservation procedures followed

standards outlined in the *Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites Volume 1* (CCME 1993).

The field protocols and quality assurance and quality control (QA/QC) procedures followed by Associated were in accordance with industry best practices.

5.3 Monitoring Well Installation

Under Associated's direction, CP installed four groundwater monitoring wells, which included the following features:

- 51 mm diameter Schedule 40 polyvinyl chloride (PVC) pipes;
- Well screen lengths pre-packed with sand and 1.5 or 3 m in length with a 10-slot size (0.254 mm) screen;
- A solid PVC pipe installed above the well screen to ground surface;
- A silica sand pack (10/20 Colorado Sand) placed in the annulus between the well screen and the borehole wall, extending to around 0.3-0.5 m above the well screen;
- Bentonite chips added above the sand to ground surface; and
- Each well capped with a J-plug and a lockable steel casing and secured with padlocks.

Following installation, the monitoring wells were surveyed by Meridian Surveys and tied to a nearby Alberta survey control marker with reported ground and top of pipe elevations relative to sea level.

5.4 Groundwater Monitoring and Sampling

On July 25, 2024, Associated personnel monitored the four monitoring wells. The wells were then-developed using dedicated Waterra tubing with an inertial foot-valve and surge block to remove particulate matter. The wells were developed by moving the surge block throughout the screened section to purge at least six well volumes of water, or until practically dry. Observations were recorded at each monitoring well including, but not limited to, colour, turbidity, and indicators of contamination (e.g., odour, discoloration, staining, sheen), if present.

On August 1 and 2, 2024, Associated collected groundwater samples from the four wells. All groundwater samples were collected using dedicated bailers. A Hanna Combo multi-parameter meter was used to measure parameters of pH, EC, and temperature. Samples were filtered with a 0.45 µm filter and preserved, where required, and collected in laboratory-supplied containers using single-use nitrile gloves to prevent cross-contamination. Samples were placed in laboratory-supplied coolers with ice and submitted to CARO Analytical Services (CARO) in Edmonton, Alberta with chain-of-custody documentation.

Groundwater samples were analyzed for the following parameters:

- Routine parameters (pH, major ions, EC, etc.);
- Dissolved metals;
- Benzene, toluene, ethylbenzene, total xylenes (BTEX);
- Petroleum hydrocarbon (PHC) fractions F1-F2;
- Volatile organic compounds (VOC);
- Polycyclic aromatic hydrocarbons (PAH);
- Ammonia; and
- Chemical oxygen demand.

5.5 Quality Assurance/Quality Control (QA/QC)

Comprehensive QA/QC measures were followed to ensure high-quality samples and data. The following protocols were used to collect samples:

- Wearing a new pair of disposable nitrile gloves for collecting and handling each sample;
- Cleaning all sampling equipment between each sampling interval and location;
- Using laboratory-supplied sampling containers appropriate to the selected analytes;
- Keeping the sealed samples in a cooler filled with ice packs as needed;
- Shipping the samples to CARO Analytical promptly, respecting the samples' holding time and receiving temperature requirements specified as part of the laboratory QA/QC measures; and
- Collecting and analyzing field duplicates, which provide information about the combined (field and analytical) precision of the sampling and analytical program.

CARO follows internal QA/QC procedures to ensure data are reliable. Common quality control measures are run at 5–10% frequency, including the use of method blanks, duplicates, blank spikes, and standard reference materials. Further information about the laboratory's QA/QC procedures is provided in the laboratory reports.

Collection and analysis of duplicate samples provide information about the combined (field and analytical) precision of the sampling and analytical program. Duplicate soil, groundwater and surface water samples were collected in the field at a 10% frequency. For each respective analyte, the results for each sample in the duplicate pair (*a* and *b*, respectively in the formula below) were compared and the relative percent difference (RPD) was calculated using the formula:

$$RPD = \left(\frac{(a-b)}{\left(\frac{a+b}{2}\right)} \right) \times 100$$

The RPD calculations were completed when both sample-duplicate values were equal to or greater than five times the laboratory method detection limit. An RPD value of 25% was selected for groundwater QA/QC analysis. One duplicate groundwater sample was collected for the Site. In addition, a field blank and trip blank were collected.

6 RESULTS AND DISCUSSION

The four boreholes, 24MW01 through 24MW04, were advanced to 7.5 and 13.5 mbgs. Drilling locations and Site details are provided in Figure 2, Appendix A and borehole logs with well completion details are provided in Appendix C. The laboratory analytical reports are provided in Appendix B.

6.1 Soil

At the planned borehole 24MW01 location, buried waste was encountered, including metal wires and glass. The borehole location was moved approximately 10 m north. At the planned borehole 24MW03 location, waste was also encountered, and the borehole location was moved approximately 5 m south. Therefore, buried waste may extend slightly further north and south than originally anticipated based on former aerial photographs review (Associated 2023). The locations of the boreholes where buried waste was encountered are shown on Figure 2, Appendix A.

Soil was highly variable and heterogenous. The dominant soil types were as follows:

- Silty fine-grained sand with trace clay and trace organics.
- Silt with varying amounts of sand and clay, trace gravel, trace oxides and coal pieces.
- Silty clay with varying amounts of sand, occasional silt pockets.

Due to sloughing in the boreholes, pre-packed screens were used in monitoring well construction.

Soil vapour hexane readings ranged from 0 parts per million (ppm) (most samples) to 5 ppm (24BH02 [1.8-2.0 m]). Soil vapour isobutylene readings were 0 ppm in all samples. Soil EC readings ranged from 0.13 microsiemens per cm (µS/cm) (24BH03 [0.3-0.6m]) to 1.84 µS/cm (24BH03 [2.2-2.5m]). The field screening values are provided in the borehole logs in Appendix A.

There were no indications (e.g., visual, odour, field screening) of contamination, and therefore no soil samples were submitted for analysis of potential contaminants of concern. Four samples were collected for grain size analysis. The results are summarized in Table 6-1.

Table 6-1 Grain Size Summary

Sample	Particles >75 µm	Grain Size	Soil Type
24BH01 (1.0-1.3m),	34.4	Fine	Clayey silt, sandy, trace gravel
24BH02 (1.8-2.0m)	33.6	Fine	Silty clay, trace gravel, silt pockets
24BH03 (5.0-5.2m)	74.4	Coarse	Sandy silty clay
24BH04 (7.3-7.5m)	7.2	Fine	Silty clay, firm

One composite soil sample, LF, was collected from the drill cuttings and submitted for Class II Landfill Analysis prior to landfill disposal. All parameters met guidelines for landfill disposal, and the results are provided in Table 2, Appendix B.

6.2 Groundwater

On July 25, 2024, static groundwater depths ranged between 4.57 mbgs (24MW02) and 11.14 mbgs (24MW01). Groundwater monitoring results and well construction details are provided in Table 1, Appendix B.

Observed soil conditions in borehole 24MW01 varied from moist to dry with no obvious groundwater table to the maximum drilled depth of 13.5 mbgs. Soil in the other three boreholes became wet between approximately 4.0 to 6.0 mbgs. Due to the high variation in groundwater depth between the wells and the heterogeneity of the soil, Associated suspects there is likely a perched water table at the Site. Therefore, the direction of groundwater flow is inconclusive based on the limited available groundwater monitoring data.

Groundwater field screening results were as follows:

- Temperature: 8.4°C (24MW04) to 12.1°C (24MW02)
- pH: 6.98 (24MW03) to 7.38 (24MW02)
- EC: 891 µS/cm (24MW01) to 4,600 µS/cm (24MW03)

Groundwater parameters exceeding the applicable AT1 Guidelines included pH, total dissolved solids (TDS), chloride, sodium, sulphate, and dissolved metals (arsenic, iron and manganese), and are summarized in Table 6-2 below and Figure 2, Appendix A and Table 3, Appendix B.

Table 6-2 Groundwater Exceedance Summary

Monitoring Well	Location Relative to Buried Waste	Routine Parameter Exceedances	Dissolved Metals Exceedances
24MW01	North	-	Manganese
24MW02	East	pH (acidic – duplicate only) TDS Chloride Sulphate (duplicate only)	Manganese
24MW03	South	TDS Chloride Sodium	Arsenic Iron Manganese
24MW04	West	TDS Chloride	Manganese

'-': no exceedances

pH and Sulphate

Acidic pH and sulphate exceeding AT1 Guidelines were identified in DUP01 only, which is the duplicate sample collected from 24MW02. The source of low pH and elevated sulphate is likely a QA/QC issue, which is further discussed in Section 6.3.

Salinity

Chloride concentrations in 24MW02, 24MW03, and 24MW04 ranged from 199 milligrams per litre (mg/L) (24MW04) to 1,350 mg/L (24MW03), exceeding the AT1 Guideline of 120 mg/L. These three monitoring wells have a total depth of between 7.40-7.77 mbgs. Sodium in 24MW03 (550 mg/L) exceeded the AT1 Guideline of 200 mg/L.

Chloride and sodium may indicate landfill or sewage lagoon impacts. Monitoring wells 24MW03 and 24MW02 are approximately 110 m and 150 m east of the former sewage lagoon, respectively, and have the highest chloride concentrations and the highest sodium concentration (24MW03 only). Due to the proximity of the wells to the landfill, the salinity impacts are likely from buried waste. However, more information about groundwater flow is needed to confirm this.

Dissolved Metals

Dissolved manganese concentrations ranging from 0.629 to 3.90 mg/L were identified in all monitoring wells, which exceed the AT1 Guidelines of 0.02 mg/L.

In 24MW03 only, dissolved arsenic (0.00941 mg/L) exceeded the AT1 Guideline (0.005 mg/L) and dissolved iron (14.1 mg/L) exceeded the AT1 Guideline (0.3 mg/L). Dissolved arsenic and iron were below detection limits in the other wells.

Dissolved arsenic, iron, and manganese are commonly found to have naturally elevated concentrations in shallow groundwater in Alberta soils and are associated with anaerobic conditions in clays and silts. Slightly elevated concentration of arsenic, manganese, and iron do not necessarily indicate landfill impacts on their own, unless they have concentrations that are orders of magnitude higher than remediation guidelines. Additional sampling events will be required to confirm these values.

Total Dissolved Solids
Concentrations of TDS exceeding the AT1 Guidelines were identified in 24MW02, 24MW03, and 24MW04. TDS is a calculated parameter indicating the amount of major ions and dissolved metals within groundwater, and is not directly indicative of landfill activities.

Organics
In 24MW03 only, there were detectable concentrations of benzene, 1,2-dichloroethane, and naphthalene. These parameters were below the AT1 Guidelines and are not currently a concern for the Site. It is possible that these parameters are either the front of a migrating leachate plume, or residuals of leachate that have already migrated through. Future monitoring events should include BTEX, PHC F1-F4, VOC and PAH to ensure that conditions do not change.

Groundwater Summary
Based on a review of the groundwater quality data, it is likely that the Site groundwater is impacted by the landfill activities due to elevated chloride and sodium concentrations above AT1 Guidelines and detectable concentrations of benzene, 1,2-dichloroethane, and naphthalene. The former sewage lagoon is also a potential source of salinity, but the proximity of the monitoring wells to the waste suggest that salinity is likely from the landfill. Elevated arsenic, iron, and manganese likely represent natural conditions, but additional sampling events are required to confirm this. Detectable benzene, 1,2-dichloroethane, and naphthalene in 24MW03 are not currently a concern as the concentrations are below AT1 Guidelines, but it is likely from buried waste, and hydrocarbon concentrations should continue to be monitored.

Although the groundwater flow direction could not be confirmed due to suspected perched water table conditions and heterogeneous soil profiles, it is likely that some of the groundwater flows south, as 24MW03 had the highest chloride and sodium concentrations, along with detectable organic compounds that were not detected in other wells.

6.3 Quality Assurance/Quality Control

A groundwater duplicate, DUP01, was analyzed and compared to parent sample 21MW02. Parameters with RPD values exceeding 25% included TDS, EC, and sulphate. All other calculated RPD values were less than 25% for water samples.

Sample DUP01 had a very low pH (3.41) compared to the parent sample (6.94). The laboratory confirmed the value by re-analysis, and also tested all collected groundwater samples using pH paper. The sulphate in sample DUP01 was 785 mg/L, compared to 28.3 mg/L in the parent sample. The laboratory provided a possible explanation that the sample bottle used for routine parameters may have been cross-contaminated with preservative acid (H_2SO_4), that is used to preserve samples in the nutrient bottles. All field QA/QC procedures were followed, and the possible source of elevated sulphate and acidic pH cannot be confirmed at this time.

A trip blank (24TB01) provided by the lab was analyzed for dissolved metals, BTEX and VOC. A field blank (24FB01) was collected in the field using deionized water and a filter, and was analyzed for dissolved metals. All parameters in the trip blank and field blank were below detection limits.

The QA/QC results are provided in Table 4, Appendix B, and indicate good accuracy and precision of all analytical data, apart from the pH issue in the duplicate sample. Further discussion and information about the laboratory's QA/QC are provided in the laboratory analytical reports (Appendix D). Communication with the laboratory is also provided in Appendix D.

7 CONCLUSION AND RECOMMENDATIONS

Associated conducted a groundwater assessment and installed four groundwater monitoring wells around a closed landfill in Onoway, Alberta, to determine groundwater conditions to support gathering the data required under the Alberta 2022 Guideline for Setback Reviews [Waste Facility] and Matters Related to Subdivision and Development Regulation under the *Municipal Government Act*.

Based on the results of the investigation, Associated concludes the following:

- Soil conditions at the Site are heterogeneous, consisting primarily of silt units with variable amounts of clay and sand, fine sand or silty clay.
- Groundwater flow direction could not be confirmed, and a perched water table is suspected.
- Chloride exceedances identified in wells east, south, and west of the landfill, a sodium exceedance south of the landfill, and detectable concentrations of benzene, 1,2-dichloroethane, and naphthalene likely indicate buried waste impacts to groundwater.

Associated recommends the following:

1) The Town should keep the zoning of adjacent properties within 300 m of the landfill to industrial and not permit the construction of schools, hospitals, or residences. Commercial and industrial businesses and on-slab buildings with no basements may be permitted at the Town's discretion as the subdivision and development authority.
2) If a school, hospital, or residence is proposed to be within 300 m of the landfill, gather the required information listed in the Guideline for Setback Reviews [Waste Facility] Appendix 4: Checklist for Landfills of the Guideline and have it summarized in a report prepared by a qualified professional. Additional required information includes: landfill gas monitoring results, confirmed groundwater conditions and flow direction, historical records on landfill operations, and landfill cell construction and cap construction details. The gathered information can inform proposed mitigative measures and an opinion on whether encroachment and setback variance are feasible.
3) The Town should establish mitigation measures including:
    a. Conducting annual groundwater and soil vapour monitoring and sampling for a minimum of four years to establish baseline groundwater conditions, quality, and concentration trends.
    b. Implementing a bylaw that all proposed and new developments within 300 m of the landfill require potable water to be supplied from a municipal system and that no water wells or dugouts be constructed within 300 m. The bylaw should be in place permanently or until there is sufficient data to show that the landfill is not an environmental concern, or if the 300 m setback is varied based on a qualified professional's recommendations stemming from the information gathered in recommendation 1.

CLOSURE

This report was prepared for the Town of Onoway to summarize the findings of the groundwater assessment at the closed Onoway landfill.

The services provided by Associated Environmental Consultants Inc. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,

Associated Environmental Consultants Inc.

Prepared by:

2024-10-22

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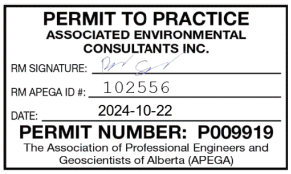

QUALIFICATIONS OF ASSESSORS

Danielle Loiselle, MSc., P.Geo

Role: Environmental Scientist

Experience: Danielle is a geoscientist with five years of experience in environmental consulting. She has an academic background in geology and hydrological modelling. She is a member of the contaminated sites team and has completed multiple environmental site assessments related to landfills, oil and gas sites, construction or infrastructure projects, and First Nations Reserves. Danielle has experience in groundwater monitoring, conducting hydraulic conductivity tests, turbidity monitoring, logging soil, collecting samples, data analysis, and writing technical reports.

Kyla Melnyk, CET

Role: Technical Reviewer

Experience: Kyla is a senior environmental technologist specializing in contaminated sites and hydrogeology with 12 years of experience in environmental consulting. She has managed various assignments in multiple sectors including upstream, midstream, and downstream oil and gas, industrial and commercial. Kyla is also a journeyman water well driller and has extensive knowledge of soil and bedrock classification.

Brent Schmidt, P.Geo.

Role: Senior Reviewer

Experience: Brent is a senior geoscientist specializing in geology and hydrogeology (including contaminant and regional hydrogeology) with 13 years of experience in environmental consulting. He has managed various environmental site assessments, remediations, and hydrogeological studies in multiple sectors including First Nations, oil and gas, industrial, commercial, mining, municipalities, developers, and private businesses.

STANDARD DISCLAIMER

ASSOCIATED ENVIRONMENTAL CONSULTANTS INC.
STANDARD DISCLAIMER FOR CONTAMINATED SITE INVESTIGATIONS, MONITORING, AND CONFIRMATION OF REMEDIATION SERVICES

Subject to the following conditions and limitations, the investigation described in this report has been conducted by Associated Environmental Consultants Inc. (Associated) for the **Town of Onoway** (the Client) in a manner consistent with a reasonable level of care and skill normally exercised by members of the environmental science profession currently practising under similar conditions in the area.

1. The scope of the investigation described in this report has been limited by the budget set for the investigation in the work program. The scope of the investigation has been reasonable in having regard to that budget constraint.
2. The investigation described in this report has been limited to the scope of work described in the work program.
3. The investigation described in this report has relied on information provided by third parties concerning the history of the site. Except as stated in this report, Associated has not independently verified such historical information.
4. The investigation described in this report has been made in the context of existing government regulations generally promulgated at the date of this report. Except as specifically noted, the investigation did not take account of any government regulations not in effect and generally promulgated at the date of this report.
5. All documents and drawings prepared by Associated, or by others on behalf of Associated, in connection with this Project are instruments of professional service for the execution of the Project. Associated retains the property and copyright in these documents and drawings, whether the Project is executed or not.
6. The findings and conclusions are valid only for the specific site identified in the report.
7. Since site conditions may change over time, the report is intended for immediate use.

This report is intended for the exclusive use of the Client, including all successors and assigns. The material in it reflects Associated's best judgement, in light of the information available to it, at the time of preparation. Any use that a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Associated accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report and makes no representation of fact or opinion of any nature whatsoever to any person or entity other than the Client.

In accepting delivery of this report, the Client hereby agrees that:

A. Associated's liability for all claims of the Client, arising out of the agreement between Associated and the Client, pursuant to which this report has been prepared (the Agreement), shall absolutely cease to exist after a period of six (6) years from the date of:

i. substantial completion of the investigation described in this report,
ii. last invoice issued to the Client,
iii. termination of Associated's Services under the Agreement,
iv. commencement of the limitation period for claims prescribed by any statute of the Province or Territory for the site of the investigation described in this report,
v. any significant alteration of the site of the investigation described in this report, and/or neighbouring properties after the date of the final report that would change the conclusions and recommendations of the final report, whichever shall first occur, and following the expiration of such period, the Client shall have no claim whatsoever against Associated.

B. Any and all claims that the Client may have against Associated or any of its servants, agents, or employees arising out of or in any way connected with the investigation described in this report or the preparation of this report, whether such claims are in contract or in tort, and whether such claims are based on negligence or otherwise, shall be limited to a total amount equal to the fees payable to Associated under the contract with

the Client. Associated shall bear no liability whatsoever for any consequential loss, injury, or damage incurred by the Client, including but not limited to claims for loss of profits and loss of markets.

REFERENCES

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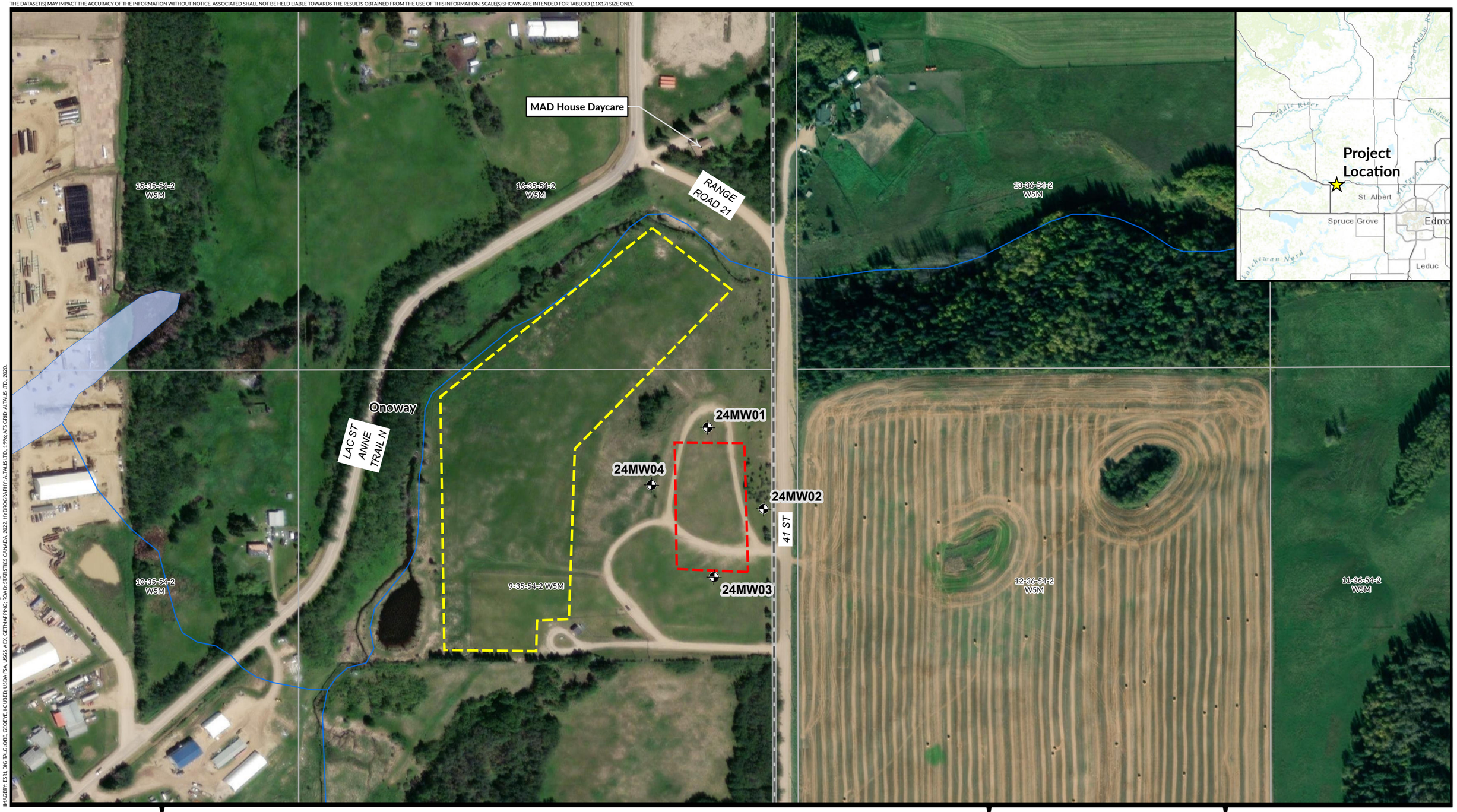
APPENDIX A – FIGURES



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IMAGERY: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, ROAD, STATISTICS CANADA, 2022. HYDROGRAPHY: ALTALIS LTD., 1996. ATS GRID: ALTALIS LTD., 2020.

LEGEND

- Monitoring Well
- Estimated Landfill Boundary
- Former Lagoon

Base Data

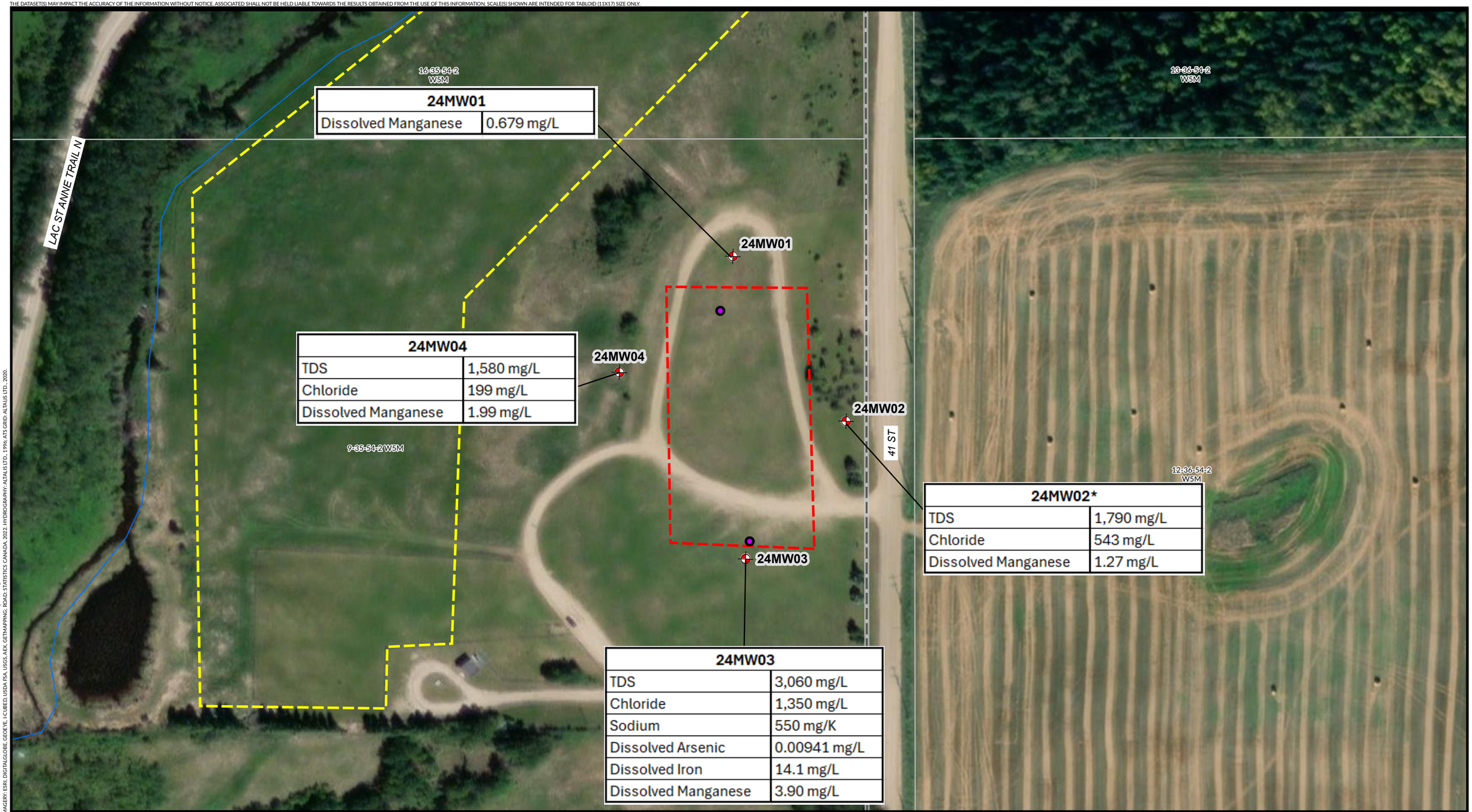
- Watercourse
- Municipal Boundary
- Water Body

0 20 40 60 80 100 m

AE PROJECT NO.	2024-8636-00
SCALE	1:3,000
COORD. SYSTEM	NAD 1983 UTM ZONE 11N
DATE	2024-08-27
REV	01
DRAWN BY	WL
CHECKED BY	DL
DESCRIPTION	ISSUED FOR REPORT

FIGURE 1
SITE DETAILS

TOWN OF ONOWAY
GROUNDWATER ASSESSMENT FOR CLOSED ONOWAY LANDFILL



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IMAGERY: ESRI, DIGITALGLOBE, GEOEYE, I-CUBED, USDA FSA, USGS, AEX, GETMAPPING, ROAD, STATISTICS CANADA, 2022. HYDROGRAPHY: ALTALIS LTD., 1996. ATS GRID: ALTALIS LTD., 2020.

Associated Environmental

ONOWAY — HUB OF THE HIGHWAYS

LEGEND

- Buried Waste
- Monitoring Well
- Estimated Landfill Boundary
- Former Lagoon

Base Data
- Watercourse

- Parameters Exceeds Tier 1 Guidelines

TDS = Total Dissolved Solids.
*Duplicate sample DUP01 (from 24MW02) had acidic pH and sulphate exceedances.

N

0 10 20 30 40 50 m

AE PROJECT NO.	2024-8636-00
SCALE	1:1,500
COORD. SYSTEM	NAD 1983 UTM ZONE 11N
DATE	2024-08-27
REV	01
DRAWN BY	WL
CHECKED BY	DL
DESCRIPTION	ISSUED FOR REPORT

FIGURE 2
GROUNDWATER EXCEEDANCES

TOWN OF ONOWAY
GROUNDWATER ASSESSMENT FOR CLOSED ONOWAY LANDFILL

APPENDIX B – TABLES

Table 1: Groundwater Monitoring and Well Construction
2024-8636

Monitoring Well	Installation Date	UTM Coordinates (NAD83 Zone 12)		Ground Elevation (masl)	Top of Pipe Elevation (masl)	Stick-up (m)	Well Depth (mb TOP)	Well Depth (mbgs)	Screen Interval (mbgs)	Screen Mid-point Elevation (masl)	Screened Material	Monitoring Date	Depth to Water		Groundwater Elevation (masl)
		Easting (m)	Northing (m)										mbTOP	mbgs	
24MW01	16-Jul-24	5955135.97	686470.47	708.27	709.21	0.94	12.86	11.91	10.41-11.91	11.16	Silt, sandy	25-Jul-24	12.083	11.14	697.13
24MW02	16-Jul-24	5955068.78	686520.45	707.92	708.84	0.93	8.70	7.77	4.77-7.77	6.27	Fine-grained sand, silty, trace clay	25-Jul-24	5.493	4.57	703.35
24MW03	16-Jul-24	5955009.59	686480.59	709.36	710.25	0.89	8.48	7.59	4.59-7.59	6.09	Silty clay and silty sand	25-Jul-24	6.918	6.03	703.33
24MW04	16-Jul-24	5955085.55	686424.76	707.18	708.10	0.92	8.32	7.40	4.40-7.40	6.82	Fine-grained sand, silty, trace clay	25-Jul-24	5.868	4.95	702.23

Notes:
m - metres
masl - metres above sea level
mbgs - metres below ground surface
mbTOP - metres below top of pipe

Table 2: Class II Landfill Analysis
2024-8636

			Location Code	24G2140-01
			Date	16 Jul 2024
			Field ID	LF
	Unit	EQL	Table 2 - Alberta Class II Landfill Suitability	
BTEX				
Benzene	µg/L	10	500	<10
Toluene	µg/L	10	500	<10
Ethylbenzene	µg/L	10	500	<10
Xylene Total	µg/L	20	500	<20
Inorganics				
pH (Lab)	-	0.1	2-12.5	**7.94**
Metals				
Antimony	mg/L	0.005	500	<0.005
Arsenic	mg/L	0.01	5	<0.010
Barium	mg/L	1	100	**1.1**
Beryllium	mg/L	0.05	5	<0.050
Boron	mg/L	0.5	500	<0.50
Cadmium	mg/L	0.001	1	**0.002**
Chromium (III+VI)	mg/L	0.05	5	<0.050
Cobalt	mg/L	0.02	100	**0.022**
Copper	mg/L	0.1	100	<0.10
Iron	mg/L	1	1,000	**2.0**
Lead	mg/L	0.01	5	<0.010
Mercury	mg/L	0.002	0.2	<0.002
Nickel	mg/L	0.1	5	<0.10
Selenium	mg/L	0.02	1	<0.020
Silver	mg/L	0.002	5	<0.002
Thallium	mg/L	0.01	5	<0.010
Uranium	µg/L	20	2,000	<20
Vanadium	mg/L	0.05	100	<0.050
Zinc	mg/L	0.5	500	<0.50
Zirconium	µg/L	50	500,000	<50
General Parameters				
Flash Point	oC	25	61	> 61

Parameters Detected within Sample
Parameter Exceeds Applicable Standards

Environmental Standards
AEP, 1996, Table 2 - Alberta Class II Landfill Suitability

Table 3: Groundwater Results
2024-8636

				Field ID	24MW01		24MW02		24MW03	24MW04
				Duplicate	-	-	-	DUP01	-	-
				Date	01 Aug 2024	02 Aug 2024	01 Aug 2024	01 Aug 2024	02 Aug 2024	02 Aug 2024
				Lab ID	24H0277-01	24H0277-07	24H0277-02	24H0277-05	24H0277-03	24H0277-04
	Unit	EQL	AB Tier 1 (2024) GW - Residential/Park							
			Coarse Soil	Fine Soil						
Routine Parameters										
pH (Lab)	-	0.1	6.5-8.5	6.5-8.5	**7.13**	-	**6.94**	**3.41**	**6.58**	**6.74**
pH (field)	-	-	6.5-8.5	6.5-8.5	**7.23**	-	**7.38**	-	**6.98**	**6.99**
Temperature (field)	°C	-	-	-	**11.2**	-	**12.1**	-	**9.3**	**8.4**
Total Dissolved Solids (Lab) (filtered)	mg/L	2	500	500	**491**	-	**1,250**	**1,790**	**3,060**	**1,580**
Alkalinity (total) as CaCO3	mg/L	2	-	-	**415**	-	**337**	<2.0	**493**	**730**
Hardness as CaCO3	mg/L	0.125	-	-		**439**	**1,020**	**1,020**	**1,750**	**1,200**
Chemical Oxygen Demand	mg/L	20	-	-	**193**	-	**61**	**118**	**193**	**60**
Nitrite + Nitrate as N	mg/L	0.05	-	-	<0.0500	-	<0.0500	<0.0500	<0.500	**1.56**
Electrical Conductivity (Lab)	µS/cm	2	-	-	**838**	-	**2560**	**3320**	**5480**	**2290**
Electrical Conductivity (Field)	µS/cm	-	-	-	**891**	-	**-**	**-**	**4600**	**1851**
Alkalinity (Bicarbonate)	mg/L	2	-	-	**506**	-	**412**	<2.0	**601**	**891**
Alkalinity (Carbonate)	mg/L	2	-	-	<2.0	-	<2.0	<2.0	<2.0	<2.0
Calcium (filtered)	mg/L	0.05	-	-	**130**	**119**	**289**	**287**	**483**	**323**
Chloride	mg/L	0.5	120	120	**11.2**	-	**543**	**537**	**1,350**	**199**
Magnesium (filtered)	mg/L	0.01	-	-	**32.5**	**34.2**	**73.0**	**73.0**	**131**	**96.5**
Potassium (filtered)	mg/L	0.1	-	-	**5.25**	-	**16.5**	**16.5**	**20.5**	**30.6**
Sulphate	mg/L	1	128-429	128-429	**49.8**	-	**28.3**	**785**	**225**	**392**
Sodium (filtered)	mg/L	0.05	200	200	**9.17**	-	**92.2**	**92.3**	**550**	**90.1**
Ammonia as N	mg/L	0.05	0.022-5.74	0.022-5.74	**0.130**	-	**0.167**	**0.201**	**0.328**	**0.166**
Nitrate (as N)	mg/L	0.05	3	3	<0.050	-	<0.050	<0.050	<0.050	**1.56**
Nitrite (as N)	mg/L	0.05	0.06-0.6	0.06-0.6	<0.050	-	<0.050	<0.050	<0.500	<0.050
Fluoride	mg/L	0.1	1.5	1.5	**0.21**	-	**0.28**	**0.50**	**0.17**	**0.15**
Hydroxide	µg/L	2,000	-	-	<2,000	-	<2,000	<2,000	<2,000	<2,000
Ionic Balance	%	1	-	-	**101**	-	**110**	**78.8**	**114**	**101**
Metals										
Aluminium (filtered)	mg/L	0.005	0.007-0.05	0.007-0.05	-	<0.0050	<0.0050	<0.0050	**0.0166**	<0.0050
Antimony (filtered)	mg/L	0.0002	0.006	0.006	-	<0.00020	<0.00020	<0.00020	<0.00040	<0.00020
Arsenic (filtered)	mg/L	0.0005	0.005	0.005	-	**0.00050**	<0.00050	<0.00050	**0.00941**	<0.00050
Barium (filtered)	mg/L	0.005	2	2	-	**0.259**	**1.12**	**1.13**	**0.878**	**0.126**
Boron (filtered)	mg/L	0.05	1.5	1.5	-	**0.0612**	**0.0708**	**0.0695**	**0.684**	**1.05**
Cadmium (filtered)	mg/L	0.00001	4E-05-0.00037	4E-05-0.00037	-	**0.000042**	**0.000181**	**0.000188**	**0.000232**	**0.000245**
Chromium (III+VI) (filtered)	mg/L	0.0005	0.05	0.05	-	<0.00050		<0.00050	<0.00100	<0.00050
Copper (filtered)	mg/L	0.0004	0.007	0.007	-	**0.00046**	**0.00083**	**0.00086**	**0.00344**	**0.00207**
Iron (filtered)	mg/L	0.01	0.3	0.3	<0.100	<0.010	<0.010	<0.010	**14.1**	<0.010
Lead (filtered)	mg/L	0.0002	0.001-0.007	0.001-0.007	-	<0.00020	<0.00020	<0.00020	<0.00040	<0.00020
Manganese (filtered)	mg/L	0.0002	0.02	0.02	**0.679**	**0.629**	**1.27**	**1.24**	**3.9**	**1.99**
Mercury (filtered)	mg/L	0.00001	0.000005	0.000005	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Nickel (filtered)	mg/L	0.0004	0-0.17	0-0.17	-	**0.00328**	**0.00482**	**0.00472**	**0.0955**	**0.0126**
Selenium (filtered)	mg/L	0.0005	0.002	0.002	-	<0.00050	**0.00115**	**0.00112**	<0.00100	<0.00050
Silver (filtered)	mg/L	0.00005	0.00025	0.00025	-	<0.000050	<0.000050	<0.000050	<0.000100	<0.000050
Uranium (filtered)	µg/L	0.02	15	15	-	**6.33**	**5.00**	**4.95**	**3.95**	**6.23**
Zinc (filtered)	mg/L	0.004	0.03	0.03	-	<0.0040	<0.0040	<0.0040	**0.0173**	<0.0040
BTEX & PHC										
Benzene	µg/L	0.5	5	5	<0.5	-	<0.5	<0.5	**2.4**	<0.5
Toluene	µg/L	0.5	21	24	<0.5	-	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	1	1.6	1.6	<1.0	-	<1.0	<1.0	<1.0	<1.0
Xylene Total	µg/L	2	20	20	<2.0	-	<2.0	<2.0	<2.0	<2.0
Styrene	µg/L	1	72	72	<1.0	-	<1.0	<1.0	<1.0	<1.0
F1	µg/L	100	810	2,200	<100	-	<100	<100	<100	<100
F1 minus BTEX	µg/L	104	810	2,200	<104	-	<104	<104	<104	<104
F2	µg/L	400	1,100	1,100	<400	-	<400	<400	<400	<400
Halogenated Benzenes										
1,2-dichlorobenzene	µg/L	0.5	0.7	0.7	<0.5	-	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	1			<1.0	-	<1.0	<1.0	<1.0	<1.0
1,4-dichlorobenzene	µg/L	1	1	1	<1.0	-	<1.0	<1.0	<1.0	<1.0
Chlorobenzene	µg/L	1	1.3	1.3	<1.0	-	<1.0	<1.0	<1.0	<1.0

Table 3: Groundwater Results
2024-8636

				Field ID	24MW01		24MW02		24MW03	24MW04
				Duplicate	-	-	-	DUP01	-	-
				Date	01 Aug 2024	02 Aug 2024	01 Aug 2024	01 Aug 2024	02 Aug 2024	02 Aug 2024
				Lab ID	24H0277-01	24H0277-07	24H0277-02	24H0277-05	24H0277-03	24H0277-04
			AB Tier 1 (2024) GW - Residential/Park							
Chlorinated Hydrocarbons										
1,1,1-trichloroethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	**µg/L**	0.5	-	-	<0.5	-	<0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
1,1-dichloroethene	**µg/L**	1	14	14	<1.0	-	<1.0	<1.0	<1.0	<1.0
1,2-dichloroethane	**µg/L**	1	5	5	<1.0	-	<1.0	<1.0	**1.5**	<1.0
1,2-dichloropropane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Bromoform	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	**µg/L**	0.5	1.5	2	<0.5	-	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	**µg/L**	1	190	190	<1.0	-	<1.0	<1.0	<1.0	<1.0
Chloroform	**µg/L**	1	18	80	<1.0	-	<1.0	<1.0	<1.0	<1.0
Chloroethane	**µg/L**	2	-	-	<2.0	-	<2.0	<2.0	<2.0	<2.0
cis-1,2-dichloroethene	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Dibromomethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Dichloromethane	**µg/L**	3	50	50	<3.0	-	<3.0	<3.0	<3.0	<3.0
Trichloroethene	**µg/L**	1	0.32	5	<1.0	-	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	**µg/L**	1	10	10	<1.0	-	<1.0	<1.0	<1.0	<1.0
trans-1,2-dichloroethene	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Vinyl chloride	**µg/L**	1	1.1	2	<1.0	-	<1.0	<1.0	<1.0	<1.0
Halogenated Hydrocarbons										
1,2-dibromoethane	**µg/L**	0.3	-	-	<0.3	-	<0.3	<0.3	<0.3	<0.3
Trichlorofluoromethane	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
Solvents										
MTBE	**µg/L**	1	15	15	<1.0	-	<1.0	<1.0	<1.0	<1.0
VOCs										
1,3-Dichloropropene	**µg/L**	1	-	-	<1.0	-	<1.0	<1.0	<1.0	<1.0
PAH										
1-Methylnaphthalene	**µg/L**	0.1	-	-	<0.100	-	<0.100	<0.100	<0.100	<0.100
2-methylnaphthalene	**µg/L**	0.1	-	-	<0.100	-	<0.100	<0.100	<0.100	<0.100
2-chloronaphthalene	**µg/L**	0.1	-	-	<0.100	-	<0.100	<0.100	<0.100	<0.100
Acenaphthene	**µg/L**	0.05	5.8	6	<0.050	-	<0.050	<0.050	<0.050	<0.050
Acenaphthylene	**µg/L**	0.2	-	-	<0.200	-	<0.200	<0.200	<0.200	<0.200
Acridine	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Anthracene	**µg/L**	0.01	0.012	3.4	<0.010	-	<0.010	<0.010	<0.010	<0.010
Benz(a)anthracene	**µg/L**	0.01	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010
Benzo(a) pyrene	**µg/L**	0.01	1.8	1.8	<0.010	-	<0.010	<0.010	<0.010	<0.010
Benzo(b+j)fluoranthene	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Chrysene	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	**µg/L**	0.01	-	-	<0.010	-	<0.010	<0.010	<0.010	<0.010
Fluoranthene	**µg/L**	0.03	0.057	240	<0.030	-	<0.030	<0.030	<0.030	<0.030
Fluorene	**µg/L**	0.05	3	4.2	<0.050	-	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Naphthalene	**µg/L**	0.2	1	1	<0.200	-	<0.200	<0.200	**0.206**	<0.200
Phenanthrene	**µg/L**	0.1	0.4	0.86	<0.100	-	<0.100	<0.100	<0.100	<0.100
Pyrene	**µg/L**	0.02	0.092	710	<0.020	-	<0.020	<0.020	<0.020	<0.020
Quinoline	**µg/L**	0.05	-	-	<0.050	-	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene (mid point)	**µg/L**	0.01	0.04	0.04	<0.0100	-	<0.0100	<0.0100	<0.0100	<0.0100

Parameters Detected within Sample
Parameter Exceeds Applicable Standards

Environmental Standards
Alberta Environment, June 27, 2024, AB Tier 1 (2024) GW - Agricultural (Coarse Soil)
Alberta Environment, June 27, 2024, AB Tier 1 (2024) GW - Agricultural (Fine Soil)
Alberta Environment, June 27, 2024, AB Tier 1 (2024) GW - Residential/Park (Coarse Soil)
Alberta Environment, June 27, 2024, AB Tier 1 (2024) GW - Residential/Parkland (Fine Soil)

Statistics
* A Non Detect Multiplier of 0.5 has been applied.

			24MW02	DUP01	Relative Percent Difference (%)	24TB01	24 FB 01
		Date Sampled	01-Aug-24			01 Aug 2024	02 Aug 2024
Parameter	Units	LDL					
Salinity & Physical Parameters							
pH (Lab)	-	0.1	6.94	3.41	68	-	-
Total Dissolved Solids (Lab) (filtered)	mg/L	2	1,250	1,790	36	-	-
Alkalinity (total) as CaCO3	mg/L	2	337	<2.0	-	-	-
Hardness as CaCO3	mg/L	0.125	1,020	1,020	0	<0.500	<0.500
Chemical Oxygen Demand	mg/L	20	61	118	-	-	-
Nitrite + Nitrate as N	mg/L	0.05	<0.0500	<0.0500	-	-	-
Electrical Conductivity	µS/cm	2	2560	3320	26	-	-
Alkalinity (Bicarbonate)	mg/L	2	412	<2.0	-	-	-
Alkalinity (Carbonate)	mg/L	2	<2.0	<2.0	-	-	-
Calcium (filtered)	mg/L	0.05	289	287	1	<0.20	<0.20
Chloride	mg/L	0.5	543	537	1	-	-
Magnesium (filtered)	mg/L	0.01	73.0	73.0	0	<0.010	<0.010
Potassium (filtered)	mg/L	0.1	16.5	16.5	0	-	-
Sulphate	mg/L	1	28.3	785	186	-	-
Sodium (filtered)	mg/L	0.05	92.2	92.3	0	-	-
Ammonia as N	mg/L	0.05	0.167	0.201	18	-	-
Nitrate (as N)	mg/L	0.05	<0.050	<0.050	-	-	-
Nitrite (as N)	mg/L	0.05	<0.050	<0.050	-	-	-
Fluoride	mg/L	0.1	0.28	0.50	-	-	-
Hydroxide	µg/L	2,000	<2,000	<2,000	-	-	-
Ionic Balance	%	1	110	78.8#2	-	-	-
Aluminium (filtered)	mg/L	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050
Antimony (filtered)	mg/L	0.0002	<0.00020	<0.00020	-	<0.00020	<0.00020
Arsenic (filtered)	mg/L	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050
Barium (filtered)	mg/L	0.005	1.12	1.13	1	<0.0050	<0.0050
Boron (filtered)	mg/L	0.05	0.0708	0.0695	-	<0.0500	<0.0500
Cadmium (filtered)	mg/L	0.00001	0.000181	0.000188	4	<0.000010	<0.000010
Chromium (III+VI) (filtered)	mg/L	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050
Copper (filtered)	mg/L	0.0004	0.00083	0.00086	-	<0.00040	<0.00040
Iron (filtered)	mg/L	0.01	<0.010	<0.010	-	<0.010	<0.010
Lead (filtered)	mg/L	0.0002	<0.00020	<0.00020	-	<0.00020	<0.00020
Manganese (filtered)	mg/L	0.0002	1.27	1.24	2	<0.00020	<0.00020
Mercury (filtered)	mg/L	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010
Nickel (filtered)	mg/L	0.0004	0.00482	0.00472	2	<0.00040	<0.00040
Selenium (filtered)	mg/L	0.0005	0.00115	0.00112	3	<0.00050	<0.00050
Silver (filtered)	mg/L	0.00005	<0.000050	<0.000050	-	<0.000050	<0.000050
Uranium (filtered)	µg/L	0.02	5.00	4.95	1	<0.020	<0.020
Zinc (filtered)	mg/L	0.004	<0.0040	<0.0040	-	<0.0040	<0.0040
Benzene	µg/L	0.5	<0.5	<0.5	-	<0.5	-
Toluene	µg/L	0.5	<0.5	<0.5	-	<0.5	-
Ethylbenzene	µg/L	1	<1.0	<1.0	-	<1.0	-
Xylene Total	µg/L	2	<2.0	<2.0	-	<2.0	-
Styrene	µg/L	1	<1.0	<1.0	-	<1.0	-
F1	µg/L	100	<100	<100	-	-	-
F1 minus BTEX	µg/L	104	<104	<104	-	-	-
F2	µg/L	400	<400	<400	-	-	-
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	-	<0.5	-
1,3-dichlorobenzene	µg/L	1	<1.0	<1.0	-	<1.0	-
1,4-dichlorobenzene	µg/L	1	<1.0	<1.0	-	<1.0	-
Chlorobenzene	µg/L	1	<1.0	<1.0	-	<1.0	-
1,1,1-trichloroethane	µg/L	1	<1.0	<1.0	-	<1.0	-
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	-	<0.5	-
1,1,2-trichloroethane	µg/L	1	<1.0	<1.0	-	<1.0	-
1,1-dichloroethane	µg/L	1	<1.0	<1.0	-	<1.0	-
1,1-dichloroethene	µg/L	1	<1.0	<1.0	-	<1.0	-
1,2-dichloroethane	µg/L	1	<1.0	<1.0	-	<1.0	-
1,2-dichloropropane	µg/L	1	<1.0	<1.0	-	<1.0	-
Bromoform	µg/L	1	<1.0	<1.0	-	<1.0	-
Bromodichloromethane	µg/L	1	<1.0	<1.0	-	<1.0	-
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	-	<0.5	-
Chlorodibromomethane	µg/L	1	<1.0	<1.0	-	<1.0	-
Chloroform	µg/L	1	<1.0	<1.0	-	<1.0	-
Chloroethane	µg/L	2	<2.0	<2.0	-	<2.0	-
cis-1,2-dichloroethene	µg/L	1	<1.0	<1.0	-	<1.0	-
Dibromomethane	µg/L	1	<1.0	<1.0	-	<1.0	-
Dichloromethane	µg/L	3	<3.0	<3.0	-	<3.0	-
Trichloroethene	µg/L	1	<1.0	<1.0	-	<1.0	-
Tetrachloroethene	µg/L	1	<1.0	<1.0	-	<1.0	-
trans-1,2-dichloroethene	µg/L	1	<1.0	<1.0	-	<1.0	-
Vinyl chloride	µg/L	1	<1.0	<1.0	-	<1.0	-
1,2-dibromoethane	µg/L	0.3	<0.3	<0.3	-	<0.3	-
Trichlorofluoromethane	µg/L	1	<1.0	<1.0	-	<1.0	-
MTBE	µg/L	1	<1.0	<1.0	-	<1.0	-
1,3-Dichloropropene	µg/L	1	<1.0	<1.0	-	<1.0	-
1-Methylnaphthalene	µg/L	0.1	<0.100	<0.100	-	-	-
2-methylnaphthalene	µg/L	0.1	<0.100	<0.100	-	-	-
2-chloronaphthalene	µg/L	0.1	<0.100	<0.100	-	-	-
Acenaphthene	µg/L	0.05	<0.050	<0.050	-	-	-
Acenaphthylene	µg/L	0.2	<0.200	<0.200	-	-	-
Acridine	µg/L	0.05	<0.050	<0.050	-	-	-
Anthracene	µg/L	0.01	<0.010	<0.010	-	-	-
Benz(a)anthracene	µg/L	0.01	<0.010	<0.010	-	-	-
Benzo(a) pyrene	µg/L	0.01	<0.010	<0.010	-	-	-
Benzo(b+j)fluoranthene	µg/L	0.05	<0.050	<0.050	-	-	-
Benzo(g,h,i)perylene	µg/L	0.05	<0.050	<0.050	-	-	-
Benzo(k)fluoranthene	µg/L	0.05	<0.050	<0.050	-	-	-
Chrysene	µg/L	0.05	<0.050	<0.050	-	-	-
Dibenz(a,h)anthracene	µg/L	0.01	<0.010	<0.010	-	-	-
Fluoranthene	µg/L	0.03	<0.030	<0.030	-	-	-
Fluorene	µg/L	0.05	<0.050	<0.050	-	-	-
Indeno(1,2,3-c,d)pyrene	µg/L	0.05	<0.050	<0.050	-	-	-
Naphthalene	µg/L	0.2	<0.200	<0.200	-	-	-
Phenanthrene	µg/L	0.1	<0.100	<0.100	-	-	-
Pyrene	µg/L	0.02	<0.020	<0.020	-	-	-
Quinoline	µg/L	0.05	<0.050	<0.050	-	-	-
Benzo(a)pyrene (mid point)	µg/L	0.01	<0.0100	<0.0100	-	-	-

Notes:
- Not analyzed / Result not 5x more than LDL
Shading indicates RPD values greater than 50%
LDL - Lowest Detection Limit
* Individual analyte detection limit reported to be greater than overall LDL

APPENDIX C - BOREHOLE LOGS

ENVIRONMENTAL WELL / BOREHOLE 24MW01

PROJECT NUMBER 2024-8636
PROJECT NAME Old Landfill GW Monitoring
CLIENT Town of Onoway
DRILLING DATE 17 Jul 2024 - 17 Jul 2024

DRILLING COMPANY CP Drilling
DRILLING METHOD Solid Stem
DRILL RIG
DIAMETER 152 mm
TOTAL DEPTH 13.50

COORDINATES 5955135.972, 686470.47
SURFACE ELEVATION 708.266
SURVEY METHOD GPS
WELL TOC
LOGGED BY DL

COMPLETION

CASING

SCREEN

COMMENTS

Depth (m)	Elevation (m)	Material Description	EC (mS)
0	708	SILT sandy, clayey, tan, dry, friable, increasing clay with depth	
		SILT clayey, sandy, trace gravel, brownish grey, dry, firm, slightly plastic, silt pockets, oxides	1.48
1	707		
		moist, slightly soft, non-plastic	
		silt pockets	
2	706	increasing clay content and firmness with depth	
		fine sand, tan, moist, friable	0.59
3	705	organics (charcoal)	
		increasing clay content and firmness with depth	
		wet	1.83
4	704	CLAY silty, brown and grey mottling, moist, slightly	
		grey with brown silt pockets, slightly firm to firm	
5	703		
		wet sand, silty, trace clay, brownish grey	1.67
6	702	clay, silty, grey, moist, sand and silt pockets	
		silt and fine sand, wet	
7	701	silty clay, grey, firm	0.36
8	700		
			0.32
9	699		
10	698	SILT sandy, brownish grey, moist	0.16
11	697		
			0.38
12	696		
13	695		0.38
14	694	Termination Depth at:13.50 m.	

Soil Vapour HEX (ppm): 0, 5, 10
IBL (ppm): 0, 5, 10
Samples Submitted

Well Installation Details: 24MW01, Bentonite, Slough

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 26 Aug 2024

ENVIRONMENTAL WELL / BOREHOLE 24MW02

PROJECT NUMBER 2024-8636
PROJECT NAME Old Landfill GW Monitoring
CLIENT Town of Onoway
DRILLING DATE 17 Jul 2024 - 17 Jul 2024

DRILLING COMPANY CP Drilling
DRILLING METHOD Solid Stem
DRILL RIG
DIAMETER 152 mm
TOTAL DEPTH 7.50

COORDINATES 5955068.781, 686520.45
SURFACE ELEVATION 707.916
SURVEY METHOD GPS
WELL TOC
LOGGED BY DL

COMPLETION

CASING

SCREEN

COMMENTS

Depth (m)	Elevation (m)	Material Description	EC (mS)
0.5	707.5	SAND fine-grained, silty, trace clay, tan, dry, friable, roots at surface	
1	707	increasing clay content with depth	
1.5	706.5	glass pieces, trace gravel	1.34
2	706	CLAY silty, trace gravel, brownish grey, dry, organics (charcoal), silt pockets, oxides	1.25
2.5	705.5		
3	705	SAND fine-grained, silty, tan, dry to slightly moist, friable	
3.5	704.5	moist	
4	704	wet	1.08
4.5	703.5	trace organics (charcoal)	
5	703		
5.5	702.5		
6	702		1.3
6.5	701.5	CLAY silty, grey, moist to wet, firm, plastic, trace silt pockets	0.74
7	701	SAND fine-grained, silty, trace clay, brownish grey, wet	
7.5	700.5	CLAY sand pockets, brownish grey, slightly firm, plastic, moist to wet	
8	700		
8.5	699.5	SAND fine-grained, silty, clayey, brownish grey, wet	
9	699		0.37
	698.5	Termination Depth at:7.50 m.	

Soil Vapour HEX (ppm): 0, 5, 10
IBL (ppm): 0, 5, 10
Samples Submitted

Well Installation Details: 24MW02
Bentonite
10/20 sand
Slough

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 26 Aug 2024

ENVIRONMENTAL WELL / BOREHOLE 24MW03

PROJECT NUMBER 2024-8636
PROJECT NAME Old Landfill GW Monitoring
CLIENT Town of Onoway
DRILLING DATE 17 Jul 2024 - 17 Jul 2024

DRILLING COMPANY CP Drilling
DRILLING METHOD Solid Stem
DRILL RIG
DIAMETER 152 mm
TOTAL DEPTH 7.50

COORDINATES 5955009.593, 686480.59
SURFACE ELEVATION 709.361
SURVEY METHOD GPS
WELL TOC
LOGGED BY DL

COMPLETION

CASING

SCREEN

COMMENTS

Depth (m)	Elevation (m)	Graphic Log	Material Description	EC (mS)	Soil Vapour HEX (ppm)	IBL (ppm)	Samples Submitted	Well Installation Details
0	709		SAND fine-grained, silty, trace gravel, tan, dry, friable, trace clay pockets	0.13				24MW03
0.5								
1	708.5		increasing clay content with depth, organics (charcoal), trace oxides					
1.5	708							
2	707.5		sandy, trace clay, trace oxides					
2.5	707		clayey, trace sand, slightly plastic	1.84				
3	706.5		fine-grained sand, trace clay, trace organics (charcoal)					
3.5	706							
4	705.5		CLAY silty, sandy, brownish grey, slightly firm, plastic, dry to moist	1.43				
4.5	705							
5	704.5		sandy, moist	0.71				
5.5	704							
6	703.5		SAND fine-grained,trace silt and sand, grey, wet					
6.5	703							
7	702.5		increasing clay content					
7.5	702			1.2				
8	701.5							
8.5	701							
9	700.5							
	700		Termination Depth at:7.50 m.					

Soil Vapour HEX (ppm): 0, 5, 10
IBL (ppm): 0, 5, 10

Well Installation Details: Bentonite; 10/20 sand

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 26 Aug 2024

ENVIRONMENTAL WELL / BOREHOLE 24MW04

PROJECT NUMBER 2024-8636
PROJECT NAME Old Landfill GW Monitoring
CLIENT Town of Onoway
DRILLING DATE 17 Jul 2024 - 17 Jul 2024

DRILLING COMPANY CP Drilling
DRILLING METHOD Solid Stem
DRILL RIG
DIAMETER 152 mm
TOTAL DEPTH 7.50

COORDINATES 5955085.545, 686424.76
SURFACE ELEVATION 707.18
SURVEY METHOD GPS
WELL TOC
LOGGED BY DL

COMPLETION

CASING

SCREEN

COMMENTS

Depth (m)	Elevation (m)	Graphic Log	Material Description	EC (mS)	Soil Vapour HEX (ppm)	IBL (ppm)	Samples Submitted	Well Installation Details
0	707		SAND fine-grained, silty, trace clay, tan, dry, friable					
0.5	706.5							
1	706			0.51				
1.5	705.5		organics (charcoal) / clayey, silt pockets, trace gravel, compact/firm, trace oxides and organics (charcoal)					
2	705		increasingly sandy, softer					
2.5	704.5			1.72				
3	704		trace organics (charcoal), friable					
3.5	703.5							
4	703		CLAY silty, brownish grey, moist, slightly firm, plastic	1.11				
4.5	702.5		SAND fine-grained, silty, clayey, brownish grey, wet, slightly plastic, organics (charcoal)					
5	702							
5.5	701.5			1.06				
6	701							
6.5	700.5							
7	700		CLAY silty, brownish grey, moist, slightly firm, plastic	1.3				
7.5	699.5							
8	699							
8.5	698.5							
9	698		Termination Depth at:7.50 m.					

Soil Vapour HEX (ppm): 0, 5, 10
IBL (ppm): 0, 5, 10

Well Installation Details: Bentonite; 10/20 sand

Disclaimer This log is intended for environmental not geotechnical purposes.

produced by ESlog.ESdat.net on 26 Aug 2024

APPENDIX D - LABORATORY REPORTS

CERTIFICATE OF ANALYSIS

REPORTED TO	Associated Environmental Consultants Inc (Edm) 500, 9888 Jasper Avenue Edmonton, AB T5J 5C6		
ATTENTION	Danielle Loiselle	**WORK ORDER**	24H0277
PO NUMBER	2024-8636.000.000	**RECEIVED / TEMP**	2024-08-02 13:24 / 12.1°C
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07
PROJECT INFO	2024 - 8636	**COC NUMBER**	no #

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

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

We've Got Chemistry

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

Ahead of the Curve

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

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

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

Authorized By:

Brent Whitehead
Account Manager

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW01 (24H0277-01) | Matrix: Water | Sampled: 2024-08-01 18:00					
Anions					
Chloride	**11.2**	0.50	mg/L	2024-08-04	
Fluoride	**0.21**	0.10	mg/L	2024-08-04	
Nitrate (as N)	< 0.050	0.050	mg/L	2024-08-04	
Nitrite (as N)	< 0.050	0.050	mg/L	2024-08-04	
Sulfate	**49.8**	1.0	mg/L	2024-08-04	
Calculated Parameters					F1
Sodium Adsorption Ratio	**0.2**		-	2024-08-07	
F1- BTEX	< 0.104	0.104	mg/L	N/A	
B[a]P TPE	< 0.0000100	0.0000100	mg/L	N/A	
Hardness, Dissolved (as CaCO3)	**460**	0.125	mg/L	N/A	
Ion Balance	**101**	1.0	%	2024-08-12	
Nitrate+Nitrite (As N)	< 0.0500	0.0500	mg/L	N/A	
Solids, Total Dissolved	**491**	2.00	mg/L	N/A	
CCME CWS Petroleum Hydrocarbons					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2024-08-06	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2024-08-07	
Surrogate: 2-Methylnonane (EPH/F2-4)	*101*	*60-140*	%	*2024-08-07*	
Dissolved Metals					F1
Calcium, dissolved	**130**	0.050	mg/L	2024-08-07	
Iron, dissolved	< 0.100	0.100	mg/L	2024-08-07	
Magnesium, dissolved	**32.5**	0.030	mg/L	2024-08-07	
Manganese, dissolved	**0.679**	0.010	mg/L	2024-08-07	
Potassium, dissolved	**5.25**	0.200	mg/L	2024-08-07	
Sodium, dissolved	**9.17**	0.050	mg/L	2024-08-07	
General Parameters					
Alkalinity, Total (as CaCO3)	**415**	2.0	mg/L	2024-08-07	
Bicarbonate (HCO3)	**506**	2.0	mg/L	2024-08-07	
Carbonate (CO3)	< 2.0	2.0	mg/L	2024-08-07	
Hydroxide (OH)	< 2.0	2.0	mg/L	2024-08-07	
Ammonia, Total (as N)	**0.130**	0.050	mg/L	2024-08-06	
Chemical Oxygen Demand	**193**	20	mg/L	2024-08-06	
Conductivity (EC)	**838**	2.0	µS/cm	2024-08-07	
pH	**7.13**	0.10	pH units	2024-08-07	HT2
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2024-08-08	
Acenaphthylene	< 0.200	0.200	µg/L	2024-08-08	
Acridine	< 0.050	0.050	µg/L	2024-08-08	
Anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benz(a)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW01 (24H0277-01) | Matrix: Water | Sampled: 2024-08-01 18:00, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Chrysene	< 0.050	0.050	µg/L	2024-08-08	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Fluoranthene	< 0.030	0.030	µg/L	2024-08-08	
Fluorene	< 0.050	0.050	µg/L	2024-08-08	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2024-08-08	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Naphthalene	< 0.200	0.200	µg/L	2024-08-08	
Phenanthrene	< 0.100	0.100	µg/L	2024-08-08	
Pyrene	< 0.020	0.020	µg/L	2024-08-08	
Quinoline	< 0.050	0.050	µg/L	2024-08-08	
Surrogate: Naphthalene-d8	*109*	*50-140*	%	*2024-08-08*	
Surrogate: Perylene-d12	*107*	*50-140*	%	*2024-08-08*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW01 (24H0277-01) | Matrix: Water | Sampled: 2024-08-01 18:00, Continued					
Volatile Organic Compounds (VOC), Continued					
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*103*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*106*	*70-130*	%	*2024-08-06*	
24MW02 (24H0277-02) | Matrix: Water | Sampled: 2024-08-01 00:00 To 2024-08-01 18:30					
Anions					
Chloride	**543**	0.50	mg/L	2024-08-06	
Fluoride	**0.28**	0.10	mg/L	2024-08-04	
Nitrate (as N)	< 0.050	0.050	mg/L	2024-08-04	
Nitrite (as N)	< 0.050	0.050	mg/L	2024-08-04	
Sulfate	**28.3**	1.0	mg/L	2024-08-04	
Calculated Parameters					
F1- BTEX	< 0.104	0.104	mg/L	N/A	
B[a]P TPE	< 0.0000100	0.0000100	mg/L	N/A	
Hardness, Total (as CaCO3)	**1020**	0.500	mg/L	N/A	
Ion Balance	**110**	1.0	%	2024-08-12	
Nitrate+Nitrite (as N)	< 0.0500	0.0500	mg/L	N/A	
Solids, Total Dissolved	**1250**	50.0	mg/L	N/A	
CCME CWS Petroleum Hydrocarbons					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2024-08-06	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2024-08-07	
Surrogate: 2-Methylnonane (EPH/F2-4)	*95*	*60-140*	%	*2024-08-07*	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2024-08-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Barium, dissolved	**1.12**	0.0050	mg/L	2024-08-08	
Boron, dissolved	**0.0708**	0.0500	mg/L	2024-08-08	
Cadmium, dissolved	**0.000181**	0.000010	mg/L	2024-08-08	
Calcium, dissolved	**289**	0.20	mg/L	2024-08-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Copper, dissolved	**0.00083**	0.00040	mg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW02 (24H0277-02) | Matrix: Water | Sampled: 2024-08-01 00:00 To 2024-08-01 18:30, Continued					
Dissolved Metals, Continued					
Iron, dissolved	< 0.010	0.010	mg/L	2024-08-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Magnesium, dissolved	**73.0**	0.010	mg/L	2024-08-08	
Manganese, dissolved	**1.27**	0.00020	mg/L	2024-08-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Nickel, dissolved	**0.00482**	0.00040	mg/L	2024-08-08	
Potassium, dissolved	**16.5**	0.10	mg/L	2024-08-08	
Selenium, dissolved	**0.00115**	0.00050	mg/L	2024-08-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2024-08-08	
Sodium, dissolved	**92.2**	0.10	mg/L	2024-08-08	
Uranium, dissolved	**0.00500**	0.000020	mg/L	2024-08-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2024-08-08	
General Parameters					
Alkalinity, Total (as CaCO3)	**337**	2.0	mg/L	2024-08-07	
Bicarbonate (HCO3)	**412**	2.0	mg/L	2024-08-07	
Carbonate (CO3)	< 2.0	2.0	mg/L	2024-08-07	
Hydroxide (OH)	< 2.0	2.0	mg/L	2024-08-07	
Ammonia, Total (as N)	**0.167**	0.050	mg/L	2024-08-06	
Chemical Oxygen Demand	**61**	20	mg/L	2024-08-06	
Conductivity (EC)	**2560**	2.0	µS/cm	2024-08-07	
pH	**6.94**	0.10	pH units	2024-08-07	HT2
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2024-08-08	
Acenaphthylene	< 0.200	0.200	µg/L	2024-08-08	
Acridine	< 0.050	0.050	µg/L	2024-08-08	
Anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benz(a)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Chrysene	< 0.050	0.050	µg/L	2024-08-08	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Fluoranthene	< 0.030	0.030	µg/L	2024-08-08	
Fluorene	< 0.050	0.050	µg/L	2024-08-08	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2024-08-08	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Naphthalene	< 0.200	0.200	µg/L	2024-08-08	
Phenanthrene	< 0.100	0.100	µg/L	2024-08-08	
Pyrene	< 0.020	0.020	µg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW02 (24H0277-02) | Matrix: Water | Sampled: 2024-08-01 00:00 To 2024-08-01 18:30, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Quinoline	< 0.050	0.050	µg/L	2024-08-08	
Surrogate: Naphthalene-d8	*100*	*50-140*	%	*2024-08-08*	
Surrogate: Perylene-d12	*95*	*50-140*	%	*2024-08-08*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*107*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*116*	*70-130*	%	*2024-08-06*	
24MW03 (24H0277-03) | Matrix: Water | Sampled: 2024-08-02 10:30					

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW03 (24H0277-03) | Matrix: Water | Sampled: 2024-08-02 10:30, Continued					
Anions					
Chloride	**1350**	0.50	mg/L	2024-08-06	
Fluoride	**0.17**	0.10	mg/L	2024-08-04	
Nitrate (as N)	< 0.050	0.050	mg/L	2024-08-04	
Nitrite (as N)	< 0.500	0.050	mg/L	2024-08-04	RA1
Sulfate	**225**	1.0	mg/L	2024-08-04	
Calculated Parameters					
F1- BTEX	< 0.104	0.104	mg/L	N/A	
B[a]P TPE	< 0.0000100	0.0000100	mg/L	N/A	
Hardness, Total (as CaCO3)	**1750**	1.00	mg/L	N/A	
Ion Balance	**114**	1.0	%	2024-08-12	
Nitrate+Nitrite (as N)	< 0.500	0.500	mg/L	N/A	
Solids, Total Dissolved	**3060**	100	mg/L	N/A	
CCME CWS Petroleum Hydrocarbons					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2024-08-06	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2024-08-07	
Surrogate: 2-Methylnonane (EPH/F2-4)	*106*	*60-140*	%	*2024-08-07*	
Dissolved Metals					
Aluminum, dissolved	**0.0166**	0.0050	mg/L	2024-08-08	RS1
Antimony, dissolved	< 0.00040	0.00020	mg/L	2024-08-08	RS1
Arsenic, dissolved	**0.00941**	0.00050	mg/L	2024-08-08	RS1
Barium, dissolved	**0.878**	0.0050	mg/L	2024-08-08	RS1
Boron, dissolved	**0.684**	0.0500	mg/L	2024-08-08	RS1
Cadmium, dissolved	**0.000232**	0.000010	mg/L	2024-08-08	RS1
Calcium, dissolved	**483**	0.20	mg/L	2024-08-08	RS1
Chromium, dissolved	< 0.00100	0.00050	mg/L	2024-08-08	RS1
Copper, dissolved	**0.00344**	0.00040	mg/L	2024-08-08	RS1
Iron, dissolved	**14.1**	0.010	mg/L	2024-08-08	RS1
Lead, dissolved	< 0.00040	0.00020	mg/L	2024-08-08	RS1
Magnesium, dissolved	**131**	0.010	mg/L	2024-08-08	RS1
Manganese, dissolved	**3.90**	0.00020	mg/L	2024-08-08	RS1
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Nickel, dissolved	**0.0955**	0.00040	mg/L	2024-08-08	RS1
Potassium, dissolved	**20.5**	0.10	mg/L	2024-08-08	RS1
Selenium, dissolved	< 0.00100	0.00050	mg/L	2024-08-08	RS1
Silver, dissolved	< 0.000100	0.000050	mg/L	2024-08-08	RS1
Sodium, dissolved	**550**	0.10	mg/L	2024-08-08	RS1
Uranium, dissolved	**0.00395**	0.000020	mg/L	2024-08-08	RS1
Zinc, dissolved	**0.0173**	0.0040	mg/L	2024-08-08	RS1
General Parameters					
Alkalinity, Total (as CaCO3)	**493**	2.0	mg/L	2024-08-07	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW03 (24H0277-03) | Matrix: Water | Sampled: 2024-08-02 10:30, Continued					
General Parameters, Continued					
Bicarbonate (HCO3)	**601**	2.0	mg/L	2024-08-07	
Carbonate (CO3)	< 2.0	2.0	mg/L	2024-08-07	
Hydroxide (OH)	< 2.0	2.0	mg/L	2024-08-07	
Ammonia, Total (as N)	**0.328**	0.050	mg/L	2024-08-06	
Chemical Oxygen Demand	**193**	20	mg/L	2024-08-06	
Conductivity (EC)	**5480**	2.0	µS/cm	2024-08-07	
pH	**6.58**	0.10	pH units	2024-08-07	HT2
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2024-08-08	
Acenaphthylene	< 0.200	0.200	µg/L	2024-08-08	
Acridine	< 0.050	0.050	µg/L	2024-08-08	
Anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benz(a)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Chrysene	< 0.050	0.050	µg/L	2024-08-08	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Fluoranthene	< 0.030	0.030	µg/L	2024-08-08	
Fluorene	< 0.050	0.050	µg/L	2024-08-08	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2024-08-08	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Naphthalene	**0.206**	0.200	µg/L	2024-08-08	
Phenanthrene	< 0.100	0.100	µg/L	2024-08-08	
Pyrene	< 0.020	0.020	µg/L	2024-08-08	
Quinoline	< 0.050	0.050	µg/L	2024-08-08	
Surrogate: Naphthalene-d8	*112*	*50-140*	%	*2024-08-08*	
Surrogate: Perylene-d12	*108*	*50-140*	%	*2024-08-08*	
Volatile Organic Compounds (VOC)					
Benzene	**2.4**	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW03 (24H0277-03) | Matrix: Water | Sampled: 2024-08-02 10:30, Continued					
Volatile Organic Compounds (VOC), Continued					
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	**1.5**	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*107*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*113*	*70-130*	%	*2024-08-06*	
24MW04 (24H0277-04) | Matrix: Water | Sampled: 2024-08-02 10:45					
Anions					
Chloride	**199**	0.50	mg/L	2024-08-04	
Fluoride	**0.15**	0.10	mg/L	2024-08-04	
Nitrate (as N)	**1.56**	0.050	mg/L	2024-08-04	
Nitrite (as N)	< 0.050	0.050	mg/L	2024-08-04	
Sulfate	**392**	1.0	mg/L	2024-08-04	
Calculated Parameters					
F1- BTEX	< 0.104	0.104	mg/L	N/A	
B[a]P TPE	< 0.0000100	0.0000100	mg/L	N/A	
Hardness, Total (as CaCO3)	**1200**	0.500	mg/L	N/A	
Ion Balance	**101**	1.0	%	2024-08-12	
Nitrate+Nitrite (as N)	**1.56**	0.0500	mg/L	N/A	
Solids, Total Dissolved	**1580**	10.0	mg/L	N/A	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW04 (24H0277-04) | Matrix: Water | Sampled: 2024-08-02 10:45, Continued					
CCME CWS Petroleum Hydrocarbons					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2024-08-06	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2024-08-07	
Surrogate: 2-Methylnonane (EPH/F2-4)	*101*	*60-140*	%	*2024-08-07*	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2024-08-07	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2024-08-07	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Barium, dissolved	**0.126**	0.0050	mg/L	2024-08-07	
Boron, dissolved	**1.05**	0.0500	mg/L	2024-08-07	
Cadmium, dissolved	**0.000245**	0.000010	mg/L	2024-08-07	
Calcium, dissolved	**323**	0.20	mg/L	2024-08-07	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Copper, dissolved	**0.00207**	0.00040	mg/L	2024-08-07	
Iron, dissolved	< 0.010	0.010	mg/L	2024-08-07	
Lead, dissolved	< 0.00020	0.00020	mg/L	2024-08-07	
Magnesium, dissolved	**96.5**	0.010	mg/L	2024-08-07	
Manganese, dissolved	**1.99**	0.00020	mg/L	2024-08-07	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Nickel, dissolved	**0.0126**	0.00040	mg/L	2024-08-07	
Potassium, dissolved	**30.6**	0.10	mg/L	2024-08-07	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Silver, dissolved	< 0.000050	0.000050	mg/L	2024-08-07	
Sodium, dissolved	**90.1**	0.10	mg/L	2024-08-07	
Uranium, dissolved	**0.00623**	0.000020	mg/L	2024-08-07	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2024-08-07	
General Parameters					
Alkalinity, Total (as CaCO3)	**730**	2.0	mg/L	2024-08-07	
Bicarbonate (HCO3)	**891**	2.0	mg/L	2024-08-07	
Carbonate (CO3)	< 2.0	2.0	mg/L	2024-08-07	
Hydroxide (OH)	< 2.0	2.0	mg/L	2024-08-07	
Ammonia, Total (as N)	**0.166**	0.050	mg/L	2024-08-06	
Chemical Oxygen Demand	**60**	20	mg/L	2024-08-06	
Conductivity (EC)	**2290**	2.0	µS/cm	2024-08-07	
pH	**6.74**	0.10	pH units	2024-08-07	HT2
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2024-08-08	
Acenaphthylene	< 0.200	0.200	µg/L	2024-08-08	
Acridine	< 0.050	0.050	µg/L	2024-08-08	
Anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benz(a)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW04 (24H0277-04) | Matrix: Water | Sampled: 2024-08-02 10:45, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Chrysene	< 0.050	0.050	µg/L	2024-08-08	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Fluoranthene	< 0.030	0.030	µg/L	2024-08-08	
Fluorene	< 0.050	0.050	µg/L	2024-08-08	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2024-08-08	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Naphthalene	< 0.200	0.200	µg/L	2024-08-08	
Phenanthrene	< 0.100	0.100	µg/L	2024-08-08	
Pyrene	< 0.020	0.020	µg/L	2024-08-08	
Quinoline	< 0.050	0.050	µg/L	2024-08-08	
Surrogate: Naphthalene-d8	*112*	*50-140*	%	*2024-08-08*	
Surrogate: Perylene-d12	*106*	*50-140*	%	*2024-08-08*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24MW04 (24H0277-04) | Matrix: Water | Sampled: 2024-08-02 10:45, Continued					
Volatile Organic Compounds (VOC), Continued					
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*113*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*119*	*70-130*	%	*2024-08-06*	
DUP01 (24H0277-05) | Matrix: Water | Sampled: 2024-08-01					
Anions					
Chloride	**537**	0.50	mg/L	2024-08-06	
Fluoride	**0.50**	0.10	mg/L	2024-08-04	
Nitrate (as N)	< 0.050	0.050	mg/L	2024-08-04	
Nitrite (as N)	< 0.050	0.050	mg/L	2024-08-04	
Sulfate	**785**	1.0	mg/L	2024-08-06	
Calculated Parameters					
F1- BTEX	< 0.104	0.104	mg/L	N/A	
B[a]P TPE	< 0.0000100	0.0000100	mg/L	N/A	
Hardness, Total (as CaCO3)	**1020**	0.500	mg/L	N/A	
Ion Balance	**78.8**	1.0	%	2024-08-12	ION2
Nitrate+Nitrite (as N)	< 0.0500	0.0500	mg/L	N/A	
Solids, Total Dissolved	**1790**	100	mg/L	N/A	
CCME CWS Petroleum Hydrocarbons					
PHC F1 (C6-C10)	< 0.10	0.10	mg/L	2024-08-06	
PHC F2 (C10-C16)	< 0.40	0.40	mg/L	2024-08-07	
Surrogate: 2-Methylnonane (EPH/F2-4)	*101*	*60-140*	%	*2024-08-07*	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2024-08-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Barium, dissolved	**1.13**	0.0050	mg/L	2024-08-08	
Boron, dissolved	**0.0695**	0.0500	mg/L	2024-08-08	
Cadmium, dissolved	**0.000188**	0.000010	mg/L	2024-08-08	
Calcium, dissolved	**287**	0.20	mg/L	2024-08-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Copper, dissolved	**0.00086**	0.00040	mg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
DUP01 (24H0277-05) | Matrix: Water | Sampled: 2024-08-01, Continued					
Dissolved Metals, Continued					
Iron, dissolved	< 0.010	0.010	mg/L	2024-08-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Magnesium, dissolved	**73.0**	0.010	mg/L	2024-08-08	
Manganese, dissolved	**1.24**	0.00020	mg/L	2024-08-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Nickel, dissolved	**0.00472**	0.00040	mg/L	2024-08-08	
Potassium, dissolved	**16.5**	0.10	mg/L	2024-08-08	
Selenium, dissolved	**0.00112**	0.00050	mg/L	2024-08-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2024-08-08	
Sodium, dissolved	**92.3**	0.10	mg/L	2024-08-08	
Uranium, dissolved	**0.00495**	0.000020	mg/L	2024-08-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2024-08-08	
General Parameters					
Alkalinity, Total (as CaCO3)	< 2.0	2.0	mg/L	2024-08-07	
Bicarbonate (HCO3)	< 2.0	2.0	mg/L	2024-08-07	
Carbonate (CO3)	< 2.0	2.0	mg/L	2024-08-07	
Hydroxide (OH)	< 2.0	2.0	mg/L	2024-08-07	
Ammonia, Total (as N)	**0.201**	0.050	mg/L	2024-08-06	
Chemical Oxygen Demand	**118**	20	mg/L	2024-08-06	
Conductivity (EC)	**3320**	2.0	µS/cm	2024-08-07	
pH	**3.41**	0.10	pH units	2024-08-07	HT2
Polycyclic Aromatic Hydrocarbons (PAH)					
Acenaphthene	< 0.050	0.050	µg/L	2024-08-08	
Acenaphthylene	< 0.200	0.200	µg/L	2024-08-08	
Acridine	< 0.050	0.050	µg/L	2024-08-08	
Anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benz(a)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(a)pyrene	< 0.010	0.010	µg/L	2024-08-08	
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L	2024-08-08	
Benzo(k)fluoranthene	< 0.050	0.050	µg/L	2024-08-08	
2-Chloronaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Chrysene	< 0.050	0.050	µg/L	2024-08-08	
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L	2024-08-08	
Fluoranthene	< 0.030	0.030	µg/L	2024-08-08	
Fluorene	< 0.050	0.050	µg/L	2024-08-08	
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L	2024-08-08	
1-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
2-Methylnaphthalene	< 0.100	0.100	µg/L	2024-08-08	
Naphthalene	< 0.200	0.200	µg/L	2024-08-08	
Phenanthrene	< 0.100	0.100	µg/L	2024-08-08	
Pyrene	< 0.020	0.020	µg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
DUP01 (24H0277-05) | Matrix: Water | Sampled: 2024-08-01, Continued					
Polycyclic Aromatic Hydrocarbons (PAH), Continued					
Quinoline	< 0.050	0.050	µg/L	2024-08-08	
Surrogate: Naphthalene-d8	*75*	*50-140*	%	*2024-08-08*	
Surrogate: Perylene-d12	*64*	*50-140*	%	*2024-08-08*	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*109*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*118*	*70-130*	%	*2024-08-06*	
24 FB 01 (24H0277-06) | Matrix: Water | Sampled: 2024-08-02 11:00					

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24 FB 01 (24H0277-06) | Matrix: Water | Sampled: 2024-08-02 11:00, Continued					
Calculated Parameters					
Hardness, Total (as CaCO3)	< 0.500	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2024-08-07	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2024-08-07	
Arsenic, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Barium, dissolved	< 0.0050	0.0050	mg/L	2024-08-07	
Boron, dissolved	< 0.0500	0.0500	mg/L	2024-08-07	
Cadmium, dissolved	< 0.000010	0.000010	mg/L	2024-08-07	
Calcium, dissolved	< 0.20	0.20	mg/L	2024-08-07	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Copper, dissolved	< 0.00040	0.00040	mg/L	2024-08-07	
Iron, dissolved	< 0.010	0.010	mg/L	2024-08-07	
Lead, dissolved	< 0.00020	0.00020	mg/L	2024-08-07	
Magnesium, dissolved	< 0.010	0.010	mg/L	2024-08-07	
Manganese, dissolved	< 0.00020	0.00020	mg/L	2024-08-07	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Nickel, dissolved	< 0.00040	0.00040	mg/L	2024-08-07	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2024-08-07	
Silver, dissolved	< 0.000050	0.000050	mg/L	2024-08-07	
Uranium, dissolved	< 0.000020	0.000020	mg/L	2024-08-07	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2024-08-07	
24 MW01 (24H0277-07) | Matrix: Water | Sampled: 2024-08-02 11:15					
Calculated Parameters					
Hardness, Total (as CaCO3)	**439**	0.500	mg/L	N/A	
Dissolved Metals					
Aluminum, dissolved	< 0.0050	0.0050	mg/L	2024-08-08	
Antimony, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Arsenic, dissolved	**0.00050**	0.00050	mg/L	2024-08-08	
Barium, dissolved	**0.259**	0.0050	mg/L	2024-08-08	
Boron, dissolved	**0.0612**	0.0500	mg/L	2024-08-08	
Cadmium, dissolved	**0.000042**	0.000010	mg/L	2024-08-08	
Calcium, dissolved	**119**	0.20	mg/L	2024-08-08	
Chromium, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Copper, dissolved	**0.00046**	0.00040	mg/L	2024-08-08	
Iron, dissolved	< 0.010	0.010	mg/L	2024-08-08	
Lead, dissolved	< 0.00020	0.00020	mg/L	2024-08-08	
Magnesium, dissolved	**34.2**	0.010	mg/L	2024-08-08	
Manganese, dissolved	**0.629**	0.00020	mg/L	2024-08-08	
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24 MW01 (24H0277-07) | Matrix: Water | Sampled: 2024-08-02 11:15, Continued					
Dissolved Metals, Continued					
Nickel, dissolved	**0.00328**	0.00040	mg/L	2024-08-08	
Selenium, dissolved	< 0.00050	0.00050	mg/L	2024-08-08	
Silver, dissolved	< 0.000050	0.000050	mg/L	2024-08-08	
Uranium, dissolved	**0.00633**	0.000020	mg/L	2024-08-08	
Zinc, dissolved	< 0.0040	0.0040	mg/L	2024-08-08	
24TB01 (24H0277-08) | Matrix: Water | Sampled: 2024-08-01					
Calculated Parameters					
Hardness, Total (as CaCO3)	< 0.500	0.500	mg/L	N/A	
Dissolved Metals					
Mercury, dissolved	< 0.000010	0.000010	mg/L	2024-08-08	
Total Metals					
Aluminum, total	< 0.0050	0.0050	mg/L	2024-08-10	
Antimony, total	< 0.00020	0.00020	mg/L	2024-08-10	
Arsenic, total	< 0.00050	0.00050	mg/L	2024-08-10	
Barium, total	< 0.0050	0.0050	mg/L	2024-08-10	
Boron, total	< 0.0500	0.0500	mg/L	2024-08-10	
Cadmium, total	< 0.000010	0.000010	mg/L	2024-08-10	
Calcium, total	< 0.20	0.20	mg/L	2024-08-10	
Chromium, total	< 0.00050	0.00050	mg/L	2024-08-10	
Copper, total	< 0.00040	0.00040	mg/L	2024-08-10	
Iron, total	< 0.010	0.010	mg/L	2024-08-10	
Lead, total	< 0.00020	0.00020	mg/L	2024-08-10	
Magnesium, total	< 0.010	0.010	mg/L	2024-08-10	
Manganese, total	< 0.00020	0.00020	mg/L	2024-08-10	
Nickel, total	< 0.00040	0.00040	mg/L	2024-08-10	
Selenium, total	< 0.00050	0.00050	mg/L	2024-08-10	
Silver, total	< 0.000050	0.000050	mg/L	2024-08-10	
Uranium, total	< 0.000020	0.000020	mg/L	2024-08-10	
Zinc, total	< 0.0040	0.0040	mg/L	2024-08-10	
Volatile Organic Compounds (VOC)					
Benzene	< 0.5	0.5	µg/L	2024-08-06	
Bromodichloromethane	< 1.0	1.0	µg/L	2024-08-06	
Bromoform	< 1.0	1.0	µg/L	2024-08-06	
Carbon tetrachloride	< 0.5	0.5	µg/L	2024-08-06	
Chlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
Chloroethane	< 2.0	2.0	µg/L	2024-08-06	
Chloroform	< 1.0	1.0	µg/L	2024-08-06	
Dibromochloromethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dibromoethane	< 0.3	0.3	µg/L	2024-08-06	

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Analyzed	Qualifier
24TB01 (24H0277-08) | Matrix: Water | Sampled: 2024-08-01, Continued					
Volatile Organic Compounds (VOC), Continued					
Dibromomethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichlorobenzene	< 0.5	0.5	µg/L	2024-08-06	
1,3-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,4-Dichlorobenzene	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,2-Dichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Dichloromethane	< 3.0	3.0	µg/L	2024-08-06	
1,2-Dichloropropane	< 1.0	1.0	µg/L	2024-08-06	
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L	2024-08-06	
Ethylbenzene	< 1.0	1.0	µg/L	2024-08-06	
Methyl tert-butyl ether	< 1.0	1.0	µg/L	2024-08-06	
Styrene	< 1.0	1.0	µg/L	2024-08-06	
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L	2024-08-06	
Tetrachloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Toluene	< 0.5	0.5	µg/L	2024-08-06	
1,1,1-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
1,1,2-Trichloroethane	< 1.0	1.0	µg/L	2024-08-06	
Trichloroethylene	< 1.0	1.0	µg/L	2024-08-06	
Trichlorofluoromethane	< 1.0	1.0	µg/L	2024-08-06	
Vinyl chloride	< 1.0	1.0	µg/L	2024-08-06	
Xylenes (total)	< 2.0	2.0	µg/L	2024-08-06	
Surrogate: Toluene-d8	*102*	*70-130*	%	*2024-08-06*	
Surrogate: 4-Bromofluorobenzene	*110*	*70-130*	%	*2024-08-06*	

Sample Qualifiers:

F1	The sample was not field-filtered and was therefore filtered through a 0.45 µm membrane in the laboratory and preserved with HNO3 prior to analysis for dissolved metals.
HT2	The 15 minute recommended holding time (from sampling to analysis) has been exceeded - field analysis is recommended.
ION2	Ion balance outside typical limits Data reviewed and no errors found. Sample composition and other factors may be contributing to imbalance
RA1	The Reporting Limit for this sample has been raised due to matrix interference.
RS1	The Reporting Limits for this sample have been raised due to high analyte concentration.

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
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Analysis Description	Method Ref.	Technique	Accredited	Location
Alkalinity in Water	SM 2320 B* (2021)	Titration with H2SO4	✓	Edmonton
Ammonia, Total in Water	SM 4500-NH3 D* (2021)	Ion Selective Electrode	✓	Edmonton
Anions in Water	SM 4110 B (2020)	Ion Chromatography	✓	Edmonton
BTEX in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)		Edmonton
CCME PHC F1 in Water	EPA 5030B / CCME CWS PHC*	Purge&Trap / Gas Chromatography (GC-FID)		Edmonton
CCME PHC F2 in Water	EPA 3511* / CCME CWS PHC*	Hexane MicroExtraction (Base/Neutral) / Gas Chromatography (GC-FID)		Edmonton
Chemical Oxygen Demand in Water	SM 5220 D* (2022)	Closed Reflux, Colorimetry	✓	Edmonton
Conductivity in Water	SM 2510 B (2021)	Conductivity Meter	✓	Edmonton
Dissolved Metals in Water	EPA 200.8 / EPA 6020B	0.45 µm Filtration / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Hardness in Water	SM 2340 B (2021)	Calculation: 2.497 [diss Ca] + 4.118 [diss Mg]	✓	N/A
Ion Balance in Water	SM 1030 E (2021)	SM 1030 E		N/A
Mercury, dissolved in Water	EPA 245.7*	BrCl2 Oxidation / Cold Vapor Atomic Fluorescence Spectrometry (CVAFS)	✓	Richmond
pH in Water	SM 4500-H+ B (2021)	Electrometry	✓	Edmonton
Polycyclic Aromatic Hydrocarbons in Water	EPA 3511* / EPA 8270D	Hexane MicroExtraction (Base/Neutral) / GC-MSD (SIM)		Edmonton
Solids, Total Dissolved in Water	SM 1030 E (2021)	SM 1030 E		N/A
Total Metals in Water	EPA 200.2 / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)	✓	Richmond
Volatile Organic Compounds in Water	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)		Edmonton

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

Glossary of Terms:

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

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
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CCME Petroleum Hydrocarbon Comments:

CARO's methods comply with the Reference Method for the CWS PHC and are validated for use.

In cases where results for both F4 and F4G are reported, the greater of the two numbers must be used in any application of the CWS PHC guidelines. The gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

Unless otherwise qualified, the following quality control criteria were adhered to:

1. All extraction and analysis holding times were met.
2. F1: The C6 and C10 response factors were within 30% of the response factor for toluene.
3. F2-F4: The C10, C16, and C34 response factors were within 10% of their average.
4. F4: The C50 response factor was at least 70% of the average of the C10, C16 and C34 response factors.
5. Linearity of the gasoline and/or diesel+motor oil response was within 15% throughout the calibration range.

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

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

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

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
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The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in "batches" and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

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

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

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B4H1656										
Blank (B4H1656-BLK1)				Prepared: 2024-08-04, Analyzed: 2024-08-04						
Chloride	< 0.50	0.50	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.050	0.050	mg/L							
Nitrite (as N)	< 0.050	0.050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
Blank (B4H1656-BLK2)				Prepared: 2024-08-05, Analyzed: 2024-08-05						
Chloride	< 0.50	0.50	mg/L							
Fluoride	< 0.10	0.10	mg/L							
Nitrate (as N)	< 0.050	0.050	mg/L							
Nitrite (as N)	< 0.050	0.050	mg/L							
Sulfate	< 1.0	1.0	mg/L							
LCS (B4H1656-BS1)				Prepared: 2024-08-04, Analyzed: 2024-08-04						
Chloride	10.1	0.50	mg/L	10.0		101	90-110			
Fluoride	0.99	0.10	mg/L	1.00		99	85-115			
Nitrate (as N)	0.991	0.050	mg/L	1.00		99	92-108			
Nitrite (as N)	0.482	0.050	mg/L	0.500		96	85-115			
Sulfate	53.4	1.0	mg/L	50.0		107	90-110			
LCS (B4H1656-BS2)				Prepared: 2024-08-05, Analyzed: 2024-08-05						
Chloride	9.00	0.50	mg/L	10.0		90	90-110			
Fluoride	0.87	0.10	mg/L	1.00		87	85-115			
Nitrate (as N)	0.874	0.050	mg/L	1.00		87	92-108			SPK1
Nitrite (as N)	0.472	0.050	mg/L	0.500		94	85-115			
Sulfate	46.7	1.0	mg/L	50.0		93	90-110			
Duplicate (B4H1656-DUP1)		**Source: 24H0277-01**		Prepared: 2024-08-04, Analyzed: 2024-08-04						
Chloride	11.2	0.50	mg/L		11.2			< 1	7	
Fluoride	0.21	0.10	mg/L		0.21				15	
Nitrate (as N)	< 0.050	0.050	mg/L		< 0.050				12	
Nitrite (as N)	< 0.050	0.050	mg/L		< 0.050				18	
Sulfate	50.0	1.0	mg/L		49.8			< 1	8	
Matrix Spike (B4H1656-MS1)		**Source: 24H0277-01**		Prepared: 2024-08-04, Analyzed: 2024-08-04						
Chloride	21.6	5.00	mg/L	10.0	11.2	104	85-115			MS2
Fluoride	1.21	0.10	mg/L	1.00	0.21	100	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Anions, Batch B4H1656, Continued										
Matrix Spike (B4H1656-MS1), Continued	**Source: 24H0277-01**			Prepared: 2024-08-04, Analyzed: 2024-08-04						
Nitrate (as N)	0.992	0.050	mg/L	1.00	< 0.050	99	87-111			
Nitrite (as N)	0.486	0.050	mg/L	0.500	< 0.050	97	81-127			
Sulfate	97.1	10.0	mg/L	50.0	49.8	95	85-115			MS2
CCME CWS Petroleum Hydrocarbons, Batch B4H1691										
Blank (B4H1691-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
PHC F1 (C6-C10)	< 0.10	0.10	mg/L							
LCS (B4H1691-BS1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
PHC F1 (C6-C10)	1.61	0.10	mg/L	1.48		108	60-130			
CCME CWS Petroleum Hydrocarbons, Batch B4H1692										
Blank (B4H1692-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-07						
PHC F2 (C10-C16)	< 0.40	0.40	mg/L							
Surrogate: 2-Methylnonane (EPH/F2-4)	*2.40*		*mg/L*	2.88		*83*	*60-140*			
LCS (B4H1692-BS1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
PHC F2 (C10-C16)	22.9	0.40	mg/L	24.8		92	60-140			
Surrogate: 2-Methylnonane (EPH/F2-4)	*2.30*		*mg/L*	2.88		*80*	*60-140*			
LCS Dup (B4H1692-BSD1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
PHC F2 (C10-C16)	23.7	0.40	mg/L	24.8		96	60-140	4	20	
Surrogate: 2-Methylnonane (EPH/F2-4)	*2.50*		*mg/L*	2.88		*87*	*60-140*			
Dissolved Metals, Batch B4H1794										
Blank (B4H1794-BLK1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Calcium, dissolved	< 0.050	0.050	mg/L							
Iron, dissolved	< 0.100	0.100	mg/L							
Magnesium, dissolved	< 0.030	0.030	mg/L							
Manganese, dissolved	< 0.010	0.010	mg/L							
Potassium, dissolved	< 0.200	0.200	mg/L							
Sodium, dissolved	< 0.050	0.050	mg/L							
Blank (B4H1794-BLK2)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Calcium, dissolved	< 0.050	0.050	mg/L							
Iron, dissolved	< 0.100	0.100	mg/L							
Magnesium, dissolved	< 0.030	0.030	mg/L							
Manganese, dissolved	< 0.010	0.010	mg/L							
Potassium, dissolved	< 0.200	0.200	mg/L							
Sodium, dissolved	< 0.050	0.050	mg/L							
Blank (B4H1794-BLK3)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Calcium, dissolved	< 0.050	0.050	mg/L							
Iron, dissolved	< 0.100	0.100	mg/L							
Magnesium, dissolved	< 0.030	0.030	mg/L							
Manganese, dissolved	< 0.010	0.010	mg/L							
Potassium, dissolved	< 0.200	0.200	mg/L							
Sodium, dissolved	< 0.050	0.050	mg/L							
LCS (B4H1794-BS1)				Prepared: 2024-08-06, Analyzed: 2024-08-07						
Calcium, dissolved	104	0.050	mg/L	100		104	80-120			
Iron, dissolved	51.4	0.100	mg/L	50.0		103	80-120			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B4H1794, Continued										
LCS (B4H1794-BS1), Continued				Prepared: 2024-08-06, Analyzed: 2024-08-07						
Magnesium, dissolved	20.4	0.030	mg/L	20.0		102	80-120			
Manganese, dissolved	2.53	0.010	mg/L	2.50		101	80-120			
Potassium, dissolved	5.06	0.200	mg/L	5.00		101	80-120			
Sodium, dissolved	105	0.050	mg/L	100		105	80-120			
LCS (B4H1794-BS2)				Prepared: 2024-08-06, Analyzed: 2024-08-07						
Calcium, dissolved	106	0.050	mg/L	100		106	80-120			
Iron, dissolved	51.8	0.100	mg/L	50.0		104	80-120			
Magnesium, dissolved	20.7	0.030	mg/L	20.0		104	80-120			
Manganese, dissolved	2.56	0.010	mg/L	2.50		102	80-120			
Potassium, dissolved	5.20	0.200	mg/L	5.00		104	80-120			
Sodium, dissolved	106	0.050	mg/L	100		106	80-120			
LCS (B4H1794-BS3)				Prepared: 2024-08-06, Analyzed: 2024-08-07						
Calcium, dissolved	107	0.050	mg/L	100		107	80-120			
Iron, dissolved	52.1	0.100	mg/L	50.0		104	80-120			
Magnesium, dissolved	20.9	0.030	mg/L	20.0		104	80-120			
Manganese, dissolved	2.57	0.010	mg/L	2.50		103	80-120			
Potassium, dissolved	5.25	0.200	mg/L	5.00		105	80-120			
Sodium, dissolved	108	0.050	mg/L	100		108	80-120			
Duplicate (B4H1794-DUP1)		**Source: 24H0277-01**		Prepared: 2024-08-06, Analyzed: 2024-08-07						
Calcium, dissolved	131	0.050	mg/L		130			< 1	20	
Iron, dissolved	< 0.100	0.100	mg/L		< 0.100				20	
Magnesium, dissolved	32.3	0.030	mg/L		32.5			< 1	20	
Manganese, dissolved	0.674	0.010	mg/L		0.679			< 1	20	
Potassium, dissolved	5.24	0.200	mg/L		5.25			< 1	20	
Sodium, dissolved	9.17	0.050	mg/L		9.17			< 1	20	
Matrix Spike (B4H1794-MS1)		**Source: 24H0277-01**		Prepared: 2024-08-06, Analyzed: 2024-08-08						
Calcium, dissolved	233	0.500	mg/L	100	130	103	80-120			
Iron, dissolved	50.8	0.100	mg/L	50.0	< 0.100	102	80-120			
Magnesium, dissolved	54.3	0.300	mg/L	20.0	32.5	109	80-120			
Manganese, dissolved	3.19	0.010	mg/L	2.50	0.679	101	80-120			
Potassium, dissolved	10.3	2.00	mg/L	5.00	5.25	100	80-120			
Sodium, dissolved	117	0.050	mg/L	100	9.17	108	80-120			
Dissolved Metals, Batch B4H1932										
Blank (B4H1932-BLK1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Aluminum, dissolved	< 0.0050	0.0050	mg/L							
Antimony, dissolved	< 0.00020	0.00020	mg/L							
Arsenic, dissolved	< 0.00050	0.00050	mg/L							
Barium, dissolved	< 0.0050	0.0050	mg/L							
Boron, dissolved	< 0.0500	0.0500	mg/L							
Cadmium, dissolved	< 0.000010	0.000010	mg/L							
Calcium, dissolved	< 0.20	0.20	mg/L							
Chromium, dissolved	< 0.00050	0.00050	mg/L							
Copper, dissolved	< 0.00040	0.00040	mg/L							
Iron, dissolved	< 0.010	0.010	mg/L							
Lead, dissolved	< 0.00020	0.00020	mg/L							
Magnesium, dissolved	< 0.010	0.010	mg/L							
Manganese, dissolved	< 0.00020	0.00020	mg/L							
Nickel, dissolved	< 0.00040	0.00040	mg/L							
Potassium, dissolved	< 0.10	0.10	mg/L							
Selenium, dissolved	< 0.00050	0.00050	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B4H1932, Continued										
Blank (B4H1932-BLK1), Continued				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Silver, dissolved	< 0.000050	0.000050	mg/L							
Sodium, dissolved	< 0.10	0.10	mg/L							
Uranium, dissolved	< 0.000020	0.000020	mg/L							
Zinc, dissolved	< 0.0040	0.0040	mg/L							
LCS (B4H1932-BS1)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Aluminum, dissolved	4.11	0.0050	mg/L	4.00		103	80-120			
Antimony, dissolved	0.0402	0.00020	mg/L	0.0400		100	80-120			
Arsenic, dissolved	0.401	0.00050	mg/L	0.400		100	80-120			
Barium, dissolved	0.0396	0.0050	mg/L	0.0400		99	80-120			
Boron, dissolved	0.415	0.0500	mg/L	0.400		104	80-120			
Cadmium, dissolved	0.0402	0.000010	mg/L	0.0400		100	80-120			
Calcium, dissolved	3.98	0.20	mg/L	4.00		100	80-120			
Chromium, dissolved	0.0400	0.00050	mg/L	0.0400		100	80-120			
Copper, dissolved	0.0402	0.00040	mg/L	0.0400		101	80-120			
Iron, dissolved	4.01	0.010	mg/L	4.00		100	80-120			
Lead, dissolved	0.0403	0.00020	mg/L	0.0400		101	80-120			
Magnesium, dissolved	4.07	0.010	mg/L	4.00		102	80-120			
Manganese, dissolved	0.0405	0.00020	mg/L	0.0400		101	80-120			
Nickel, dissolved	0.0410	0.00040	mg/L	0.0400		102	80-120			
Potassium, dissolved	4.07	0.10	mg/L	4.00		102	80-120			
Selenium, dissolved	0.406	0.00050	mg/L	0.400		102	80-120			
Silver, dissolved	0.0402	0.000050	mg/L	0.0400		100	80-120			
Sodium, dissolved	4.12	0.10	mg/L	4.00		103	80-120			
Uranium, dissolved	0.0410	0.000020	mg/L	0.0400		103	80-120			
Zinc, dissolved	0.401	0.0040	mg/L	0.400		100	80-120			
Duplicate (B4H1932-DUP1)		**Source: 24H0277-06**		Prepared: 2024-08-07, Analyzed: 2024-08-07						
Aluminum, dissolved	< 0.0050	0.0050	mg/L		< 0.0050				20	
Antimony, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Arsenic, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Barium, dissolved	< 0.0050	0.0050	mg/L		< 0.0050				20	
Boron, dissolved	< 0.0500	0.0500	mg/L		< 0.0500				20	
Cadmium, dissolved	< 0.000010	0.000010	mg/L		< 0.000010				20	
Calcium, dissolved	< 0.20	0.20	mg/L		< 0.20				20	
Chromium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Copper, dissolved	< 0.00040	0.00040	mg/L		< 0.00040				20	
Iron, dissolved	< 0.010	0.010	mg/L		< 0.010				20	
Lead, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Magnesium, dissolved	< 0.010	0.010	mg/L		< 0.010				20	
Manganese, dissolved	< 0.00020	0.00020	mg/L		< 0.00020				20	
Nickel, dissolved	< 0.00040	0.00040	mg/L		< 0.00040				20	
Potassium, dissolved	< 0.10	0.10	mg/L		< 0.10				20	
Selenium, dissolved	< 0.00050	0.00050	mg/L		< 0.00050				20	
Silver, dissolved	< 0.000050	0.000050	mg/L		< 0.000050				20	
Sodium, dissolved	< 0.10	0.10	mg/L		< 0.10				20	
Uranium, dissolved	< 0.000020	0.000020	mg/L		< 0.000020				20	
Zinc, dissolved	< 0.0040	0.0040	mg/L		< 0.0040				20	
Dissolved Metals, Batch B4H1993										
Blank (B4H1993-BLK1)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H1993-BLK2)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Dissolved Metals, Batch B4H1993, Continued										
Blank (B4H1993-BLK3)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H1993-BLK4)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
LCS (B4H1993-BS1)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00251	0.000010	mg/L	0.00250		100	80-120			
LCS (B4H1993-BS2)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00242	0.000010	mg/L	0.00250		97	80-120			
LCS (B4H1993-BS3)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00257	0.000010	mg/L	0.00250		103	80-120			
LCS (B4H1993-BS4)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00245	0.000010	mg/L	0.00250		98	80-120			
Dissolved Metals, Batch B4H2048										
Blank (B4H2048-BLK1)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H2048-BLK2)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H2048-BLK3)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H2048-BLK4)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
Blank (B4H2048-BLK5)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	< 0.000010	0.000010	mg/L							
LCS (B4H2048-BS1)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00257	0.000010	mg/L	0.00250		103	80-120			
LCS (B4H2048-BS2)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00260	0.000010	mg/L	0.00250		104	80-120			
LCS (B4H2048-BS3)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00210	0.000010	mg/L	0.00250		84	80-120			
LCS (B4H2048-BS4)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00262	0.000010	mg/L	0.00250		105	80-120			
LCS (B4H2048-BS5)				Prepared: 2024-08-08, Analyzed: 2024-08-08						
Mercury, dissolved	0.00266	0.000010	mg/L	0.00250		107	80-120			
General Parameters, Batch B4H1711										
Blank (B4H1711-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Ammonia, Total (as N)	< 0.050	0.050	mg/L							
LCS (B4H1711-BS1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Ammonia, Total (as N)	0.204	0.050	mg/L	0.200		102	85-115			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B4H1806										
Blank (B4H1806-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Chemical Oxygen Demand	< 20	20	mg/L							
LCS (B4H1806-BS1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Chemical Oxygen Demand	487	20	mg/L	500		97	85-115			
General Parameters, Batch B4H1811										
Blank (B4H1811-BLK1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Alkalinity, Total (as CaCO3)	< 2.0	2.0	mg/L							
Bicarbonate (HCO3)	< 2.0	2.0	mg/L							
Carbonate (CO3)	< 2.0	2.0	mg/L							
Hydroxide (OH)	< 2.0	2.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
Blank (B4H1811-BLK2)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Alkalinity, Total (as CaCO3)	< 2.0	2.0	mg/L							
Bicarbonate (HCO3)	< 2.0	2.0	mg/L							
Carbonate (CO3)	< 2.0	2.0	mg/L							
Hydroxide (OH)	< 2.0	2.0	mg/L							
Conductivity (EC)	< 2.0	2.0	µS/cm							
LCS (B4H1811-BS1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Alkalinity, Total (as CaCO3)	252	2.0	mg/L	250		101	94-108			
Conductivity (EC)	1010	2.0	µS/cm	1000		101	95-105			
LCS (B4H1811-BS2)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
Alkalinity, Total (as CaCO3)	249	2.0	mg/L	250		100	94-108			
Conductivity (EC)	1010	2.0	µS/cm	1000		101	95-105			
Reference (B4H1811-SRM1)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
pH	7.09	0.10	pH units	7.00		101	98-102			
Reference (B4H1811-SRM2)				Prepared: 2024-08-07, Analyzed: 2024-08-07						
pH	7.09	0.10	pH units	7.00		101	98-102			
Polycyclic Aromatic Hydrocarbons (PAH), Batch B4H1692										
Blank (B4H1692-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-08						
Acenaphthene	< 0.050	0.050	µg/L							
Acenaphthylene	< 0.200	0.200	µg/L							
Acridine	< 0.050	0.050	µg/L							
Anthracene	< 0.010	0.010	µg/L							
Benz(a)anthracene	< 0.010	0.010	µg/L							
Benzo(a)pyrene	< 0.010	0.010	µg/L							
Benzo(b+j)fluoranthene	< 0.050	0.050	µg/L							
Benzo(g,h,i)perylene	< 0.050	0.050	µg/L							
Benzo(k)fluoranthene	< 0.050	0.050	µg/L							
2-Chloronaphthalene	< 0.100	0.100	µg/L							
Chrysene	< 0.050	0.050	µg/L							
Dibenz(a,h)anthracene	< 0.010	0.010	µg/L							
Fluoranthene	< 0.030	0.030	µg/L							
Fluorene	< 0.050	0.050	µg/L							
Indeno(1,2,3-cd)pyrene	< 0.050	0.050	µg/L							
1-Methylnaphthalene	< 0.100	0.100	µg/L							
2-Methylnaphthalene	< 0.100	0.100	µg/L							
Naphthalene	< 0.200	0.200	µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Polycyclic Aromatic Hydrocarbons (PAH), Batch B4H1692, Continued										
Blank (B4H1692-BLK1), Continued				Prepared: 2024-08-06, Analyzed: 2024-08-08						
Phenanthrene	< 0.100	0.100	µg/L							
Pyrene	< 0.020	0.020	µg/L							
Quinoline	< 0.050	0.050	µg/L							
Surrogate: Naphthalene-d8	*20.7*		*µg/L*	20.0		*104*	*50-140*			
Surrogate: Perylene-d12	*23.4*		*µg/L*	20.0		*117*	*50-140*			
LCS (B4H1692-BS2)				Prepared: 2024-08-06, Analyzed: 2024-08-08						
Acenaphthene	21.8	0.050	µg/L	20.0		109	50-140			
Acenaphthylene	23.0	0.200	µg/L	20.0		115	50-140			
Acridine	22.6	0.050	µg/L	19.3		117	50-140			
Anthracene	21.2	0.010	µg/L	20.0		106	50-140			
Benz(a)anthracene	23.7	0.010	µg/L	20.0		119	50-140			
Benzo(a)pyrene	23.7	0.010	µg/L	20.0		118	50-140			
Benzo(b+j)fluoranthene	39.7	0.050	µg/L	40.0		99	50-140			
Benzo(g,h,i)perylene	23.1	0.050	µg/L	20.0		115	50-140			
Benzo(k)fluoranthene	18.6	0.050	µg/L	20.0		93	50-140			
2-Chloronaphthalene	24.8	0.100	µg/L	20.4		122	50-140			
Chrysene	26.0	0.050	µg/L	20.0		130	50-140			
Dibenz(a,h)anthracene	24.8	0.010	µg/L	20.0		124	50-140			
Fluoranthene	22.1	0.030	µg/L	20.0		110	50-140			
Fluorene	21.5	0.050	µg/L	20.0		108	50-140			
Indeno(1,2,3-cd)pyrene	23.2	0.050	µg/L	20.0		116	50-140			
1-Methylnaphthalene	21.9	0.100	µg/L	20.0		109	50-140			
2-Methylnaphthalene	22.8	0.100	µg/L	20.0		114	50-140			
Naphthalene	23.0	0.200	µg/L	20.0		115	50-140			
Phenanthrene	22.5	0.100	µg/L	20.0		112	50-140			
Pyrene	21.1	0.020	µg/L	20.0		106	50-140			
Quinoline	21.3	0.050	µg/L	20.2		106	50-140			
Surrogate: Naphthalene-d8	*21.5*		*µg/L*	20.0		*108*	*50-140*			
Surrogate: Perylene-d12	*21.7*		*µg/L*	20.0		*109*	*50-140*			
LCS Dup (B4H1692-BSD2)				Prepared: 2024-08-06, Analyzed: 2024-08-08						
Acenaphthene	24.3	0.050	µg/L	20.0		122	50-140	11	30	
Acenaphthylene	25.5	0.200	µg/L	20.0		127	50-140	10	30	
Acridine	25.4	0.050	µg/L	19.3		132	50-140	12	30	
Anthracene	24.6	0.010	µg/L	20.0		123	50-140	15	30	
Benz(a)anthracene	27.2	0.010	µg/L	20.0		136	50-140	14	30	
Benzo(a)pyrene	27.7	0.010	µg/L	20.0		138	50-140	16	30	
Benzo(b+j)fluoranthene	45.5	0.050	µg/L	40.0		114	50-140	14	30	
Benzo(g,h,i)perylene	27.5	0.050	µg/L	20.0		138	50-140	18	30	
Benzo(k)fluoranthene	22.7	0.050	µg/L	20.0		114	50-140	20	30	
2-Chloronaphthalene	27.9	0.100	µg/L	20.4		137	50-140	12	30	
Chrysene	27.6	0.050	µg/L	20.0		138	50-140	6	30	
Dibenz(a,h)anthracene	27.3	0.010	µg/L	20.0		137	50-140	10	30	
Fluoranthene	25.8	0.030	µg/L	20.0		129	50-140	15	30	
Fluorene	24.7	0.050	µg/L	20.0		123	50-140	14	30	
Indeno(1,2,3-cd)pyrene	27.2	0.050	µg/L	20.0		136	50-140	16	30	
1-Methylnaphthalene	24.7	0.100	µg/L	20.0		124	50-140	12	30	
2-Methylnaphthalene	25.8	0.100	µg/L	20.0		129	50-140	12	30	
Naphthalene	26.1	0.200	µg/L	20.0		131	50-140	13	30	
Phenanthrene	26.2	0.100	µg/L	20.0		131	50-140	15	30	
Pyrene	24.4	0.020	µg/L	20.0		122	50-140	15	30	
Quinoline	23.9	0.050	µg/L	20.2		118	50-140	11	30	
Surrogate: Naphthalene-d8	*21.6*		*µg/L*	20.0		*108*	*50-140*			
Surrogate: Perylene-d12	*22.8*		*µg/L*	20.0		*114*	*50-140*			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Total Metals, Batch B4H2209										
Blank (B4H2209-BLK1)				Prepared: 2024-08-09, Analyzed: 2024-08-10						
Aluminum, total	< 0.0050	0.0050	mg/L							
Antimony, total	< 0.00020	0.00020	mg/L							
Arsenic, total	< 0.00050	0.00050	mg/L							
Barium, total	< 0.0050	0.0050	mg/L							
Boron, total	< 0.0500	0.0500	mg/L							
Cadmium, total	< 0.000010	0.000010	mg/L							
Calcium, total	< 0.20	0.20	mg/L							
Chromium, total	< 0.00050	0.00050	mg/L							
Copper, total	< 0.00040	0.00040	mg/L							
Iron, total	< 0.010	0.010	mg/L							
Lead, total	< 0.00020	0.00020	mg/L							
Magnesium, total	< 0.010	0.010	mg/L							
Manganese, total	< 0.00020	0.00020	mg/L							
Nickel, total	< 0.00040	0.00040	mg/L							
Selenium, total	< 0.00050	0.00050	mg/L							
Silver, total	< 0.000050	0.000050	mg/L							
Uranium, total	< 0.000020	0.000020	mg/L							
Zinc, total	< 0.0040	0.0040	mg/L							
LCS (B4H2209-BS1)				Prepared: 2024-08-09, Analyzed: 2024-08-10						
Aluminum, total	3.91	0.0050	mg/L	4.00		98	80-120			
Antimony, total	0.0384	0.00020	mg/L	0.0400		96	80-120			
Arsenic, total	0.399	0.00050	mg/L	0.400		100	80-120			
Barium, total	0.0387	0.0050	mg/L	0.0400		97	80-120			
Boron, total	0.377	0.0500	mg/L	0.400		94	80-120			
Cadmium, total	0.0388	0.000010	mg/L	0.0400		97	80-120			
Calcium, total	3.99	0.20	mg/L	4.00		100	80-120			
Chromium, total	0.0405	0.00050	mg/L	0.0400		101	80-120			
Copper, total	0.0403	0.00040	mg/L	0.0400		101	80-120			
Iron, total	4.04	0.010	mg/L	4.00		101	80-120			
Lead, total	0.0386	0.00020	mg/L	0.0400		97	80-120			
Magnesium, total	3.99	0.010	mg/L	4.00		100	80-120			
Manganese, total	0.0404	0.00020	mg/L	0.0400		101	80-120			
Nickel, total	0.0402	0.00040	mg/L	0.0400		100	80-120			
Selenium, total	0.403	0.00050	mg/L	0.400		101	80-120			
Silver, total	0.0403	0.000050	mg/L	0.0400		101	80-120			
Uranium, total	0.0401	0.000020	mg/L	0.0400		100	80-120			
Zinc, total	0.391	0.0040	mg/L	0.400		98	80-120			
Volatile Organic Compounds (VOC), Batch B4H1691										
Blank (B4H1691-BLK1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Benzene	< 0.5	0.5	µg/L							
Bromodichloromethane	< 1.0	1.0	µg/L							
Bromoform	< 1.0	1.0	µg/L							
Carbon tetrachloride	< 0.5	0.5	µg/L							
Chlorobenzene	< 1.0	1.0	µg/L							
Chloroethane	< 2.0	2.0	µg/L							
Chloroform	< 1.0	1.0	µg/L							
Dibromochloromethane	< 1.0	1.0	µg/L							
1,2-Dibromoethane	< 0.3	0.3	µg/L							
Dibromomethane	< 1.0	1.0	µg/L							
1,2-Dichlorobenzene	< 0.5	0.5	µg/L							
1,3-Dichlorobenzene	< 1.0	1.0	µg/L							
1,4-Dichlorobenzene	< 1.0	1.0	µg/L							
1,1-Dichloroethane	< 1.0	1.0	µg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B4H1691, Continued										
Blank (B4H1691-BLK1), Continued				Prepared: 2024-08-06, Analyzed: 2024-08-06						
1,2-Dichloroethane	< 1.0	1.0	µg/L							
1,1-Dichloroethylene	< 1.0	1.0	µg/L							
cis-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
trans-1,2-Dichloroethylene	< 1.0	1.0	µg/L							
Dichloromethane	< 3.0	3.0	µg/L							
1,2-Dichloropropane	< 1.0	1.0	µg/L							
1,3-Dichloropropene (cis + trans)	< 1.0	1.0	µg/L							
Ethylbenzene	< 1.0	1.0	µg/L							
Methyl tert-butyl ether	< 1.0	1.0	µg/L							
Styrene	< 1.0	1.0	µg/L							
1,1,2,2-Tetrachloroethane	< 0.5	0.5	µg/L							
Tetrachloroethylene	< 1.0	1.0	µg/L							
Toluene	< 0.5	0.5	µg/L							
1,1,1-Trichloroethane	< 1.0	1.0	µg/L							
1,1,2-Trichloroethane	< 1.0	1.0	µg/L							
Trichloroethylene	< 1.0	1.0	µg/L							
Trichlorofluoromethane	< 1.0	1.0	µg/L							
Vinyl chloride	< 1.0	1.0	µg/L							
Xylenes (total)	< 2.0	2.0	µg/L							
Surrogate: Toluene-d8	*20.8*		*µg/L*	18.8		*111*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*24.8*		*µg/L*	19.9		*125*	*70-130*			
LCS (B4H1691-BS1)				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Benzene	19.9	0.5	µg/L	20.1		99	70-130			
Bromodichloromethane	16.0	1.0	µg/L	20.1		80	70-130			
Bromoform	15.3	1.0	µg/L	20.1		76	70-130			
Carbon tetrachloride	15.7	0.5	µg/L	20.1		78	70-130			
Chlorobenzene	20.0	1.0	µg/L	20.1		99	70-130			
Chloroethane	14.3	2.0	µg/L	20.1		71	60-140			
Chloroform	17.8	1.0	µg/L	20.1		88	70-130			
Dibromochloromethane	16.8	1.0	µg/L	20.1		84	70-130			
1,2-Dibromoethane	18.3	0.3	µg/L	20.1		91	70-130			
Dibromomethane	18.5	1.0	µg/L	20.1		92	70-130			
1,2-Dichlorobenzene	21.0	0.5	µg/L	20.1		105	70-130			
1,3-Dichlorobenzene	20.8	1.0	µg/L	20.1		104	70-130			
1,4-Dichlorobenzene	21.1	1.0	µg/L	20.1		105	70-130			
1,1-Dichloroethane	18.0	1.0	µg/L	20.1		90	70-130			
1,2-Dichloroethane	16.9	1.0	µg/L	20.1		84	70-130			
1,1-Dichloroethylene	14.4	1.0	µg/L	20.1		72	70-130			
cis-1,2-Dichloroethylene	18.6	1.0	µg/L	20.1		92	70-130			
trans-1,2-Dichloroethylene	16.1	1.0	µg/L	20.1		80	70-130			
Dichloromethane	16.6	3.0	µg/L	20.1		82	70-130			
1,2-Dichloropropane	18.9	1.0	µg/L	20.1		94	70-130			
1,3-Dichloropropene (cis + trans)	36.0	1.0	µg/L	40.0		90	70-130			
Ethylbenzene	19.7	1.0	µg/L	20.1		98	70-130			
Methyl tert-butyl ether	15.4	1.0	µg/L	20.0		77	70-130			
Styrene	20.5	1.0	µg/L	20.1		102	70-130			
1,1,2,2-Tetrachloroethane	21.6	0.5	µg/L	20.1		108	70-130			
Tetrachloroethylene	20.2	1.0	µg/L	20.1		100	70-130			
Toluene	21.0	0.5	µg/L	20.1		104	70-130			
1,1,1-Trichloroethane	15.3	1.0	µg/L	20.1		76	70-130			
1,1,2-Trichloroethane	18.5	1.0	µg/L	20.1		92	70-130			
Trichloroethylene	20.8	1.0	µg/L	20.1		104	70-130			
Trichlorofluoromethane	13.9	1.0	µg/L	20.1		69	60-140			
Vinyl chloride	15.4	1.0	µg/L	20.1		77	60-140			
Xylenes (total)	63.9	2.0	µg/L	60.3		106	70-130			

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24H0277
PROJECT	2024-8636.000.000	**REPORTED**	2024-08-13 08:07

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
Volatile Organic Compounds (VOC), Batch B4H1691, Continued										
LCS (B4H1691-BS1), Continued				Prepared: 2024-08-06, Analyzed: 2024-08-06						
Surrogate: Toluene-d8	*17.6*		*µg/L*	18.8		*94*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*21.4*		*µg/L*	19.9		*108*	*70-130*			

QC Qualifiers:

MS2	The native sample concentration is greater than the spike concentration hence the matrix spike limits do not apply.
SPK1	The recovery of this analyte was outside of established control limits. The data was accepted based on performance of other batch QC.

CERTIFICATE OF ANALYSIS

REPORTED TO	Associated Environmental Consultants Inc (Edm) 500, 9888 Jasper Avenue Edmonton, AB T5J 5C6		
ATTENTION	Danielle Loiselle	**WORK ORDER**	24G2140
PO NUMBER	2024-8636.000.000	**RECEIVED / TEMP**	2024-07-17 13:50 / 22.1°C
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14
PROJECT INFO	Onoway NE-35-54-02 W5M	**COC NUMBER**	No #

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

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

We've Got Chemistry

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

Ahead of the Curve

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

Work Order Comments:

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

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

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

Authorized By:

Brent Whitehead
Account Manager

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

Analyte	Result	RL	Units	Analyzed	Qualifier
LF (24G2140-01) | Matrix: Soil | Sampled: 2024-07-16					
General Parameters					
Flashpoint	**> 61**	25	°C	2024-07-22	
Free Liquid	**Absent**	1	-	2024-07-23	
pH (1:1 H2O Solution)	**7.94**	0.10	pH units	2024-07-23	
TCLP Metals					
Antimony	< 0.005	0.001	mg/L	2024-07-19	
Arsenic	< 0.010	0.002	mg/L	2024-07-19	
Barium	**1.1**	0.20	mg/L	2024-07-19	
Beryllium	< 0.050	0.010	mg/L	2024-07-19	
Boron	< 0.50	0.10	mg/L	2024-07-19	
Cadmium	**0.002**	0.0002	mg/L	2024-07-19	
Chromium	< 0.050	0.010	mg/L	2024-07-19	
Cobalt	**0.022**	0.004	mg/L	2024-07-19	
Copper	< 0.10	0.020	mg/L	2024-07-19	
Iron	**2.0**	0.20	mg/L	2024-07-19	
Lead	< 0.010	0.002	mg/L	2024-07-19	
Mercury	< 0.002	0.0004	mg/L	2024-07-19	
Nickel	< 0.10	0.020	mg/L	2024-07-19	
Selenium	< 0.020	0.004	mg/L	2024-07-19	
Silver	< 0.002	0.0004	mg/L	2024-07-19	
Thallium	< 0.010	0.002	mg/L	2024-07-19	
Uranium	< 0.020	0.004	mg/L	2024-07-19	
Vanadium	< 0.050	0.010	mg/L	2024-07-19	
Zinc	< 0.50	0.10	mg/L	2024-07-19	
Zirconium	< 0.050	0.010	mg/L	2024-07-19	
TCLP Volatiles					
Benzene	< 0.01	0.10	mg/L	2024-07-19	
Ethylbenzene	< 0.01	0.10	mg/L	2024-07-19	
Toluene	< 0.01	0.10	mg/L	2024-07-19	
Xylenes (total)	< 0.02	0.20	mg/L	2024-07-19	
Surrogate: Toluene-d8	*80*	*70-130*	%	*2024-07-19*	
Surrogate: 4-Bromofluorobenzene	*81*	*70-130*	%	*2024-07-19*	
24BH01 (1.0-1.3m) (24G2140-02) | Matrix: Soil | Sampled: 2024-07-16					
Particle Size Distribution					
> 75 µm	**34.4**	0.1	% dry	2024-07-22	
Classification	**Fine**		% dry	2024-07-22	
24BH02 (1.8-2.0m) (24G2140-03) | Matrix: Soil | Sampled: 2024-07-16					
Particle Size Distribution					

TEST RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

Analyte	Result	RL	Units	Analyzed	Qualifier
24BH02 (1.8-2.0m) (24G2140-03) | Matrix: Soil | Sampled: 2024-07-16, Continued					
Particle Size Distribution, Continued					
> 75 µm	**33.6**	0.1	% dry	2024-07-22	
Classification	**Fine**		% dry	2024-07-22	
24BH03 (5.0-5.2m) (24G2140-04) | Matrix: Soil | Sampled: 2024-07-16					
Particle Size Distribution					
> 75 µm	**74.4**	0.1	% dry	2024-07-22	
Classification	**Coarse**		% dry	2024-07-22	
24BH04 (7.3-7.5m) (24G2140-05) | Matrix: Soil | Sampled: 2024-07-16					
Particle Size Distribution					
> 75 µm	**7.2**	0.1	% dry	2024-07-22	
Classification	**Fine**		% dry	2024-07-22	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

Analysis Description	Method Ref.	Technique	Accredited	Location
Flash Point in Soil	ASTM D93-16 B	Pensky-Martens Closed Cup Tester		Edmonton
Free Liquids in Soil	EPA 9095B	Paint Filter		Edmonton
Particle Size in Soil	Carter 55.4*	Mechanical Sieving	✓	Edmonton
pH in Soil	Carter 16.2 / SM 4500-H+ B (2021)	1:2 Soil/Water Slurry / Electrometry	✓	Edmonton
TCLP Leachable Metals in Soil	EPA 200.2* / EPA 6020B	HNO3+HCl Hot Block Digestion / Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS)		Edmonton
TCLP VOC in Soil	EPA 5030B / EPA 8260D	Purge&Trap / GC-MSD (SIM)	✓	Edmonton

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

Glossary of Terms:

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

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

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

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

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

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

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

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

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B4G3761										
Reference (B4G3761-SRM1)				Prepared: 2024-07-22, Analyzed: 2024-07-22						
Flashpoint	53	25	°C	52.8		100	95.1-104.9			
General Parameters, Batch B4G3870										
Duplicate (B4G3870-DUP1)		**Source: 24G2140-01**		Prepared: 2024-07-23, Analyzed: 2024-07-23						
pH (1:1 H2O Solution)	7.95	0.10	pH units		7.94			< 1	2	
Reference (B4G3870-SRM1)				Prepared: 2024-07-23, Analyzed: 2024-07-23						
pH (1:1 H2O Solution)	7.35	0.10	pH units	7.40		99	95-105			
Particle Size Distribution, Batch B4G3694										
Reference (B4G3694-SRM1)				Prepared: 2024-07-22, Analyzed: 2024-07-22						
> 75 µm	45.1	0.1	% dry	45.0		100	70-130			
Classification	Fine		% dry	45.0		100	70-130			
TCLP Metals, Batch B4G3523										
Blank (B4G3523-BLK1)				Prepared: 2024-07-19, Analyzed: 2024-07-19						
Antimony	< 0.005	0.005	mg/L							
Arsenic	< 0.010	0.010	mg/L							
Barium	< 1.0	1.0	mg/L							
Beryllium	< 0.050	0.050	mg/L							
Boron	< 0.50	0.50	mg/L							
Cadmium	< 0.001	0.001	mg/L							
Chromium	< 0.050	0.050	mg/L							
Cobalt	< 0.020	0.020	mg/L							
Copper	< 0.10	0.10	mg/L							
Iron	< 1.0	1.0	mg/L							
Lead	< 0.010	0.010	mg/L							
Mercury	< 0.002	0.002	mg/L							
Nickel	< 0.10	0.10	mg/L							
Selenium	< 0.020	0.020	mg/L							
Silver	< 0.002	0.002	mg/L							
Thallium	< 0.010	0.010	mg/L							

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
TCLP Metals, Batch B4G3523, Continued										
Blank (B4G3523-BLK1), Continued				Prepared: 2024-07-19, Analyzed: 2024-07-19						
Uranium	< 0.020	0.020	mg/L							
Vanadium	< 0.050	0.050	mg/L							
Zinc	< 0.50	0.50	mg/L							
Zirconium	< 0.050	0.050	mg/L							
LCS (B4G3523-BS1)				Prepared: 2024-07-19, Analyzed: 2024-07-19						
Antimony	0.226	0.005	mg/L	0.200		113	80-120			
Arsenic	0.453	0.010	mg/L	0.400		113	80-120			
Barium	2.92	1.0	mg/L	3.00		97	80-120			
Beryllium	0.053	0.050	mg/L	0.0500		106	80-120			
Boron	< 0.50	0.50	mg/L	0.100		119	80-120			
Cadmium	0.049	0.001	mg/L	0.0500		99	80-120			
Chromium	0.490	0.050	mg/L	0.500		98	80-120			
Cobalt	0.391	0.020	mg/L	0.400		98	80-120			
Copper	0.425	0.10	mg/L	0.400		106	80-120			
Iron	37.2	1.0	mg/L	40.0		93	80-120			
Lead	0.391	0.010	mg/L	0.400		98	80-120			
Mercury	0.109	0.002	mg/L	0.100		109	80-120			
Nickel	0.484	0.10	mg/L	0.500		97	80-120			
Selenium	0.141	0.020	mg/L	0.100		141	80-120			SPK
Silver	0.081	0.002	mg/L	0.100		81	80-120			
Thallium	0.093	0.010	mg/L	0.100		93	80-120			
Uranium	0.866	0.020	mg/L	1.00		87	80-120			
Vanadium	2.09	0.050	mg/L	2.00		105	80-120			
Zinc	2.17	0.50	mg/L	2.00		109	80-120			
Zirconium	0.167	0.050	mg/L	0.200		83	80-120			
TCLP Volatiles, Batch B4G3524										
Blank (B4G3524-BLK1)				Prepared: 2024-07-19, Analyzed: 2024-07-19						
Benzene	< 0.01	0.01	mg/L							
Ethylbenzene	< 0.01	0.01	mg/L							
Toluene	< 0.01	0.01	mg/L							
Xylenes (total)	< 0.02	0.02	mg/L							
Surrogate: Toluene-d8	*0.149*		*mg/L*	0.188		*79*	*70-130*			
Surrogate: 4-Bromofluorobenzene	*0.168*		*mg/L*	0.199		*84*	*70-130*			

QC Qualifiers:

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

APPENDIX 3: REVISION HISTORY

REPORTED TO	Associated Environmental Consultants Inc (Edm)	**WORK ORDER**	24G2140
PROJECT	2024-8636.000.000	**REPORTED**	2024-07-26 11:14

Sample ID	Changed	Change	Analysis	Analyte(s)
24G2140-	2024-07-26	Project Info	N/A	N/A

Danielle Loiselle

From: Brent Whitehead <bwhitehead@caro.ca>
Sent: August 13, 2024 12:55 PM
To: Danielle Loiselle
Subject: RE: project 2024-8636 (24H0277) sample 5 issues
Attachments: PXL_20240813_144834546.jpg

Hello Danielle,

Thank you very much for letting me know you hadn't receive the ESDAT EDD. There was an error that prevented it from being generated this morning. My system only notifies me of these errors in the evening. So, with your notification I have been able to resolve the issue. You should receive the ESDAT EDD in the next 20 minutes.

The results for the DUP01 sample are quite strange. Even when we did a manual pH check with pH paper we find that sample is the only one with a low pH. I have attached a picture of this check.

Have a good day

CARO ANALYTICAL SERVICES

BRENT WHITEHEAD
ACCOUNT MANAGER

Richmond | Burnaby | Kelowna | Edmonton
Phone: 250-765-9646 EXT 416
After-hours Emergency: 1-888-311-8849
24/7 Data Access: https://cci.caro.ca/

From: Danielle Loiselle <loiselled@ae.ca>
Sent: Tuesday, August 13, 2024 11:21 AM
To: Brent Whitehead <bwhitehead@caro.ca>
Subject: RE: project 2024-8636 (24H0277) sample 5 issues

Hi Brent,

We still haven't received the EsDat file – it needs to be sent directly to ESdat_CA+ae@ESdatLabSync.net please.

That is strange – I don't see how preservatives from the nutrient bottles could have gotten into the routine bottle.

Thanks

From: Brent Whitehead <bwhitehead@caro.ca>
Sent: Tuesday, August 13, 2024 12:04 PM
To: Danielle Loiselle <loiselled@ae.ca>
Subject: project 2024-8636 (24H0277) sample 5 issues

Hello Danielle,

For project 2024-8636, water samples, sample 5 (CARO WO 24H0277) which is labeled "DUP01" came back with a very low pH. We confirmed the pH by re-analysis before reporting the results.

Reviewing the results, we also noticed that the Sulfate is higher for this sample compared to other samples within the sample set. The low pH means that the sample had no Alkalinity. As the results are different from the other samples, we are wondering if maybe the general bottle might have been contaminated with preservative acid (H2SO4 from the nutrient bottle or some other source).

Have a good day

CARO ANALYTICAL SERVICES

BRENT WHITEHEAD
ACCOUNT MANAGER

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