2021 Groundwater and Soil Vapour Monitoring Report
Former Montfort Landfill Site
NE 20-038-27 W4M

PRESENTED TO

City of Red Deer

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EXECUTIVE SUMMARY

The City of Red Deer (The City) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct the 2021 groundwater and vapour monitoring program at the former Montfort landfill, located within Lot S1 Plan 3762 NY and Block Z Plan 982 0142, within NE 20-038-27 W4M, in Red Deer, Alberta, hereafter referred to as "the site". The objective of the monitoring program is to identify potential environmental concerns related to former operations at the site.

The groundwater monitoring network at the site currently consists of 8 groundwater monitoring wells and 14 soil vapour monitoring wells. In 2021, monitoring wells MW-01, MW-03, MW-04, MW-06, and MW-07 were decommissioned. Several other vapour wells have been installed at the site by others but were not included in the monitoring program.

Tetra Tech's scope of work for the 2021 monitoring and sampling program at the Montfort site included decommissioning five groundwater monitoring wells, conducting semi-annual vapour monitoring, annual vapour sampling, semi-annual groundwater water level and headspace monitoring, annual groundwater sampling, updating the hazard quotients, reviewing and updating previous recommendations for the site, and preparing an annual report.

The results of the groundwater and vapour monitoring program in 2021 and the historical sampling results have identified evidence of residual impacts in the groundwater and soil vapour at several locations. Key results for 2021 are as follows:

- So far, clear groundwater flow patterns have not been established. The elevations measured at the shallow monitoring wells show that the shallow (perched) groundwater table is essentially level with minimal horizontal gradients within the eastern portion of the site. The deeper monitoring wells along the west flank of the site are expected to have an overall westerly or southwesterly groundwater flow direction, consistent with the steep topographic slope to the southwest.

- Routine groundwater chemistry parameters and dissolved metals concentrations that exceeded the Alberta Tier 1 Guidelines at one or more monitoring wells in 2021 included total dissolved solids (TDS), chloride, nitrate and the dissolved metals; arsenic, iron, manganese, and zinc. Overall, the groundwater quality has shown limited changes in recent years.

- During the 2021 sampling event, chloride concentrations greater than the Tier 1 Guideline (120 mg/L) were measured at monitoring wells XCG-13 and MW-05, situated in the north and southwest portions of the site, respectively. Chloride concentrations at most wells remained within the same range as the sampling event in September 2019. While two of the wells sampled exceeded the Tier 1 Guideline for chloride, the measured concentrations are not uncommon for groundwater in an urban setting.

- The Tier 1 Guideline exceedances of dissolved manganese, iron, and arsenic are likely related to anoxic conditions and biodegradation within the landfill wastes. Similarly, the exceedances for nitrate and zinc (both at XCG-6 south of the landfill waste) may be leachate related.

- Concentrations of volatile organic compounds (VOCs) were less than the analytical detection limits at most groundwater monitoring wells in 2021 with the exception of at XCG-13. The concentration of vinyl chloride at XCG-13 was 0.0275 mg/L and exceeded the Tier 1 Guideline of 0.0011 mg/L. Other chlorinated VOCs detected at XCG-13 included chloroethane, 1,2-dichloroethene (trans), dichlorodifluoromethane, methylene chloride, and trichloroethene; the measured concentrations for these VOCs were less than the guidelines or no guidelines have been established. The VOC concentrations measured in 2021 were overall consistent with the concentrations measured in 2019 and 2020.

- Concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbon (PHC) fractions F1 to F2 in 2021 were less than the analytical detection limits at all groundwater monitoring wells.
- Concentrations of BTEX and PHCs in all soil vapour samples were less than the soil vapour screening criteria.
- Concentrations of tetrachloroethene and trichloroethene exceeded the soil vapour screening criteria at VW-04, situated on the southeast edge of the waste and within the waste footprint. Vapour well VW-04 has not been sampled before and was sampled in November 2021 to replace XCG-5, as XCG-5 could not be sampled. Vapour well XCG-5 is located 33 m south of VW-04 and in 2018, XCG-5 did not have any parameters that exceeded the soil vapour criteria.
- The estimated individual and cumulative risks and hazards associated with the soil vapour samples collected in November 2021 did not exceed the corresponding target risk and hazard levels for soil vapour wells XCG-4 and XCG-6; however, they exceeded the individual and/or cumulative risks and hazards at soil vapour wells VW-04, VW-05, and XCG-13.

While the 2019 and 2020 soil vapour concentrations did not exceed the calculated risk and hazard levels, the results from 2021 are more in line with the historical vapour sampling data from 2013 and 2017. There is insufficient data with which to establish potential trends in vapour concentrations, and while The City has approached the homeowners, The City was not granted permission to install the additional vapour sampling points recommended by the regulators proximate to homes north of the site.

Based on the preceding, and considering buried wastes remain within the former landfill area, ongoing risk management is recommended for the site relating to the presence of leachate indicator parameters, including VOCs in the groundwater and to methane and VOCs in the soil vapour at several monitoring locations. Risk management is recommended including the following.

Ongoing Monitoring and Vapour Risk Management Strategy

The recommended monitoring program, which was implemented in 2021, includes semi-annual groundwater and vapour monitoring and annual sampling at select wells along the site's perimeter to:

- Continue to establish groundwater flow patterns; and
- Continue to monitor groundwater and soil vapour quality trends.

The groundwater monitoring program focusses on the perimeter monitoring locations near potential receptors, as well as monitoring location XCG-13 along the north side of the former landfill. The vapour monitoring program focuses on locations near potential receptors to support the vapour risk management strategy discussed below. Semi-annual monitoring should be conducted during June/July and November/December. Groundwater sampling should be conducted in June/July and vapour sampling in November/December (during frozen/assumed worst-case conditions). The following schedule is proposed.

Well ID	Relative Location	Proposed Program	Rationale
XCG-04 (MW/SVP)	Southeast corner.	1, 2, 3	Adjacent to 52 Avenue and residential area.
XCG-05 (MW/SVP)	Southeast of the site.	1, 2, 3	Near Montfort Centre.
XCG-06 (MW/SVP)	South of the site.	1, 2, 3	Near Montfort Heights.
XCG-13 (MW/SVP)	North, in backyard of residence on Hermary Street.	1, 2, 3	Near residence.
MW-05/VW-05	Southwest corner.	1, 2, 3	Near Montfort Heights.
Select MWs/SVP	Site perimeter.	1	Establish groundwater flow pattern, monitoring vapour concentrations.

Notes:

1. Semi-annual groundwater elevation and vapour monitoring. Vapour monitoring includes methane concentrations and pressures.
2. Annual groundwater sampling in June/July of monitoring wells for routine water chemistry, ammonia, dissolved metals, and VOCs including BTEX compounds (EPA method 8260).
3. Annual vapour sampling in November/December for VOCs (soil vapour probes only).

The groundwater monitoring and sampling program should be continued as described. If concentrations are found to be stable and/or decreasing, the program should be evaluated for opportunities to reduce sampling frequency and/or locations. Any proposed modifications to the groundwater monitoring program should describe contingency responses and should be verified with the regulators in consideration of the concurrent management strategy for vapours. Potential contingency responses (to address potential risks associated with concentrations greater than guidelines or screening values or increasing trends in concentrations) include:

- Resampling to confirm concentrations;
- Increasing frequency of monitoring and/or sampling; and
- Assessment and implementation of risk management measures.

In addition to the semi-annual vapour monitoring program described above, a vapour risk management strategy is required for the site. The strategy needs to be developed in consultation with the regulators and in consideration of the current lack of access to install additional monitoring capability proximate to residences.

As indicated, based on the current and historical site data, and in consideration of limitations of available site data, Tetra Tech recommends that the Passive Level B mitigation measures (synthetic liner with type of material, thickness, and installation details dependent on the design professional) be considered in the interim for developments within 300 m of the landfill, which is a recognized generic setback distance for sensitive land use. Based on the ongoing monitoring and development of an overall vapour management strategy for the site in consultation with the regulators, the appropriate generic mitigative measures should continue to be reviewed and updated.

Administrative Actions

- Utilize the revised generic mitigative measures when evaluating applications for development within the setback.
- Ensure that the site is clearly identified within The City's Land Use Bylaw and appropriate administrative requirements are met for the site in accordance with City policies.

Further to the above recommendations, as noted, the site remains an historical landfill. It presently appears to be well maintained and capped. The City should review this status on an ongoing basis to ensure that the cover remains intact and drainage remains positive; repairs or maintenance should be undertaken as required to maintain the site.

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LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of The City of Red Deer and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than The City of Red Deer, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

The City of Red Deer (The City) retained Tetra Tech Canada Inc. (Tetra Tech) to conduct the 2021 groundwater and vapour monitoring program at the former Montfort landfill, within Lot S1 Plan 3762 NY and Block Z Plan 982 0142, within the northeast portion of section 20-038-27 W4M, in Red Deer, Alberta, hereafter referred to as "the site". The objective of the monitoring program is to identify potential environmental concerns related to former operations at the site.

The scope for 2021 was based on Tetra Tech's 2019 groundwater and soil vapour monitoring and sampling program conducted at the site. Those results were presented and discussed in the 2019 Groundwater and Soil Vapour Monitoring Report – Former Montfort Landfill Site (Tetra Tech 2020), and key findings and recommendations of that program are summarized in Section 1.1. The objectives and scope for the 2021 monitoring program are presented in Section 1.2.

The field components of the monitoring program were completed under Tetra Tech's detailed work plans encompassing the scope of work outlined in Section 1.2 below. The current report was completed under Tetra Tech's Limitations on the Use of this Document for conducting environmental work. A copy of these conditions is provided in Appendix A.

1.1 2019 Report – Key Findings and Recommendations

The report identified residual impacts to groundwater and soil vapour. Buried landfill waste remains in place beneath the site; therefore, ongoing risk management is required. Key findings included the following:

- Based on the measured groundwater elevations in 2019 and 2020, clear groundwater flow patterns could not be confirmed. The deeper monitoring wells along the west flank of the site suggest an overall westerly or southwesterly groundwater flow direction, which is consistent with the steep topographic slope to the southwest.
- Routine groundwater chemistry parameters and dissolved metals concentrations that exceeded the Alberta Tier 1 Soil and Groundwater Remediation Guidelines [Tier 1 Guidelines; Alberta Environment and Parks (AEP) 2019a] at one or more monitoring wells in 2019 and 2020 included total dissolved solids (TDS), chloride, and the dissolved metals; arsenic, iron, manganese, uranium, and zinc. The measured concentrations of these parameters were generally consistent with previous results and with background/up-gradient concentrations and may reflect natural groundwater quality or may be elevated due to inadequate filtration but are not considered to be related to landfill impacts.
- During the 2019 and 2020 sampling events, chloride concentrations greater than the Tier 1 Guideline (120 mg/L) were measured at monitoring wells XCG-13 and MW-05, situated in the north and southwest portions of the site, respectively. Chloride concentrations at most wells remained within the same range as the sampling event in 2017. Chloride at XCG-4 (situated at the southeast corner of the site adjacent to 52 Avenue) increased from 17 mg/L in 2017 to 110 mg/L in 2019, which may be due to road salt use in the area and not necessarily related to landfill impacts.
- Concentrations of volatile organic compounds (VOCs) were less than the analytical detection limits at most groundwater monitoring wells in 2019 and 2020 with the exception of XCG-13. The concentration of vinyl chloride at XCG-13 was 0.025 mg/L in September 2019 and 0.0041 mg/L in April 2020. Both results are greater than the Tier 1 Guideline of 0.0011 mg/L. Other chlorinated VOCs detected at XCG-13 included chloroethane, 1,2-dichloroethene (cis), 1,2-dichloroethene (trans), and trichloroethene; the measured concentrations for these VOCs were less than the guidelines or no guidelines have been established. The April 2020 concentrations were lower than the September 2019 results for all of these chlorinated VOCs.

- Concentrations of benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon (PHC) fractions F1 to F2, adsorbable organic halogen (AOX) and volatile fatty/carboxylic acids in 2019 and 2020 were less than the analytical detection limits at all groundwater monitoring wells, except for a trace concentration (0.00055 mg/L) of benzene at XCG-13 in September 2019. Benzene was also detected at XCG-13 in March 2017 (0.00086 mg/L). The benzene concentration in September 2019 did not exceed the Tier 1 Guideline and in April 2020, the concentration was less than the analytical detection limit.
- Concentrations of BTEX, PHCs, and VOCs in all soil vapour samples were less than the soil vapour screening criteria.
- The estimated individual and cumulative risks and hazards associated with the soil vapour samples collected in September 2019 and April 2020 did not exceed the corresponding target risk and hazard levels.

Based on these findings, recommendations for the 2021 monitoring program were as follows:

- Conduct semi-annual groundwater and vapour monitoring and annual sampling at select wells along the site's perimeter to:
  - Continue to establish groundwater flow patterns; and
  - Continue to monitor groundwater and soil vapour quality trends.

  The table below includes the suggested wells to be included in the monitoring programs.

Well ID	Relative Location	Proposed Program	Rationale
XCG-04 (MW/SVP)	Southeast corner.	1, 2, 3	Adjacent to 52 Avenue and residential area.
XCG-05 (MW/SVP)	Southeast of the site.	1, 2, 3	Near Montfort Centre.
XCG-06 (MW/SVP)	South of the site.	1, 2, 3	Near Montfort Heights.
XCG-13 (MW/SVP)	North, in backyard of residence on Hermary Street.	1, 2, 3	Near residence.
MW-05/VW-05	Southwest corner.	1, 2, 3	Near Montfort Heights.
Select MWs/SVP	Site perimeter.	1	Establish groundwater flow pattern, monitoring vapour concentrations.

Notes:
Proposed Program:
1. Semi-annual groundwater elevation and vapour monitoring. Vapour monitoring includes methane concentrations and pressures.
2. Annual groundwater sampling in June/July of monitoring wells for routine water chemistry, ammonia, dissolved metals, and VOCs including BTEX compounds (EPA method 8260).
3. Annual vapour sampling in November/December for VOCs (soil vapour probes only).

- The groundwater monitoring and sampling program was recommended to be continued as described for one year. If concentrations were found to be stable and/or decreasing, the program should be evaluated for opportunities to reduce sampling frequency and/or locations. Any proposed modifications to the groundwater monitoring program should describe contingency responses and should be verified with the regulators in consideration of the concurrent management strategy for vapours. Potential contingency responses (to address potential risks associated with concentrations greater than guidelines or screening values or increasing trends in concentrations) included:
  - Resampling to confirm concentrations;
  - Increasing frequency of monitoring and/or sampling; and
  - Assessment and implementation of risk management measures.

- Develop in consultation with the regulators, and in consideration of the current lack of access to install, additional monitoring capability proximate to residences.
- As indicated, based on the current and historical site data, and in consideration of limitations of available site data, Tetra Tech recommends that the Passive Level B mitigation measures (synthetic liner with type of material, thickness and installation details dependent on the design professional) be considered in the interim for developments within 300 m of the landfill, which is a recognized generic setback distance for sensitive land use. Based on the ongoing monitoring and development of an overall vapour management strategy for the site in consultation with the regulators, the appropriate generic mitigative measures should continue to be reviewed and updated.
- Monitoring well MW-05 should be surveyed into the existing monitoring well network to be added to the groundwater contours.
- Monitoring wells MW-01, MW-03, and MW-04, which were previously installed with screens straddling the waste, should be decommissioned following discussions with regulators to remove the potential for hydraulic connections between layers. In addition, monitoring wells MW-06 and MW-07, which were installed by Alberta Environment (currently AEP) should be decommissioned, as there is no construction information available and their locations are not integral to the assessment. Replacing these monitoring wells is not proposed.

1.2 Scope of Work

Based on the 2019 findings and recommendations (Tetra Tech 2020), the 2021 monitoring program scope of work was outlined in the proposal titled 2021 Work Scope and Cost Estimate dated March 2, 2021 (Tetra Tech 2021). The work conducted in 2021 included the following activities:

- Decommissioning monitoring wells MW-01, MW-03, MW-04, MW-06, and MW-07.
- Conducting semi-annual vapour monitoring events, including measuring headspace vapours and groundwater levels within each vapour monitoring well and observing monitoring well integrity.
- Conducting semi-annual groundwater monitoring events, including measuring methane concentrations in headspace vapours and groundwater levels within each groundwater monitoring well and observing monitoring well integrity.
- Conducting one groundwater sampling event at the five proposed monitoring wells:
  - Using low flow sampling techniques, 19 mm Teflon tubing was placed in each monitoring well and a peristaltic pump was used to extract groundwater samples using low flow sampling protocols.
  - Once field parameters stabilized at each well, groundwater samples were collected. At the time of sampling, field measurements for electrical conductivity (EC), pH, and temperature were recorded. The samples were then submitted for laboratory chemical analyses.
  - Collecting one duplicate groundwater sample for quality assurance/quality control (QA/QC) purposes.
- Conducting one vapour sampling event at the five proposed soil vapour wells:
  - Collecting vapour samples into Summa canisters for analysis.
  - Collecting one duplicate vapour sample for QA/QC purposes.
- Conducting monitoring well repairs, as required.

- Update the hazard quotients prepared during previous reports using the 2021 monitoring and sampling results and updated toxicity reference value (TRV) information.
- Preparing an annual report summarizing the field activities undertaken for the year and interpreting the groundwater and soil vapour analytical results.

In the proposal titled 2021 Work Scope and Cost Estimate (Tetra Tech 2021), Tetra Tech recommended semi-annual monitoring of groundwater well headspaces for methane as a useful screening tool in the absence of vapour wells in other areas of the site. Subsequently, while headspace methane monitoring was conducted, headspace monitoring for VOCs and combustible vapour concentrations (CVCs) was not conducted in 2021.

2.0 BACKGROUND INFORMATION

2.1 General Information

The site is located within the northeast portion of section 20-038-27 W4M, within Lot S1 Plan 3762 NY and Block Z Plan 982 0142. The western portion of the site is zoned PS (public service district) and the eastern portion is zoned A1 (future urban development). The City does not own either portion of the site.

The site is located within the community of Highland Green Estates. The site is located southwest of Hermary Street and 52 Avenue in Red Deer and consists of two baseball diamonds and a grassed field. Two groundwater monitoring wells and two vapour monitoring wells (XCG-12 and XCG-13) are located in the backyards of two residences of Hermary Street. Single-unit residential houses are located on the north and west side of the site and multi-unit homes are on the east side. Montfort Centre (including Red Deer Catholic Regional Schools board) and multi-family homes are south of the site. A municipal right-of-way (ROW) crosses the site with an inactive 500 mm water main within the south area of the waste material. A general site location plan is shown on Figure 1 and Figure 2 shows the site location with monitoring well locations. Additional information on the site history, historical groundwater monitoring investigations, geology, and hydrogeology can be found in Appendix B. Cross-sections that were prepared using the wells previously installed at the site in 2013 are included in Appendix C [from XCG Environmental Engineers & Scientists (XCG) 2018]. The available borehole logs for the site are included in Appendix F.

2.2 2019 Conceptual Site Model Summary

The selection of comparative guidelines is based on the conceptual site model (CSM), which outlines the rationale for the selection of applicable exposure pathways and receptors at the site. This evaluation is based on guidance presented in the Alberta Tier 1 Guidelines (AEP 2019a). The CSM that was developed for the site in the 2019 groundwater and soil vapour monitoring report (Tetra Tech 2020) included the following items:

- Description of any identified environmental issues including a description of processes or activities undertaken at or near the site and a listing of chemicals of potential concern (COPCs) identified in earlier investigations.
- Description of known and reported historical releases, including locations and status of any subsequent environmental site assessments (ESAs) and remediation.
- Identification of applicable exposure pathways and receptors.

The CSM is summarized in the table below.

Summary of Exposure Pathways and Receptors for Soil and Groundwater

Release Mechanism	COPC	Migration Pathway	Potential Receptor
Leachate infiltration into foundation or through cover.	Inorganic parameters and nutrients, metals, BTEX, PHC fractions, and VOCs.	Direct soil contact.	Human users of the parkland; ecological plants and soil invertebrates.
		Groundwater ingestion (drinking water) – freshwater aquatic life would not be applicable.	Domestic use aquifer (DUA) drinking water.
		Nutrient and energy cycling.	Microbial functioning of the soil.
Volatile contaminants released from soil and groundwater.	VOCs, methane, BTEX, and PHC fractions.	Vapour inhalation.	Human users of the parkland; inhabitants of houses and buildings near the parkland.

To establish the appropriate guidelines for the site, the most sensitive land use was used. The receptors are a combination of the degree of potential exposure, the exposure pathway, and the contaminants of concern. Human receptor exposures applicable to the site include the direct soil contact and inhalation pathways. The ecological receptor exposures applicable to the site include direct soil contact and nutrient and energy cycling.

As recommended by AEP, the soil vapour results obtained during the 2019 investigation were compared to the Canadian Council of Minister of the Environment's (CCME's) document A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours (CCME 2014). To determine the appropriate guidelines to compare the vapour sampling results to, indoor air risk calculations were undertaken and methane explosive risks were evaluated.

The CSM determined that the most applicable guidelines for groundwater and vapour results for the site were as follows:

- Groundwater concentrations at the site were compared to the Alberta Tier 1 Guidelines under residential land use for coarse-grained soils (AEP 2019a).
- Soil vapour analytical results were compared to A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours under residential land use for both slab-on-grade and basement for coarse-grained soils (CCME 2014). Soil vapour screening criteria have been updated using current TRVs from Health Canada and the United States Environmental Protection Agency (USEPA).

2.3 Monitoring Well Network

The groundwater monitoring network at the site consists of 10 monitoring wells (MW-02, MW-05, XCG-1, XCG-2, XCG-4 to XCG-6, and XCG-12 to XCG-14). The vapour monitoring network consists of 14 vapour monitoring wells (VW-01 to VW-05, XCG-1, XCG-2, XCG-4 to XCG-6, XCG-9, XCG-10, XCG-12, and XCG-13). Most monitoring wells and vapour wells were in fair condition during the 2021 events. In 2021, several flushmount vapour wells were filled with water and/or dirt, and the Teflon tubing of several vapour wells were found damaged. Vapour monitoring wells XCG-1, XCG-2, and XCG-9 were blinded during both events (i.e., groundwater level above top of screen elevation) and could not be monitored.

A new flushmount casing was added to MW-05 in September 2021. Monitoring well completion details are summarized in Table 1. Groundwater and vapour monitoring well locations are shown on Figure 2.

3.0 MONITORING AND SAMPLING PROGRAM

A discussion of the methods used for the fieldwork, laboratory testing, and data evaluation is presented in the following sections.

3.1 Monitoring Well Decommissioning

On May 3, 2021, groundwater monitoring wells MW-01, MW-03, MW-04, MW-06, and MW-07 were decommissioned as recommended in the 2019 report. The monitoring wells were decommissioned by removing the polyvinyl chloride (PVC) piping, reaming out the original boreholes and sealing the holes with bentonite. All materials removed were collected and disposed.

3.2 Groundwater Monitoring and Sampling Program

A discussion of the methods used for groundwater monitoring and sampling fieldwork and laboratory testing is presented in the following section. In 2021, Tetra Tech conducted groundwater monitoring on July 8, September 10 (MW-05, XCG-4, XCG-5, XCG-6, and XCG-13), and November 20. Groundwater sampling was conducted on September 10, 2021.

Monitoring at the 2” (51 mm diameter) groundwater monitoring wells consisted of measuring headspace methane concentrations and static groundwater levels during each monitoring event (July, September, and November).

The methodology for groundwater monitoring and sampling included the following:

- Observing the integrity of each well and noting drainage and site conditions near the well that may have an effect on monitoring results or groundwater quality.
- Measuring the methane headspace concentrations in each well using an RKI Eagle Hydrocarbon Surveyor II (RKI Eagle) calibrated to methane.
- Measuring liquid levels in each monitoring well with an interface probe and recording total depths confirming absence of non-aqueous phase liquids (NAPL) and evaluating the water level relative to the screen to confirm the screen was not blinded.
- Recording of field data on standardized forms as documented in Tetra Tech standard operating practices.
- Using low flow sampling techniques, 6 mm Teflon tubing was placed in each monitoring well and a peristaltic pump was used to extract groundwater samples using low flow sampling protocols while recording field measurements for EC, pH, and temperature.
- Groundwater samples were collected from each well once field parameters stabilized. At the time of sampling, field measurements for EC, pH, and temperature were recorded.
- Groundwater samples were collected from five monitoring wells [MW-05, XCG-4 (MW), XCG-5 (MW), XCG-6 (MW), and XCG-13 (MW)] and placed into appropriate laboratory supplied, sterile glass and plastic vials and bottles for the required analytical package. If required, samples were filtered and/or preserved in the field.
- Samples were submitted in coolers with ice to ALS Laboratory Group (ALS) in Calgary, Alberta for laboratory analysis under a chain-of-custody (COC) documentation.

The groundwater monitoring well locations are shown on Figure 2.

3.2.1 Analytical Program

The analytical program for the groundwater monitoring wells was developed based on the recommendations in Section 1.1 and is summarized below:

- Routine water chemistry and dissolved metals.
- Ammonia.
- BTEX and PHC fractions F1 to F2.
- VOCs.

3.3 Vapour Monitoring and Sampling Program

A discussion of the methods used for the soil vapour fieldwork, laboratory testing, and data evaluation is presented in the following sections. In 2021, Tetra Tech conducted vapour monitoring on July 7 and July 8, September 10, and November 20. Vapour sampling was conducted on November 20, 2021.

3.3.1 Field Program

Monitoring at the 14 vapour monitoring probes (VW-01 to VW-05 are 25 mm diameter PVC probes and the XCG probes are equipped with 6 mm Teflon tubing) consisted of measuring and recording soil gas pressure, composition (methane, carbon dioxide, oxygen, hydrogen sulphide, and balance) on a percent volumetric basis and groundwater elevation, semi-annually (July and November).

Each soil vapour probe was inspected for visible signs of damage and the position of the sampling labcock was noted. Soil gas pressure was recorded using a digital manometer. Once the soil gas pressure measurement was recorded, the soil gas probe was purged of three well volumes of air, or until readings stabilized. The soil vapour probes were purged directly with the GEM landfill gas (LFG) analyzer.

After purging, gas composition measurements for methane, carbon dioxide, oxygen, balance gas, and hydrogen sulphide were recorded using the GEM analyzer. After recording soil gas concentrations, the probe/well depths and water levels were measured and recorded to confirm the water level within the probe was beneath the screen portion of the soil gas probe (i.e., the probe was not blinded).

In November 2021, a leak detection test was completed prior to probe sampling to ensure the vapour probes and sampling train were sealed properly. The test was completed using a helium gas tracer to inspect the testing probe and apparatus for any leaks. If there was a leak beyond the acceptable range (2% of helium concentration), the connections were tightened, and the leak test was conducted again.

In November 2021, soil vapour probe XCG-5 was frozen and was unable to be monitored and sampled. It was determined that VW-04 would be sampled in the absence of XCG-5 as they are both located in the southeast corner of the site. VW-04 has not previously been included in the soil vapour probe sampling program as it is located within the waste footprint. This change in vapour well sampling is discussed further in Section 4.6.

Sampling of the soil vapour probes (VW-04, VW-05, XCG-4, XCG-6, and XCG-13) was based on the methodology of the CCME sampling guidelines, which are summarized as follows:

- Prior to collecting the soil vapour probe samples, the well was purged of three well volumes, or until headspace readings stabilized.

- A 1.4 L Summa vacuum canister was used for sample collection at the soil vapour probe.
- Sample data was recorded on the provided sample tag for each canister.
- Sample tubing that was used to connect the canister to the soil vapour probe was low in VOCs and only used once to prevent sample contamination.
- When beginning sample collection, the end cap was removed, and a 60-minute flow controller was attached to the canister. The start time was recorded on the sample tag.
- When sampling was complete, the valve was closed, and the flow controller was removed. The end time was recorded on the sample tag.
- The protective end cap was replaced back on the canister.
- Canisters, flow controllers, and pressure gauges were placed in the original shipping container and returned to the laboratory with a COC.
- The soil vapour probe sampling port was returned to the closed position and the well was securely locked.

The vapour samples were originally sent to Bureau Veritas Laboratories (BV); however, due to technical difficulties and sample hold time constraints the samples were transferred to ALS for chemical analysis. A duplicate sample was collected during the vapour sampling event for QA/QC purposes.

The vapour monitoring well locations are shown on Figure 2.

3.3.2 Vapour Well Analytical Program

The analytical program for the vapour monitoring probes is summarized below:

- VOCs.
- Matrix gases including oxygen, carbon dioxide, methane, and nitrogen.
- BTEX and PHCs.

4.0 RESULTS AND DISCUSSION

This section presents the results of the fieldwork conducted in 2021 at the former Montfort Landfill and discussions of these results.

4.1 Groundwater Well Headspace Monitoring

In 2021, Tetra Tech monitored eight groundwater monitoring wells (MW-05, XCG-1, XCG-2, XCG-4, XCG-5, XCG-6, XCG-12, and XCG-13) during three monitoring events for measurements of methane in well headspace using an RKI Eagle, calibrated to methane. The RKI Eagle detection limit ranges from 5 parts per million (ppm) to 100% of the lower explosive limit (LEL). For methane, 500 ppm is equivalent to 1% LEL; 20% LEL is equivalent to 1% Gas.

Based on the screened intervals and measured depths to groundwater none of the groundwater monitoring wells were blinded during the 2021 monitoring events.

During the July 2021 monitoring event, methane headspace concentrations at the groundwater wells (measured using the RKI Eagle) ranged from 130 ppm at XCG-1 to 20,000 ppm at XCG-13. During the September and November monitoring events, methane headspace concentrations at the groundwater wells ranged from less than the instrument detection limit at XCG-6 in November to 350 ppm at XCG-13 in July. The highest methane concentration measured at the groundwater monitoring wells was 20,000 ppm at XCG-13 in July 2021, equivalent to 2% Gas (and 40% LEL). The results of monitoring at the soil vapour probes are presented in Section 4.5.

The combustible headspace concentrations for 2021 are presented in Table 1.

4.2 Groundwater Elevations

The measured groundwater levels and calculated groundwater elevations for 2021 are presented in Table 1.

Monitoring well MW-05 was unable to be located in July 2021. In September 2021, MW-05 was located, a flushmount casing and locking j-plug were installed onto the monitoring well and the water level was monitored.

During the groundwater monitoring events in 2021, a measurable thickness of NAPL was not detected at any locations. Figure 3 presents the groundwater elevation trends (hydrographs) for the groundwater monitoring wells. The figure shows the groundwater elevations measured in 2013, 2017, 2019, 2020, and 2021. Overall, groundwater elevations were stable or marginally decreased at all monitoring wells from 2019 and 2020. The exception is XCG-12; at this well, the September 2019 measurement was approximately 2 m higher than the 2017 and 2021 results (in 2020 the well was frozen). It is suspected that the September 2019 reading is in error or anomalous as the 2021 water level was consistent with the 2017 results. Overall, small seasonal fluctuations were observed in 2021.

The monitoring wells at the site are either less than approximately 6 m deep (XCG-4, XCG-5, XCG-6, and XCG-13) or between approximately 7 m and 11 m deep (MW-05, XCG-1, XCG-2, and XCG-12). These deeper wells are mainly located near the west and southwest portions of the site. In 2021, the average depth to groundwater in the shallow monitoring wells was 3.37 m below grade (mbg) in July, 3.45 mbg in September, and 3.64 mbg in November. Groundwater in these wells is interpreted to be perched above the clay layer beneath the site (XCG 2018). The average depth to groundwater in the deeper groundwater monitoring wells was 8.67 mbg in July 2021 and 7.60 mbg in November 2021. Only monitoring well MW-05 in the deep groundwater was monitored in September 2021, and the water level was 5.80 mbg.

The groundwater elevations measured in 2021 are shown on Figure 4. Based on the measured elevations in 2019, 2020, and 2021, a clear groundwater flow pattern could not be determined. The elevations measured at the shallow monitoring wells show that the shallow (perched) groundwater table is essentially level with minimal horizontal gradients within the eastern portion of the site. The previous observation by XCG (XCG 2018) that the perched water table shows a radial flow pattern was not apparent in 2019 and 2021. The deeper monitoring wells along the west flank of the site are similarly difficult to contour and a consistent flow direction has not been determined; there is a steep topographic slope to the southwest which may suggest a westerly to southwesterly flow. This is consistent with data reported by XCG in 2018.

4.3 Groundwater Field Parameters

Field measurements for pH, EC, and temperature in September 2021 are shown in Table 1. A discussion of the results of the field tests is summarized in this section.

Groundwater temperatures ranged from 7.17°C (MW-05) to 9.95°C (XCG-4) in September 2021.

Field pH values ranged from 6.48 (XCG-13) to 6.98 (XCG-5) in September 2021. Field pH values were generally less than the laboratory pH values.

In 2021, field EC measurements ranged from 485 µs/cm (XCG-5) to 1,430 µs/cm (XCG-13). Field EC results were slightly less than the laboratory measured EC results, which may be due to differences in sample temperatures and limitations of field equipment.

4.4 Laboratory Results

The groundwater analytical data for 2021 is summarized in Table 2. The laboratory analytical reports are included in Appendix D. Groundwater QA/QC results are included in Table 3. Historical analytical results are included in Appendix E.

4.4.1 Background Water Chemistry

Background groundwater quality in the deeper groundwater unit is interpreted to be represented by XCG-14, located northwest of the landfill outside the waste footprint. Radial flow was suggested in the perched groundwater unit in 2017 (XCG 2018); however, the groundwater elevations in this unit showed minimal differences in 2019 and 2020. As such, no specific wells were identified as up-gradient within the perched unit.

XCG-14 was not sampled in 2019, 2020, or 2021. In 2017, concentrations of BTEX, PHC fractions F1 and F2, and VOCs were less than the analytical detection limits. The concentration of chloride at this location in 2017 was 21 mg/L. Concentrations of TDS and dissolved manganese were greater than the 2016 Alberta Tier 1 Guidelines; the concentrations of these parameters are interpreted to be naturally occurring and not necessarily related to historical landfill operations.

4.4.2 Routine Water Chemistry Parameters

In September 2021, TDS concentrations ranged from 359 mg/L (XCG-5) to 1,110 mg/L (XCG-13). TDS concentrations at most monitoring wells were greater than the Alberta Tier 1 Guidelines (500 mg/L), with the exception of XCG-5. Historical sampling at the background monitoring well XCG-14 exceeded the guideline for TDS in 2017 (570 mg/L); that well was not sampled in 2021.

Elevated TDS concentrations often occur in groundwater as a result of the dissolution of naturally occurring salts in the glacial tills of Alberta, and do not necessarily indicate groundwater quality impact related to the former operations at the site.

Chloride is often considered a useful parameter to assess groundwater quality impacts associated with landfills, as chloride is generally present in elevated concentrations in leachate and is a mobile and conservative (non-reactive) ion. Chloride does not enter into reactions as a non-reactive ion, does not adsorb significantly onto mineral surfaces, or form complexes with other ions. Chloride concentrations in 2021 were greater than the Tier 1 Guideline at monitoring wells XCG-13 and MW-05. Concentrations ranged from 9.4 mg/L at XCG-6 to 235 mg/L at MW-05. Chloride concentrations measured in 2021 were consistent with historical concentrations. While two of the wells sampled exceeded the Tier 1 Guideline for chloride, the measured concentrations are not uncommon for groundwater in an urban setting.

Concentrations of ammonia at all wells in 2021 were less than the Tier 1 Guidelines and ranged from 0.067 mg-N/L (XCG-13) to 1.09 mg-N/L (XCG-6). The ammonia concentration at XCG-6 increased considerably from the concentrations measured in 2019 and 2020; however, as other leachate indicator parameters including for instance

chloride and boron did not change much, the increase is not necessarily related to migration of leachate impacted groundwater. The nitrate concentration at XCG-6 increased from 1.5 mg-N/L in April 2020 to 27.7 mg-N/L in September 2021 and exceeded the Tier 1 Guideline of 3 mg-N/L. However, historically nitrate concentrations at monitoring well XCG-6 have also been elevated with a nitrate concentration of 56 mg-N/L being measured in March 2017 (XCG 2018). Elevated nitrate concentrations in groundwater are not uncommon near older landfills due to natural attenuation; when redox conditions change from anoxic to oxic, reduced nitrogen compounds including ammonia may oxidize and convert into nitrate (nitrification).

Concentrations of all other routine chemistry parameters were less than the Tier 1 Guidelines and were generally consistent with historical results.

4.4.3 Metals

Iron and manganese are redox-sensitive parameters that can help determine whether the groundwater quality is affected by biodegradation reactions, for instance related to landfill leachate. The biodegradation process leads to a low redox status (anoxic conditions), which will dissolve iron and manganese oxides present in soil and increase dissolved concentrations in groundwater. The dissolved iron and dissolved manganese concentrations were greater than the Tier 1 Guidelines at most monitoring wells during the sampling event in 2021, except for dissolved iron at XCG-4 and XCG-6.

Concentrations of dissolved boron, which is often present in landfill leachate, were at least an order of magnitude less than the Tier 1 Guideline for all monitoring wells in 2019, 2020, and 2021.

The concentration of dissolved arsenic was greater than the Tier 1 Guideline (0.005 mg/L) at MW-05 (0.0103 mg/L) in 2021. Arsenic is known to be strongly adsorbed onto iron(hydr)oxides, and when manganese and iron dissolve, arsenic will also go into solution (Hem 1992). The concentration of arsenic is, therefore, likely related to the dissolution iron in the subsurface at MW-05.

The concentration of dissolved zinc exceeded the Tier 1 Guideline (0.03 mg/L) at monitoring well XCG-6 in September 2021 (0.187 mg/L). In September 2019, the dissolved zinc concentration at XCG-6 was much lower than the concentration measured in 2021. Dissolved zinc can be associated with landfill leachate, and in consideration of other parameter concentrations at this well it may be leachate related. However, the exceedances in 2021 are not necessarily of environmental concern as the referenced Tier 1 Guideline of 0.03 mg/L is applicable for the freshwater aquatic life pathway. The nearest surface waterbody is greater than 300 m from the site.

4.4.4 Organic Parameters

Concentrations of BTEX and PHC fractions F1 and F2 in groundwater samples were less than the laboratory analytical detection limits at all monitoring wells in 2021.

Concentrations of VOCs in groundwater samples were less than the analytical detection limits for most wells with the exception of XCG-13. The concentration of vinyl chloride at XCG-13 in September 2021 (0.0275 mg/L) was greater than the Tier 1 Guidelines of 0.0011 mg/L. The concentration of chloroethane was within the same order of magnitude as the analytical detection limit in September 2021. Concentrations of 1,2-dichloroethene (trans), dichlorodifluoromethane, methylene chloride, and trichloroethene were also detected at XCG-13. The concentrations of methylene chloride and trichloroethene were less than the Tier 1 Guidelines; there are no Tier 1 Guidelines for 1,2-dichloroethene (trans), and dichlorodifluoromethane. The VOC concentrations measured at XCG-13 were overall consistent with previous findings.

4.5 Vapour Monitoring Results

The soil vapour monitoring results are presented in Table 4A to Table 4E.

Vapour monitoring wells XCG-1, XCG-12, and XCG-13 were unable to be monitored in July 2021 because the probes contained water. In September 2021, methane gas concentrations at XCG-12 were assessed by collecting a sampling using a Tedlar bag and vacuum pump as water was present in the tubing of the probe. The sample was then analyzed by ALS. In November 2021, vapour monitoring wells XCG-1 and XCG-5 could not be monitored as the monitoring probes were frozen and vapour probe XCG-9 was blinded. In November 2021, soil vapour well VW-04 was sampled as a replacement for soil vapour well XCG-5 as XCG-5 was frozen.

Pressures at most vapour wells were negligible during the 2021 monitoring events.

Concentrations of methane were less than the instrument detection limits in 2021 at most vapour wells except VW-02 in July (18.7%) and XCG-13 in September (1.0%). Both wells are near the north-central limit of the waste and the methane concentrations at these wells were consistent with historical results and with headspace readings at the adjacent groundwater monitoring well [XCG-13(MW)] in July 2021. The methane concentrations fluctuated between events at these wells; however, at XCG-13, they were less than the instrument detection limit during the November 2021 event. Concentrations of carbon dioxide, oxygen, and the balance gas were generally consistent during the monitoring events.

4.6 Soil Vapour Analytical Results

Table 5 summarizes the soil vapour chemical results collected in 2021, as well as historical results and compares them to the calculated generic soil vapour screening criteria protective of vapour intrusion into indoor air, as well as the de minimus soil vapour screening criteria from XCG (2018). The 2021 laboratory analytical reports are included in Appendix D.

BTEX and PHC fractions F1 and F2 (parameters with a TRV for inhalation) were compared against the screening criteria for residential land use for coarse-grained soil. In 2021, BTEX, and/or PHC fractions F1 and F2 were detected at concentrations greater than the analytical detection limits in samples VW-04, VW-05 and it's duplicate, XCG-4, XCG-6, and XCG-13. However, soil vapour concentrations were between 28 and 91,695 times less than the soil vapour screening criteria, which are protective of vapour intrusion into indoor air.

VOCs (parameters with a TRV for inhalation) were compared against the soil vapour screening criteria for residential land use, coarse-grained soil. In 2021 tetrachloroethene and trichloroethene were detected at concentrations exceeding the soil vapour screening criteria and/or the de minimus soil vapour criteria in the sample from soil vapour well VW-04. Vapour well VW-04 was sampled in November 2021 to replace XCG-5 as XCG-5 could not be sampled. Vapour well VW-04 is located within the waste footprint and has not been sampled before. Vapour well XCG-5 is located 33 m south of VW-04 and in 2018 did not have any parameters exceed the soil vapour criteria at that time.

Several parameters were detected at concentrations greater than the analytical detection limits in samples VW-05, XCG-4, XCG-6, and XCG-13. However, soil vapour concentrations were between 2 and 996,182 times less than the soil vapour screening criteria, which are protective of vapour intrusion into indoor air. VOC concentrations measured at the soil vapour wells in 2021 were comparable to the measurements in 2019 with the exception of dichlorodifluoromethane in the sample from XCG-13, which was 3.3 $\mu g/m^3$ in 2019 and 1,890 $\mu g/m^3$ in 2021. Dichlorodifluoromethane is also known as Freon-12 and is used as a refrigerant and aerosol spray propellant. The analytical result for the freon compound is two orders of magnitude greater than the result in 2019. None of the other VOC compounds showed a similar large change since 2019 and the result should be confirmed in future sampling events.

4.7 Quality Assurance/Quality Control Methods

4.7.1 Methods

Tetra Tech's QA/QC procedures include reviewing the data collected for precision and accuracy and following the appropriate field protocols.

The field procedures for QA/QC involved:

- Changing nitrile gloves between sample collections;
- Using sample containers provided by the laboratory;
- Cleaning monitoring and sampling tools between sample locations;
- Filling sample containers for PHC analysis with no headspace (air) when the containers were closed;
- Conducting leak testing at vapour wells prior to the collection of vapour samples;
- Collecting duplicate groundwater and vapour samples during the sampling program; and
- Documenting field procedures and sampling activities.

4.7.2 Results

The groundwater QA/QC results are included in Table 3, and the soil vapour QA/QC results are included in Table 6. The duplicate sample was submitted for analysis of the same parameters as the original sample.

The duplicate analysis is compared by relative percent difference (RPD). The RPD is calculated using the following equation:

$$\mathrm{RPD} = \frac{(V_1 - V_2)}{\frac{(V_1 + V_2)}{2}} * 100\%$$

Where:

V_1 = Parent Sample

V_2 = Duplicate Sample

Chemical parameters were considered as having passed the QA/QC reproducibility procedure if the RPD was less than or equal to 20% in groundwater or 60% in soil vapour, indicating a close correlation between the sample-duplicate pair.

RPD values were not calculated if one or both of the sample-duplicate concentrations were between the reportable detection limit (RDL) and five times the RDL. In these cases, chemical parameters were still considered as having passed the QA/QC reproducibility procedure if the sample duplicate concentration difference was less than one RDL value.

For the groundwater duplicate at XCG-6 (MW) in September 2021, RPDs were less than or equal to 20% for all of the reportable concentrations. Based on the QA/QC results, the sample methods and results are considered acceptable.

Leak testing was conducted at vapour wells prior to collected vapour samples for analysis. For leak testing, test sample was collected into Tedlar bag while tubing was set up in shroud filled with helium. If resulting test samples

included concentrations of helium less than 2% of concentration within the shroud, the test was considered successful. Leak testing results for the wells were successful and contained non-detect concentrations for helium.

For soil vapour, duplicate RPDs were less than 8% for the reportable concentrations with the exception of methane (106%); however, since the results were between the RDL and five times the RDL this result is considered acceptable. Based on the QA/QC results, the sample methods and results are considered acceptable.

5.0 UPDATED HAZARD QUOTIENT CALCULATIONS

Using the calculations described in the 2019 and 2020 Groundwater and Soil Vapour Monitoring Report (Tetra Tech 2020), summarized in Appendix B and using updated soil vapour screening levels, estimated cancer risks (for carcinogens) and estimated hazard quotients (for non-carcinogens) for the soil vapour sampling results were calculated for the site.

For this evaluation, cumulative target risk and hazard levels were determined in accordance with Alberta Tier 2 Guidelines (AEP 2019b). For carcinogens, the target risk level is 1×10^{-5}, as this value is considered by Health Canada to represent a negligible risk. This risk level applies to both individual compounds and a summation (i.e., cumulative) of individual compounds risks. For non-carcinogens a cumulative target hazard level of 1.0 is used as potential exposures that result in cumulative hazard indices equal to or less than 1.0 signify negligible potential for adverse health effects. For individual compounds, a hazard index of 0.2 was used. Each sampling location was screened individually for every chemical detected, and the results evaluated relative to both individual and cumulative risks and hazard levels.

The cumulative risk levels for carcinogens in samples collected from VW-05, XCG-4, XCG-6, and XCG-13 in 2021 ranged between 1.3×10^{-6} and 9.4×10^{-8}, which were less than the target risk levels. The cumulative risk level for carcinogens in sample VW-04 was 4.1×10^{-5}, which is greater than the target risk level of 1×10^{-5}. This risk was due to tetrachloroethene with an individual risk of 3.3×10^{-5}.

The cumulative hazard levels identified in samples collected from VW-05, XCG-4, XCG-6, and XCG-13 in 2021 for the non-carcinogens ranged between 0.05 and 0.65, which were less than the target cumulative hazard level of 1.0. However, sample VW-05 has an individual hazard level of 0.24 for cis-1,2-dichloroethene, which is marginally greater than the target individual hazard level of 0.2. In 2019, the sample from VW-05 had an individual hazard level of 0.19 for cis-1,2-dichloroethene. The groundwater results for cis-1,2-dichloroethene at MW-05 were non-detect in both 2019 and 2021. As well, sample XCG-13 had an individual hazard level of 0.53 for dichlorodifluoromethane, which is greater than the target individual hazard level of 0.2. This result is significantly different than the results from 2019 and 2020 and should be confirmed during next years sampling efforts. In 2021 the groundwater from XCG-13 had a detectable level of dichlorodifluoromethane; however, it was not measured in 2019 and 2020. The cumulative hazard level identified in sample VW-04 in 2021 collected for the non-carcinogens was 7.7, which is significantly greater than the target hazard level of 1. This hazard was due to tetrachloroethene with an individual hazard of 6.4 and trichloroethene with an individual hazard of 1.3. Groundwater from XCG-5, which is south of VW-04 had non-detect concentrations of tetrachloroethene and trichloroethene in 2021.

Soil vapour well VW-04 is on the edge of the waste and has not been sampled for several years. Soil vapour well XCG-5 is south of this well and between the waste and the commercial building. However, XCG-5 was frozen in November 2021 and not able to be sampled. The potential risk identified in soil vapour well VW-04 is not surprising as it is installed in waste, and the potential risk to vapour intrusion to the residences and commercial buildings is low given the historical results at soil vapour well XCG-5. XCG-5 historically has not had any parameters exceed the soil vapour criteria and most parameters measured below the analytical detection limit.

Table 7 summarizes the properties of the compounds being assessed. Table 8 summarizes the soil properties used for the calculations. Table 9 summarizes the building properties used for the calculations, and Table 10 presents the generic soil vapour criteria calculated. Table 11 presents the estimated individual and cumulative risks and hazards for the volatile compounds that were detected in soil vapour.

As shown in Table 11, the estimated individual and cumulative risks and hazards associated with soil vapour samples collected from XCG-4 and XCG-6 collected in November 2021 did not exceed the corresponding target risk and hazard levels. As presented in Table 11, the estimated individual and cumulative risks and hazards associated with soil vapour samples collected from VW-04, VW-05, and XCG-13 indicate a potential risk from vapour intrusion to indoor air. Soil vapour well VW-04 is located in the southeast portion of the site and is bounded by parking lots to the west and east. It is approximately 50 m from the nearest residential building and approximately 40 m from the nearest commercial building. The potential risk identified in soil vapour well VW-04 is not surprising, and the potential risk to vapour intrusion to the residences and commercial buildings is low, given the historical results at soil vapour well XCG-5 further away from the limit of waste. Soil vapour well VW-05 is located in the southwest corner of the site and is bounded by residential buildings to the west and south. It is approximately 20 m from the apartment building parking lot and parking garages, 65 m from the nearest residential apartment, and approximately 40 m from the edge of the houses along Hill Crescent. Soil vapour well XCG-13 is located on the north side of the site and is bounded by residential buildings to the north. It is approximately 13 m from the nearest residential building. The potential hazard identified in soil vapour well XCG-13 is considered an anomalous result, as the results for dichlorodifluoromethane are significantly different than previous years. This result should be confirmed in future sampling events.

6.0 EVALUATION OF SITE CONDITIONS

6.1 Summary of Site Conditions

Based on the 2021 and historical data for the site, there are some concerns related to the presence of the former landfill at Montfort. The site contains buried landfill waste and risk management measures are required, specifically related to the presence of leachate indicator parameters, including VOCs, and soil vapours at several monitoring locations.

The waste at the site is present near the backyards of most residential units on the northern portion of the site, and based on groundwater sample results, VOCs (including vinyl chloride) are present off site to the north at the location of XCG-13. Concentrations of vinyl chloride in the groundwater at XCG-13 were also greater than the Tier 1 Guideline in September 2019 and April 2020, although the concentration in April 2020 was an order of magnitude less than the concentration in September 2019.

Vapour samples collected during the 2021 program identified elevated VOCs including tetrachloroethene, trichloroethene, cis-1,2-dichloroethene, and dichlorodifluoromethane. While soil vapour results in 2019 and 2020 did not indicate potential vapour intrusion risk, the 2021 results are more in line with historical vapour sampling, which has measured VOCs at concentrations greater than the screening criteria in vapour wells. At this time, the identified risks and hazards do not indicate a change in impacts at the site and the recommended mitigative measures still fall within the Passive Level B measures. Previous sampling of methane, vinyl chloride, and cis-1,2-dichloroethene in indoor air at select adjacent residences (XCG 2018) did not detect concentrations of these parameters and detection limits were set below acceptable risk levels.

During a meeting with AEP, Tetra Tech, The City, and Alberta Health Services (AHS) in January 2020, additional groundwater monitoring wells and vapour monitoring wells in the vicinity of XCG-13 were recommended to evaluate

groundwater and vapour concentrations adjacent to residences. Based on that recommendation, Tetra Tech proposed to install monitoring wells within the backyards of three lots along Hermary Street. However, after reaching out to owners of properties directly north of the site in February 2020 and March 2020, The City was not granted permission to access private properties to install the additional monitoring well locations, and no new wells were able to be installed.

Based on the proximity of the potential receptors, the presence of waste, and concerns raised by AEP and AHS, ongoing risk management is required and is further discussed in Section 7.0.

The XCG report (2018) recommended semi-annual monitoring at several wells for methane, and water level monitoring was recommended to be conducted in conjunction with methane monitoring. The program was recommended to take place for three years. Recommendations were updated based on discussions with AEP and AHS to include sampling at select locations for groundwater and soil vapour. Based on the 2019 and 2020 program, a monitoring plan was recommended for the site, as presented in Section 7.0 below.

6.2 Summary of Hazard Quotient Results

A summary of the hazard quotients from the 2014 risk management plan (RMP) for the site that was completed by Tiamat Environmental Consultants Ltd. (Tiamat 2014b) is attached in Appendix B.

The 2019 and 2020 vapour data were less than the target hazard quotients and target risks at the locations tested. The 2021 vapour data suggests some potential risks and hazards at locations along the south and north sides of the site. However, we note that there are limitations to both the historical and current data in relation to sample locations. Specifically, The City in consultation with AEP and AHS identified the need for monitoring locations in closer proximity to residential properties along Hermary Street. To date, collection of this data has not been possible; therefore, we recommended an interim approach for mitigation while The City continues to work with the regulators on an overall vapour management strategy for the site.

Based on the hazard assessment conducted by XCG in 2018, the risks to indoor air associated with the measured soil vapour concentrations identified a worst case cancer risk, which corresponded to Passive Level B mitigation measures (synthetic liner with type of material, thickness and installation details dependent on the design professional). Based on the current and historical site data, and in consideration of limitations on available site data, Tetra Tech continues to recommend that the Passive Level B mitigation measures be considered in the interim for developments within 300 m of the landfill, which is a recognized generic setback distance for sensitive land use. Based on the ongoing monitoring and development of an overall vapour management strategy for the site in consultation with the regulators, the appropriate generic mitigative measures should continue to be reviewed and updated.

Future applications for development within the setback are subject to review and approval by The City. The developer's team would be responsible for reviewing and verifying the available data relative to their proposed development. The mitigative measures presented above are generic and can be used as a general guide for expectations by The City; ultimately, the developer's design engineer would be responsible for developing measures specific to the intended development based on the above or an appropriate equivalent. Protection of workers (e.g., construction and utility) should form part of any development plan.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the groundwater and vapour monitoring program in 2021 and the historical sampling results have identified evidence of residual impacts in the groundwater and soil vapour at several locations. Key results for 2021 are:

- So far, clear groundwater flow patterns have not been established. The elevations measured at the shallow monitoring wells show that the shallow (perched) groundwater table is essentially level with minimal horizontal gradients within the eastern portion of the site. The deeper monitoring wells along the west flank of the site are expected to have an overall westerly or southwesterly groundwater flow direction, consistent with the steep topographic slope to the southwest.
- Routine groundwater chemistry parameters and dissolved metals concentrations that exceeded the Alberta Tier 1 Guidelines at one or more monitoring wells in 2021 included TDS, chloride, nitrate and the dissolved metals; arsenic, iron, manganese, and zinc. Overall, the groundwater quality has shown limited changes in recent years.
- During the 2021 sampling event, chloride concentrations greater than the Tier 1 Guideline (120 mg/L) were measured at monitoring wells XCG-13 and MW-05, situated in the north and southwest portions of the site, respectively. Chloride concentrations at most wells remained within the same range as the sampling event in September 2019. While two of the wells sampled exceeded the Tier 1 Guideline for chloride, the measured concentrations are not uncommon for groundwater in an urban setting.
- The Tier 1 Guideline exceedances of dissolved manganese, iron, and arsenic are likely related to anoxic conditions and biodegradation within the landfill wastes. Similarly, the exceedances for nitrate and zinc (both at XCG-6 south of the landfill waste) may be leachate related.
- Concentrations of VOCs were less than the analytical detection limits at most groundwater monitoring wells in 2021 with the exception of at XCG-13. The concentration of vinyl chloride at XCG-13 was 0.0275 mg/L and exceeded the Tier 1 Guideline of 0.0011 mg/L. Other chlorinated VOCs detected at XCG-13 included chloroethane, 1,2-dichloroethene (trans), dichlorodifluoromethane, methylene chloride, and trichloroethene; the measured concentrations for these VOCs were less than the guidelines or no guidelines have been established. The VOC concentrations measured in 2021 were overall consistent with the concentrations measured in 2019 and 2020.
- Concentrations of BTEX and PHC fractions F1 to F2 in 2021 were less than the analytical detection limits at all groundwater monitoring wells.
- Concentrations of BTEX and PHCs in all soil vapour samples were less than the soil vapour screening criteria.
- Concentrations of tetrachloroethene and trichloroethene exceeded the soil vapour screening criteria at VW-04, situated on the southeast edge of the waste and within the waste footprint. Vapour well VW-04 has not been sampled before and was sampled in November 2021 to replace XCG-5 as XCG-5 could not be sampled. Vapour well XCG-5 is located 33 m south of VW-04 and in 2018, XCG-5 did not have any parameters exceed the soil vapour criteria.
- The estimated individual and cumulative risks and hazards associated with the soil vapour samples collected in November 2021 did not exceed the corresponding target risk and hazard levels for soil vapour wells XCG-4 and XCG-6; however, they exceeded the individual and/or cumulative risks and hazards at soil vapour wells VW-04, VW-05, and XCG-13.

While the 2019 and 2020 soil vapour concentrations did not exceed the calculated risk and hazard levels, the results from 2021 are more in line with the historical vapour sampling data from 2013 and 2017. There is insufficient data

with which to establish potential trends in vapour concentrations, and while The City has approached the homeowners, The City was not granted permission to install the additional vapour sampling points recommended by the regulators proximate to homes north of the site.

Based on the preceding, and considering buried wastes remain within the former landfill area, ongoing risk management is recommended for the site relating to the presence of leachate indicator parameters, including VOCs in the groundwater and to methane and VOCs in the soil vapour at several monitoring locations. Risk management is recommended including the following.

Ongoing Monitoring and Vapour Risk Management Strategy

The recommended monitoring program, which was implemented in 2021, includes semi-annual groundwater and vapour monitoring and annual sampling at select wells along the site's perimeter to:

- Continue to establish groundwater flow patterns; and
- Continue to monitor groundwater and soil vapour quality trends.

The groundwater monitoring program focuses on the perimeter monitoring locations near potential receptors, as well as monitoring location XCG-13 along the north side of the former landfill. The vapour monitoring program focuses on locations near potential receptors to support the vapour risk management strategy discussed below. Semi-annual monitoring should be conducted during June/July and November/December. Groundwater sampling should be conducted in June/July and vapour sampling in November/December (during frozen/assumed worst-case conditions). The following schedule is proposed.

Well ID	Relative Location	Proposed Program	Rationale
XCG-04 (MW/SVP)	Southeast corner.	1, 2, 3	Adjacent to 52 Avenue and residential area.
XCG-05 (MW/SVP)	Southeast of the site.	1, 2, 3	Near Montfort Centre.
XCG-06 (MW/SVP)	South of the site.	1, 2, 3	Near Montfort Heights.
XCG-13 (MW/SVP)	North, in backyard of residence on Hermary Street.	1, 2, 3	Near residence.
MW-05/VW-05	Southwest corner.	1, 2, 3	Near Montfort Heights.
Select MWs/SVP	Site perimeter.	1	Establish groundwater flow pattern, monitoring vapour concentrations.

Notes:

1. Semi-annual groundwater elevation and vapour monitoring. Vapour monitoring includes methane concentrations and pressures.
2. Annual groundwater sampling in June/July of monitoring wells for routine water chemistry, ammonia, dissolved metals, and VOCs including BTEX compounds (EPA method 8260).
3. Annual vapour sampling in November/December for VOCs (soil vapour probes only).

The groundwater monitoring and sampling program should be continued as described. If concentrations are found to be stable and/or decreasing, the program should be evaluated for opportunities to reduce sampling frequency and/or locations. Any proposed modifications to the groundwater monitoring program should describe contingency responses and should be verified with the regulators in consideration of the concurrent management strategy for vapours. Potential contingency responses (to address potential risks associated with concentrations greater than guidelines or screening values or increasing trends in concentrations) include:

- Resampling to confirm concentrations;
- Increasing frequency of monitoring and/or sampling; and
- Assessment and implementation of risk management measures.

In addition to the semi-annual vapour monitoring program described above, a vapour risk management strategy is required for the site. The strategy needs to be developed in consultation with the regulators and in consideration of the current lack of access to install additional monitoring capability proximate to residences.

As indicated, based on the current and historical site data, and in consideration of limitations of available site data, Tetra Tech recommends that the Passive Level B mitigation measures (synthetic liner with type of material, thickness, and installation details dependent on the design professional) be considered in the interim for developments within 300 m of the landfill, which is a recognized generic setback distance for sensitive land use. Based on the ongoing monitoring and development of an overall vapour management strategy for the site in consultation with the regulators, the appropriate generic mitigative measures should continue to be reviewed and updated.

Administrative Actions

- Utilize the revised generic mitigative measures when evaluating applications for development within the setback.
- Ensure that the site is clearly identified within the City's Land Use Bylaw and appropriate administrative requirements are met for the site in accordance with City policies.

Further to the above recommendations, as noted, the site remains an historical landfill. It presently appears to be well maintained and capped. The City should review this status on an ongoing basis to ensure that the cover remains intact and drainage remains positive; repairs or maintenance should be undertaken as required to maintain the site.

8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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PERMIT TO PRACTICE
TETRA TECH CANADA INC.

RM SIGNATURE: _____

RM APEGA ID #: 62764

DATE: 2022-08-03

PERMIT NUMBER: P013774
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

/dm:lc

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TABLES

Table 1: Groundwater Monitoring Results

Monitoring Well ID	Monitoring Date	Stickup (m)	Top of Pipe Elevation (mASL)	Screened Interval (mbg)	Depth to Groundwater (mbTPC)	Total Depth (mbTPC)	Groundwater Elevation (mASL)	Methane Concentrations[2] (ppm)	Combustible Vapour Concentrations[1] (ppm)	Volatile Organic Compound Concentrations[1] (ppm)
MW-01*	19-Sep-19	-0.06	880.51	3.1 - 9.1	7.28	9.01	873.22	-	5	ND
	01-Apr-20				7.35		873.16	-	ND	ND
MW-02	19-Sep-19	-0.14	878.87	1.5 - 6.1	2.33	6.06	876.54	-	35	ND
	01-Apr-20				2.45		876.42	-	15	ND
MW-03*	19-Sep-19	-0.06	879.35	1.5 - 4.6	2.55	4.54	876.79	-	320	ND
	01-Apr-20				CNL		CNL	-	CNL	CNL
MW-04*	19-Sep-19	-0.03	879.48	1.5 - 4.6	2.72	3.86	876.76	-	55	ND
	01-Apr-20				CNL		CNL	-	CNL	CNL
MW-05	19-Sep-19	-0.02	879.98	Unknown	5.81	7.17	874.17	-	ND	ND
	01-Apr-20				CNL		CNL	-	CNL	CNL
	08-Jul-21				CNL		CNL	CNL	-	-
	10-Sep-21				5.80		874.18	120	-	-
	20-Nov-21				5.66		874.32	160	-	-
MW-06*	19-Sep-19	0.69	879.88	Unknown	3.24	4.99	876.64	-	ND	ND
	01-Apr-20				3.61		876.27	-	20	ND
MW-07*	19-Sep-19	0.85	880.53	Unknown	4.53	6.64	876.00	-	55	ND
	01-Apr-20				4.71		875.82	-	25	2
XCG-1	19-Sep-19	-0.06	881.15	6.1 - 9.1	7.45	8.98	873.70	-	50	ND
	01-Apr-20				FROZEN		FROZEN	-	-	-
	08-Jul-21				7.83		873.32	130	-	-
	20-Nov-21				7.86		873.29	5	-	-
XCG-2	19-Sep-19	1.05	882.22	7.3 -10.3	9.25	11.58	872.97	-	ND	ND
	01-Apr-20				9.16		873.06	-	ND	ND
	08-Jul-21				9.48		872.74	160	-	-
	20-Nov-21				9.37		872.85	35	-	-
XCG-4	19-Sep-19	1.04	880.28	1.5 - 3.0	3.61	4.07	876.68	-	380	ND
	01-Apr-20				3.98		876.31	-	ND	ND
	07-Jul-21				3.28		877.00	460	-	-
	10-Sep-21				3.61		876.67	55	-	-
	20-Nov-21				3.80		876.48	120	-	-
XCG-5	19-Sep-19	-0.10	880.19	1.5 - 4.6	3.38	4.15	876.81	-	15	ND
	01-Apr-20				3.97		876.22	-	ND	ND
	08-Jul-21				3.34		876.85	140	-	-
	10-Sep-21				3.30		876.89	70	-	-
	20-Nov-21				3.54		876.65	320	-	-
XCG-6	19-Sep-19	-0.09	879.90	1.5 - 4.6	3.11	3.92	876.79	-	50	ND
	01-Apr-20				3.59		876.31	-	ND	ND
	08-Jul-21				3.09		876.81	310	-	-
	10-Sep-21				2.97		876.93	300	-	-
	20-Nov-21				3.20		876.70	ND	-	-
XCG-12	19-Sep-19	-0.09	880.76	4.9 - 8.0	5.47	7.80	875.29	-	30	ND
	01-Apr-20				FROZEN		FROZEN	-	-	-
	07-Jul-21				Dry		Dry	410	-	-
	20-Nov-21				7.51		873.25	125	-	-
XCG-13	19-Sep-19	-0.09	879.61	2.1 -5.2	3.37	5.33	876.25	-	ND	ND
	01-Apr-20				4.07		875.54	-	ND	ND
	07-Jul-21				3.76		875.86	40% LEL	-	-
	10-Sep-21				3.93		875.68	350	-	-
	20-Nov-21				4.02		875.59	5	-	-
XCG-14	19-Sep-19	-0.02	880.67	5.5 - 8.5	7.15	8.66	873.52	-	110	ND
	01-Apr-20				CNL		CNL	-	CNL	CNL

Notes:

mASL - Metres above sea level.

Top of casing elevations from XCG Consultants Ltd. (2017).

* Monitoring well decommissioned on May 3, 2021.

** Unable to calculate groundwater elevation as no surveyed elevation available.

[1]Measured using an RKI Eagle operated in methane elimination mode

[2]Measured using an RKI Eagle II calibrated to methane.

mbTPC - Metres below top of pipe casing.

mbg - Metres below grade..

CNL - Could not locate.

FROZEN - Monitoring wells frozen closed.

ND - Less than instrument detection limit.

ppm - Parts per million.

Table 2: Groundwater Analytical Results

Parameter	Unit	Tier 1 Guideline[1]	XCG-4 (MW)		XCG-5 (MW)	XCG-6 (MW)				XCG-13 (MW)			MW-05	
			19-Sep-2019	10-Sep-2021	10-Sep-2021	20-Sep-2019	1-Apr-2020	10-Sep-2021	10-Sep-2021	19-Sep-2019	1-Apr-2020	10-Sep-2021	19-Sep-2019	10-Sep-2021
Field														
Field Electric Conductivity	µS/cm	-	1363	892	485	1079	605	922	-	2054	1106	1430	1976	1336
Field Temperature	°C	-	11.8	9.95	9.60	9.60	2.70	9.92	-	9.5	3.56	9.34	8.9	7.17
Field pH	pH Units	6.5 to 8.5	6.76	6.81	6.98	6.64	7.12	6.53	-	**6.49**	6.68	**6.48**	6.58	6.62
Routine														
pH	pH Units	6.5 to 8.5	7.54	7.97	8.16	7.36	7.51	7.75	7.67	7.41	7.20	7.51	7.35	7.58
Electrical Conductivity (EC)	µS/cm	-	1400	1180	628	1100	1100	1270	1260	2100	2000	1980	2000	1870
Total Dissolved Solids (TDS)	mg/L	500	**750**	**716**	359	**610**	**610**	**819**	**822**	**1100**	**980**	**1110**	**1100**	**1060**
Hardness as $CaCO_3$	mg/L	-	630	581	348	550	530	660	675	980	890	1050	1000	979
Alkalinity (total as $CaCO_3$)	mg/L	-	560	613	334	520	510	573	570	840	800	877	720	760
Alkalinity (pp as $CaCO_3$)	mg/L	-	<1.0	-	-	<1.0	<1.0	-	-	<1.0	<1.0	-	<1.0	-
Bicarbonate	mg/L	-	690	747	407	630	620	699	695	1000	980	1070	880	927
Carbonate	mg/L	-	<1.0	<5.0	<5.0	<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<5.0	<1.0	<5.0
Hydroxide	mg/L	-	<1.0	<5.0	<5.0	<1.0	<1.0	<5.0	<5.0	<1.0	<1.0	<5.0	<1.0	<5.0
Calcium	mg/L	-	190	171	90.2	160	140	201	207	180	160	188	240	227
Magnesium	mg/L	-	42	37.4	29.9	37	41	38.5	38.4	130	120	140	100	100
Potassium	mg/L	-	23	24.7	6.47	5	6	8.91	8.65	3.1	3	3.11	4.7	4.43
Sodium	mg/L	200	42	51.4	5.30	19	22	33.8	33.9	35	26	38.4	25	22.5
Chloride	mg/L	120	110	49.6	13.0	11	11	9.4	9.5	**200**	**180**	**205**	**230**	**235**
Fluoride	mg/L	1.5	-	<0.10	0.106	-	-	0.10	0.10	-	-	<0.1	-	<0.1
Sulphate	mg/L	429 [2]	12	11.3	8.06	66	72	60.6	60.1	9.3	15	6.6	11	10.4
Ionic Balance	%	-	100	104	101	100	100	100	102	102	102	96.6	99	93.8
Nutrients														
Ammonia as N	mg/L	9.11-29.5 [3]	0.20	0.267	0.181	0.098	0.089	1.09	1.09	0.18	0.075	0.067	0.46	0.408
Nitrate (as NO_3)	mg/L	-	<0.044	-	-	7.8	6.5	-	-	<0.044	<0.044	-	<0.044	-
Nitrate (as NO_3-N)	mg/L	3	<0.010	0.69	1.32	1.8	1.5	**27.7**	**27.6**	<0.010	<0.010	0.13	<0.010	<0.10
Nitrite (as NO_2)	mg/L	-	<0.033	-	-	0.19	<0.033	-	-	<0.033	<0.033	-	<0.033	-
Nitrite (as NO_2-N)	mg/L	0.10-0.20 [4]	<0.010	<0.050	<0.010	0.057	<0.010	0.096	**0.106**	<0.010	<0.010	<0.050	<0.010	<0.050
Nitrate and Nitrate (as N)	mg/L	-	<0.014	0.69	1.32	1.8	1.5	27.8	27.7	<0.014	<0.014	0.13	<0.014	<0.11
Total Kjeldahl Nitrogen (TKN)	mg/L	-	0.55	-	-	1.2	-	-	-	1.7	1.1	-	1.1	-
Total Phosphorus	mg/L	-	0.034	-	-	0.19	-	-	-	0.39	0.16	-	0.078	-
Dissolved Metals														
Aluminum	mg/L	0.046-0.050 [5]	<0.0030	0.0013	0.0095	0.0033	-	0.0069	0.0049	0.0051	0.037	0.0039	0.0037	<0.0050
Antimony	mg/L	0.006	<0.00060	0.00059	0.00068	<0.00060	-	0.00039	0.00039	<0.00060	<0.00060	0.00015	<0.00060	<0.0005
Arsenic	mg/L	0.005	0.0011	0.00066	0.00226	0.00076	-	0.00168	0.0017	0.0033	0.0012	0.00259	**0.0075**	**0.0103**
Barium	mg/L	1	0.21	0.260	0.246	0.25	-	0.351	0.352	0.83	0.64	1.00	0.50	0.525
Beryllium	mg/L	-	<0.0010	-	-	<0.0010	-	-	-	<0.0010	<0.0010	-	<0.0010	-
Boron	mg/L	1.5	0.045	0.042	0.037	0.48	-	0.341	0.351	0.044	0.048	0.051	0.12	0.113
Cadmium	mg/L	0.00037 [2]	<0.000020	0.000016	0.000023	0.000097	-	0.000117	0.000111	<0.000020	0.00011	<0.000005	0.000025	<0.000025
Chromium	mg/L	0.05	<0.0010	<0.00010	<0.00010	0.0010	-	<0.00010	<0.00010	<0.0010	<0.0010	0.00013	<0.0010	<0.00050
Cobalt	mg/L	-	0.0033	-	-	0.00063	-	-	-	0.0062	0.0046	-	0.0032	-
Copper	mg/L	0.007	0.00068	0.0017	0.00217	0.0034	-	0.00443	0.00364	0.0013	0.0018	0.00056	0.0005	<0.0010
Iron	mg/L	0.3	**0.59**	0.146	**0.425**	<0.060	0.16	0.096	0.092	**3.4**	**0.79**	**3.68**	**2.2**	**2.19**
Lead	mg/L	0.007 [2]	<0.00020	<0.000050	<0.000050	<0.00020	-	0.000056	<0.000050	<0.00020	0.00022	<0.000050	<0.00020	<0.000205
Lithium	mg/L	-	<0.020	-	-	<0.020	-	-	-	0.049	0.055	-	0.077	-
Manganese	mg/L	0.05	**0.48**	**0.144**	**0.292**	**0.13**	**0.32**	**0.29**	**0.286**	**0.87**	**1.1**	**0.668**	**0.85**	**0.689**
Mercury	mg/L	0.000005	-	<0.0000050	<0.0000050	-	-	<0.0000050	<0.0000050	-	-	<0.0000050	-	<0.0000050
Molybdenum	mg/L	-	0.00071	-	-	0.00096	-	-	-	0.00071	0.00085	-	0.00054	-
Nickel	mg/L	0.15-0.38 [2]	0.011	0.00724	0.0044	0.0068	-	0.011	0.0109	0.013	0.0086	0.013	0.0091	0.0084
Phosphorus	mg/L	-	<0.10	-	-	<0.10	-	-	-	<0.10	<0.10	-	<0.10	-
Selenium	mg/L	0.002	<0.00020	0.00159	0.000264	0.00054	-	0.000705	0.000714	<0.00020	0.00029	0.000663	<0.00020	0.00056
Silicon	mg/L	-	8.2	-	-	8.9	-	-	-	8.6	7.8	-	9.9	-
Silver	mg/L	0.0001	<0.00010	<0.000010	<0.000010	<0.00010	-	<0.000010	<0.000010	<0.00010	<0.00010	<0.000010	<0.00010	<0.000050
Strontium	mg/L	-	0.54	-	-	0.38	-	-	-	1.8	1.7	-	2.1	-
Sulphur	mg/L	-	4.2	-	-	19	-	-	-	3.2	4.3	-	4.0	-
Thallium	mg/L	-	<0.00020	-	-	<0.00020	-	-	-	<0.00020	<0.00020	-	<0.00020	-
Tin	mg/L	-	<0.0010	-	-	<0.0010	-	-	-	<0.0010	<0.0010	-	<0.0010	-
Titanium	mg/L	-	<0.0010	-	-	<0.0010	-	-	-	<0.0010	<0.0010	-	<0.0010	-
Uranium	mg/L	0.015	0.0024	0.00207	0.000982	0.0024	-	0.00171	0.00168	0.015	**0.018**	0.0109	**0.017**	0.0124
Vanadium	mg/L	-	<0.0010	-	-	<0.0010	-	-	-	<0.0010	<0.0010	-	<0.0010	-
Zinc	mg/L	0.03	<0.0030	0.0049	0.0291	0.028	-	**0.187**	**0.185**	**0.096**	**0.89**	0.0073	0.015	<0.0050

Notes:

[1] Alberta Environment and Parks (AEP). 2019. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 198 pp. Referenced guidelines are for coarse textured soils under Residential/Parkland land use.

[2] Guideline varies with hardness. Values shown based on hardness range of 348 mg/L to 1050 mg/L.

[3] Guideline varies with pH and temperature. Values shown based on field pH range of 6.48 to 7.12 and field temperature range of ---

[4] Guideline varies with chloride. Values shown based on chloride range of 9.4 mg/L to 235 mg/L.

[5] Guideline varies with pH. Values shown based on field pH range of 6.48 to 7.12.

"-" No applicable guideline or not analyzed.

BOLD - Greater than Tier 1 Guideline.

N/A - Not applicable.

Table 2: Groundwater Analytical Results

Parameter	Unit	Tier 1 Guideline[1]	XCG-4 (MW)		XCG-5 (MW)	XCG-6 (MW)				XCG-13 (MW)			MW-05	
			19-Sep-2019	10-Sep-2021	10-Sep-2021	20-Sep-2019	1-Apr-2020	10-Sep-2021	10-Sep-2021	19-Sep-2019	1-Apr-2020	10-Sep-2021	19-Sep-2019	10-Sep-2021
Total Metals														
Aluminum	mg/L	-	2.7	-	-	4.2	-	-	-	7.0	1.4	-	0.36	-
Antimony	mg/L	-	0.00070	-	-	0.00096	-	-	-	0.00099	<0.00060	-	<0.00060	-
Arsenic	mg/L	-	0.0027	-	-	0.0060	-	-	-	0.010	0.0034	-	0.011	-
Barium	mg/L	-	0.28	-	-	0.37	-	-	-	1.1	0.71	-	0.54	-
Beryllium	mg/L	-	<0.0010	-	-	<0.0010	-	-	-	<0.0010	<0.0010	-	<0.0010	-
Boron	mg/L	-	0.052	-	-	0.51	-	-	-	0.063	0.057	-	0.12	-
Cadmium	mg/L	-	0.0025	-	-	0.00086	-	-	-	0.00084	0.00052	-	0.00062	-
Calcium	mg/L	-	200	-	-	170	-	-	-	220	170	-	240	-
Chromium	mg/L	-	0.0051	-	-	0.0071	-	-	-	0.012	0.0026	-	0.0015	-
Cobalt	mg/L	-	0.0053	-	-	0.0035	-	-	-	0.014	0.0056	-	0.0034	-
Copper	mg/L	-	0.011	-	-	0.0095	-	-	-	0.026	0.0068	-	0.0019	-
Iron	mg/L	-	3.6	-	-	8.3	-	-	-	19	3.5	-	3.3	-
Lead	mg/L	-	0.010	-	-	0.0051	-	-	-	0.010	0.0025	-	0.00091	-
Lithium	mg/L	-	<0.020	-	-	<0.020	-	-	-	0.072	0.063	-	0.083	-
Magnesium	mg/L	-	46	-	-	44	-	-	-	160	150	-	110	-
Manganese	mg/L	-	0.54	-	-	0.19	-	-	-	1.1	1.2	-	0.82	-
Molybdenum	mg/L	-	0.0012	-	-	0.00094	-	-	-	0.0018	0.0016	-	0.00043	-
Nickel	mg/L	-	0.020	-	-	0.017	-	-	-	0.035	0.019	-	0.010	-
Phosphorus	mg/L	-	0.20	-	-	0.19	-	-	-	0.46	0.27	-	<0.10	-
Potassium	mg/L	-	25	-	-	5.8	-	-	-	5.0	4.4	-	5.1	-
Selenium	mg/L	-	0.00025	-	-	0.00081	-	-	-	0.00056	0.00035	-	<0.00020	-
Silicon	mg/L	-	13	-	-	17	-	-	-	25	12	-	11	-
Silver	mg/L	-	0.00012	-	-	0.00012	-	-	-	0.00024	<0.00010	-	<0.00010	-
Sodium	mg/L	-	46	-	-	21	-	-	-	40	35	-	25	-
Strontium	mg/L	-	0.58	-	-	0.43	-	-	-	1.9	1.7	-	2.2	-
Sulphur	mg/L	-	4.5	-	-	21	-	-	-	3.6	5.4	-	3.9	-
Thallium	mg/L	-	<0.00020	-	-	<0.00020	-	-	-	<0.00020	<0.00020	-	<0.00020	-
Tin	mg/L	-	0.0013	-	-	0.0026	-	-	-	0.0019	<0.0010	-	<0.0010	-
Titanium	mg/L	-	0.080	-	-	0.11	-	-	-	0.13	0.037	-	0.0099	-
Uranium	mg/L	-	0.0028	-	-	0.003	-	-	-	0.017	0.019	-	0.017	-
Vanadium	mg/L	-	0.0071	-	-	0.012	-	-	-	0.021	0.0035	-	0.0014	-
Zinc	mg/L	-	0.032	-	-	0.14	-	-	-	0.27	3.6	-	0.0092	-
Carbon														
Total Organic Carbon (TOC)	mg/L	-	5.4	-	-	7.8	-	-	-	13	10	-	8.6	-
Demand Parameters														
Biochemical Oxygen Demand (BOD)	mg/L	-	<2.0	-	-	<2.0	-	-	-	<2.0	3.2	-	2.3	-
Chemical Oxygen Demand (COD)	mg/L	-	17	-	-	61	-	-	-	96	50	-	33	-
Organics														
Organic halogen	mg/L	-	0.32	-	-	0.01	-	-	-	0.12	0.04	-	0.01	-
Hydrocarbons														
Benzene	mg/L	0.005	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00050	0.00055	<0.00040	<0.00050	<0.00040	<0.00050
Toluene	mg/L	0.021	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00040	<0.00050
Ethylbenzene	mg/L	0.0016	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00040	<0.00050
Xylene (o)	mg/L	-	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00050	<0.00040	<0.00040	<0.00050	<0.00040	<0.00050
Xylenes (m & p)	mg/L	-	<0.00080	<0.00050	<0.00050	<0.00080	<0.00080	<0.00050	<0.00050	<0.00080	<0.00080	<0.00050	<0.00080	<0.00050
Xylenes Total	mg/L	0.02	<0.00089	<0.00071	<0.00071	<0.00089	<0.00089	<0.00071	<0.00071	<0.00089	<0.00089	<0.00071	<0.00089	<0.00071
Styrene	mg/L	0.072	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
F1 (C_6-C_{10})	mg/L	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F1 (C_6-C_{10}) - BTEX	mg/L	0.81	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
F2 (C_{10}-C_{16})	mg/L	1.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Notes:

[1] Alberta Environment and Parks (AEP). 2019. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 198 pp. Referenced guidelines are for coarse textured soils under Residential/Parkland land use.

[2] Guideline varies with hardness. Values shown based on hardness range of 348 mg/L to 1050 mg/L.

[3] Guideline varies with pH and temperature. Values shown based on field pH range of 6.48 to 7.12 and field temperature range of ---

[4] Guideline varies with chloride. Values shown based on chloride range of 9.4 mg/L to 235 mg/L.

[5] Guideline varies with pH. Values shown based on field pH range of 6.48 to 7.12.

"-" No applicable guideline or not analyzed.

BOLD - Greater than Tier 1 Guideline.

N/A - Not applicable.

Table 2: Groundwater Analytical Results

Parameter	Unit	Tier 1 Guideline[1]	XCG-4 (MW)		XCG-5 (MW)	XCG-6 (MW)				XCG-13 (MW)			MW-05	
			19-Sep-2019	10-Sep-2021	10-Sep-2021	20-Sep-2019	1-Apr-2020	10-Sep-2021	10-Sep-2021	19-Sep-2019	1-Apr-2020	10-Sep-2021	19-Sep-2019	10-Sep-2021
Volatile Organic Compounds (VOCs)														
2,4,5-Trichlorophenoxy-propanoic acid	mg/L	-	<0.50	-	-	<0.50	<0.50	-	-	<0.50	<0.50	-	<0.50	-
Acetic Acid	mg/L	-	<0.50	-	-	<0.50	<0.50	-	-	<0.50	<0.50	-	<0.50	-
Formic Acid	mg/L	-	<0.50	-	-	<0.50	<0.50	-	-	<0.50	<0.50	-	<0.50	-
Bromobenzene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Bromochloromethane	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Bromodichloromethane	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bromoform	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bromomethane	mg/L	-	<0.0020	<0.0010	<0.0010	<0.0020	-	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010
n-Butylbenzene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
sec-Butylbenzene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
tert-Butylbenzene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Carbon tetrachloride	mg/L	0.00057	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chlorobenzene	mg/L	0.0013	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chloroethane	mg/L	-	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0019	<0.0010	0.0023	<0.0010	<0.0010
Chloroform	mg/L	0.018	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chloromethane	mg/L	-	<0.0020	<0.0010	<0.0010	<0.0020	-	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.0020	<0.0010
2-Chlorotoluene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
4-Chlorotoluene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Dibromochloromethane	mg/L	0.19	<0.0010	<0.00050	<0.00050	<0.0010	-	<0.00050	<0.00050	<0.0010	<0.0010	<0.00050	<0.0010	<0.00050
1,2-Dibromo-3-chloropropane	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
1,2-Dibromoethane	mg/L	-	<0.00020	<0.00050	<0.00050	<0.00020	-	<0.00050	<0.00050	<0.00020	<0.00020	<0.00050	<0.00020	<0.00050
Dibromomethane	mg/L	-	-	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	-	<0.00050	-	<0.00050
1,2-Dichlorobenzene	mg/L	0.0007	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,3-Dichlorobenzene	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,4-Dichlorobenzene	mg/L	0.001	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1-Dichloroethane	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,2-Dichloroethane	mg/L	0.005	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010
1,1-Dichloroethene	mg/L	0.014	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,2-Dichloroethene (cis)	mg/L	-	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	0.11	0.033	<0.0010	<0.00050	<0.0010
1,2-Dichloroethene (trans)	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	0.0021	<0.00050	0.00186	<0.00050	<0.00050
Dichlorodifluoromethane	mg/L	-	-	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	-	0.00153	-	<0.00050
1,2-Dichloropropane	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,3-Dichloropropane	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
2,2-Dichloropropane	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
1,1-Dichloropropene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
1,3-Dichloropropene [cis]	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,3-Dichloropropene [trans]	mg/L	-	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010
Hexachlorobutadiene	mg/L	0.0013	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
p-Isopropyltoluene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
Methyl t-Butyl Ether (MTBE)	mg/L	0.015	<0.00050	-	-	<0.00050	-	-	-	<0.00050	<0.00050	-	<0.00050	-
Methylene Chloride	mg/L	0.05	<0.0020	<0.0010	<0.0010	<0.0020	-	<0.0010	<0.0010	<0.0020	<0.0020	0.0014	<0.0020	<0.0010
Methyl Methacrylate	mg/L	0.47	<0.00050	-	-	<0.00050	-	-	-	<0.00050	<0.00050	-	<0.00050	-
iso-Propylbenzene (cumene)	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
n-Propylbenzene	mg/L	-	-	<0.0010	<0.0010	-	-	<0.0010	<0.0010	-	-	<0.0010	-	<0.0010
1,1,1,2-Tetrachloroethane	mg/L	-	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,1,2,2-Tetrachloroethane	mg/L	-	<0.0020	<0.00050	<0.00050	<0.0020	-	<0.00050	<0.00050	<0.0020	<0.0020	<0.00050	<0.0020	<0.00050
Tetrachloroethene	mg/L	0.01	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,2,3-Trichlorobenzene	mg/L	0.008	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,2,4-Trichlorobenzene	mg/L	0.015	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
1,3,5-Trichlorobenzene	mg/L	0.014	<0.00050	-	-	<0.00050	-	-	-	<0.00050	<0.00050	-	<0.00050	-
1,1,1-Trichloroethane	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
1,1,2-Trichloroethane	mg/L	-	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Trichloroethene	mg/L	0.005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	0.00072	<0.00050	0.00066	<0.00050	<0.00050
Trichlorofluoromethane	mg/L	-	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010
Trihalomethanes	mg/L	0.1	<0.00103	-	-	<0.00103	-	-	-	<0.00103	<0.00103	-	<0.00103	-
1,2,3-Trichloropropane	mg/L	-	-	<0.00050	<0.00050	-	-	<0.00050	<0.00050	-	-	<0.00050	-	<0.00050
1,2,4-Trimethylbenzene	mg/L	-	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010
1,3,5-Trimethylbenzene	mg/L	-	<0.00050	<0.0010	<0.0010	<0.00050	-	<0.0010	<0.0010	<0.00050	<0.00050	<0.0010	<0.00050	<0.0010
Vinyl chloride	mg/L	0.0011	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	**0.025**	**0.0041**	**0.0275**	<0.00050	<0.00050

Notes:

[1] Alberta Environment and Parks (AEP). 2019. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division. 198 pp. Referenced guidelines are for coarse textured soils under Residential/Parkland land use.

[2] Guideline varies with hardness. Values shown based on hardness range of 348 mg/L to 1050 mg/L.

[3] Guideline varies with pH and temperature. Values shown based on field pH range of 6.48 to 7.12 and field temperature range of ---

[4] Guideline varies with chloride. Values shown based on chloride range of 9.4 mg/L to 235 mg/L.

[5] Guideline varies with pH. Values shown based on field pH range of 6.48 to 7.12.

"-" No applicable guideline or not analyzed.

BOLD - Greater than Tier 1 Guideline.

N/A - Not applicable.

Table 3: Groundwater Quality Assurance/Quality Control Analytical Results

Parameter	Unit	RDL	XCG-6 (MW)	DUPLICATE	RPD (%)
			10-Sep-2021	10-Sep-2021	
Routine					
pH	pH Units	0.1	7.75	7.67	1
Electrical Conductivity (EC)	µS/cm	2	1270	1260	1
Total Dissolved Solids (TDS)	mg/L	10	819	822	0.4
Hardness as $CaCO_3$	mg/L	0.5	660	675	2
Alkalinity (total as $CaCO_3$)	mg/L	1	573	570	1
Bicarbonate	mg/L	1	699	695	1
Carbonate	mg/L	1	<5.0	<5.0	-
Hydroxide	mg/L	1	<5.0	<5.0	-
Calcium	mg/L	0.05	201	207	3
Magnesium	mg/L	0.005	38.5	38.4	0.3
Potassium	mg/L	0.05	8.91	8.65	3
Sodium	mg/L	0.05	33.8	33.9	0.3
Chloride	mg/L	0.5	9.4	9.5	1
Fluoride	mg/L	0.02	0.10	0.10	0
Sulphate	mg/L	0.3	60.6	60.1	1
Nutrients					
Ammonia as N	mg/L	0.015	1.09	1.09	0
Nitrate (as NO_3-N)	mg/L	0.01	27.7	27.6	0.4
Nitrite (as NO_2-N)	mg/L	0.01	0.096	0.106	10
Nitrate and Nitrate (as N)	mg/L	0.014	27.8	27.7	0.4
Dissolved Metals					
Aluminum	mg/L	0.001	0.0069	0.0049	-
Antimony	mg/L	0.0001	0.00039	0.00039	-
Arsenic	mg/L	0.0001	0.00168	0.0017	-
Barium	mg/L	0.0001	0.351	0.352	0.3
Boron	mg/L	0.01	0.341	0.351	3
Cadmium	mg/L	0.000005	0.000117	0.000111	5
Chromium	mg/L	0.0001	<0.00010	<0.00010	-
Copper	mg/L	0.0002	0.00443	0.00364	20
Iron	mg/L	0.01	0.096	0.092	4
Lead	mg/L	0.00005	0.000056	<0.000050	-
Manganese	mg/L	0.0001	0.29	0.286	1
Mercury	mg/L	0.000005	<0.0000050	<0.0000050	-
Nickel	mg/L	0.0005	0.011	0.0109	1
Selenium	mg/L	0.00005	0.000705	0.000714	1
Silver	mg/L	0.00001	<0.000010	<0.000010	-
Uranium	mg/L	0.00001	0.00171	0.00168	2
Zinc	mg/L	0.001	0.187	0.185	1
Hydrocarbons					
Benzene	mg/L	0.0004	<0.00050	<0.00050	-
Toluene	mg/L	0.0004	<0.00050	<0.00050	-
Ethylbenzene	mg/L	0.0004	<0.00050	<0.00050	-
Xylene (o)	mg/L	0.0004	<0.00050	<0.00050	-
Xylenes (m & p)	mg/L	0.0005	<0.00050	<0.00050	-
Xylenes Total	mg/L	0.00071	<0.00071	<0.00071	-
Styrene	mg/L	0.0005	<0.00050	<0.00050	-
F1 (C_6-C_{10})	mg/L	0.1	<0.10	<0.10	-
F1 (C_6-C_{10}) - BTEX	mg/L	0.1	<0.10	<0.10	-
F2 (C_{10}-C_{16})	mg/L	0.1	<0.10	<0.10	-

Notes:

RDL - Reportable detection limit.

RPD - Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.

"-" Indicates RPD not calculated. RPDs have only been considered where both concentrations are greater than 5 times the RDL.

N/A - Not applicable.

BOLD - RPD value greater than 20%.

Table 3: Groundwater Quality Assurance/Quality Control Analytical Results

Parameter	Unit	RDL	XCG-6 (MW)	DUPLICATE	RPD (%)
			10-Sep-2021	10-Sep-2021	
Volatile Organic Compounds (VOCs)					
Bromobenzene	mg/L	0.001	<0.0010	<0.0010	-
Bromochloromethane	mg/L	0.001	<0.0010	<0.0010	-
Bromodichloromethane	mg/L	0.0005	<0.00050	<0.00050	-
Bromoform	mg/L	0.0005	<0.00050	<0.00050	-
Bromomethane	mg/L	0.001	<0.0010	<0.0010	-
n-Butylbenzene	mg/L	0.001	<0.0010	<0.0010	-
sec-Butylbenzene	mg/L	0.001	<0.0010	<0.0010	-
tert-Butylbenzene	mg/L	0.001	<0.0010	<0.0010	-
Carbon tetrachloride	mg/L	0.0005	<0.00050	<0.00050	-
Chlorobenzene	mg/L	0.0005	<0.00050	<0.00050	-
Chloroethane	mg/L	0.001	<0.0010	<0.0010	-
Chloroform	mg/L	0.0005	<0.00050	<0.00050	-
Chloromethane	mg/L	0.001	<0.0010	<0.0010	-
2-Chlorotoluene	mg/L	0.001	<0.0010	<0.0010	-
4-Chlorotoluene	mg/L	0.001	<0.0010	<0.0010	-
Dibromochloromethane	mg/L	0.0005	<0.00050	<0.00050	-
1,2-Dibromo-3-chloropropane	mg/L	0.001	<0.0010	<0.0010	-
1,2-Dibromoethane	mg/L	0.0002	<0.00050	<0.00050	-
Dibromomethane	mg/L	0.0005	<0.00050	<0.00050	-
1,2-Dichlorobenzene	mg/L	0.0005	<0.00050	<0.00050	-
1,3-Dichlorobenzene	mg/L	0.0005	<0.00050	<0.00050	-
1,4-Dichlorobenzene	mg/L	0.0005	<0.00050	<0.00050	-
1,1-Dichloroethane	mg/L	0.0005	<0.00050	<0.00050	-
1,2-Dichloroethane	mg/L	0.0005	<0.0010	<0.0010	-
1,1-Dichloroethene	mg/L	0.0005	<0.00050	<0.00050	-
1,2-Dichloroethene (cis)	mg/L	0.0005	<0.0010	<0.0010	-
1,2-Dichloroethene (trans)	mg/L	0.0005	<0.00050	<0.00050	-
Dichlorodifluoromethane	mg/L	0.0005	<0.00050	<0.00050	-
1,2-Dichloropropane	mg/L	0.0005	<0.00050	<0.00050	-
1,3-Dichloropropane	mg/L	0.001	<0.0010	<0.0010	-
2,2-Dichloropropane	mg/L	0.001	<0.0010	<0.0010	-
1,1-Dichloropropene	mg/L	0.001	<0.0010	<0.0010	-
1,3-Dichloropropene [cis]	mg/L	0.0005	<0.00050	<0.00050	-
1,3-Dichloropropene [trans]	mg/L	0.0005	<0.0010	<0.0010	-
Hexachlorobutadiene	mg/L	0.001	<0.0010	<0.0010	-
p-Isopropyltoluene	mg/L	0.001	<0.0010	<0.0010	-
Methylene Chloride	mg/L	0.001	<0.0010	<0.0010	-
iso-Propylbenzene (cumene)	mg/L	0.001	<0.0010	<0.0010	-
n-Propylbenzene	mg/L	0.001	<0.0010	<0.0010	-
1,1,1,2-Tetrachloroethane	mg/L	0.001	<0.0010	<0.0010	-
1,1,2,2-Tetrachloroethane	mg/L	0.0005	<0.00050	<0.00050	-
Tetrachloroethene	mg/L	0.0005	<0.00050	<0.00050	-
1,2,3-Trichlorobenzene	mg/L	0.001	<0.0010	<0.0010	-
1,2,4-Trichlorobenzene	mg/L	0.001	<0.0010	<0.0010	-
1,1,1-Trichloroethane	mg/L	0.0005	<0.00050	<0.00050	-
1,1,2-Trichloroethane	mg/L	0.0005	<0.00050	<0.00050	-
Trichloroethene	mg/L	0.0005	<0.00050	<0.00050	-
Trichlorofluoromethane	mg/L	0.0005	<0.0010	<0.0010	-
1,2,3-Trichloropropane	mg/L	0.0005	<0.00050	<0.00050	-
1,2,4-Trimethylbenzene	mg/L	0.0005	<0.0010	<0.0010	-
1,3,5-Trimethylbenzene	mg/L	0.0005	<0.0010	<0.0010	-
Vinyl chloride	mg/L	0.0005	<0.00050	<0.00050	-

Notes:

RDL - Reportable detection limit.

RPD - Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.

"-" Indicates RPD not calculated. RPDs have only been considered where both concentrations are greater than 5 times the RDL.

N/A - Not applicable.

BOLD - RPD value greater than 20%.

Table 4A: Soil Vapour Monitoring Results (September 2019)

Location	Blinded (Y/N)	Soil Gas Pressure (pascals)	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance Gas (%)
VW-01	N	0.0	0.0	3.5	17.4	79.1
VW-02	N	0.0	30.0	28.2	0.1	41.7
VW-03	N	0.0	0.0	20.5	3.5	76.1
VW-04	N	0.0	0.0	4.4	17.5	78.1
VW-05	N	0.0	0.0	7.5	13.7	78.8
XCG-1	Y	5.2				
XCG-2	Y	2.1				
XCG-4	N	0.0	0.0	5.1	15.0	80.0
XCG-5	N	0.0	0.0	3.6	17.0	79.4
XCG-6	N	0.0	0.0	16.3	5.1	78.6
XCG-9	Y	3.4				
XCG-10	N	0.0	0.0	6.5	16.3	77.2
XCG-12	N	0.1	0.0	0.3	20.0	79.7
XCG-13	N	0.0	0.0	0.1	20.8	79.1

Notes:
Blank - Not measured because probe was blinded.

Table 4B: Soil Vapour Monitoring Results (April 2020)

Location	Blinded (Y/N)	Soil Gas Pressure (mmHg)	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance Gas (%)
VW-01	Frozen					
VW-02	CNL					
VW-03	N	0.0	0.0	18.2	2.4	79.4
VW-04	CNL					
VW-05	N	0.0	0.0	0.1	21.0	79.0
XCG-1	Frozen					
XCG-2	Frozen					
XCG-4	N	0.0	0.0	2.0	11.1	86.3
XCG-5	N	0.1	0.0	1.4	19.6	79.0
XCG-6	N	0.0	0.0	0.1	21.8	78.2
XCG-9	CNL					
XCG-10	N	0.0	0.0	5.8	18.4	75.8
XCG-12	N	0.1	0.0	0.1	23.6	76.2
XCG-13	N	0.0	0.1	4.1	19.4	77.3

Notes:

Blank - Not measured because probe was blinded.

CNL - Could not locate.

Table 4C: Soil Vapour Monitoring Results (July 2021)

Location	Blinded (Y/N)	Soil Gas Pressure (mmHg)	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance Gas (%)
VW-01	N	0.0	0.0	2.2	18.2	79.6
VW-02	N	0.0	18.7	20.3	3.3	57.8
VW-03	N	0.0	0.0	12.6	7.3	80.1
VW-04	N	0.0	0.0	2.6	18.8	78.6
VW-05	N	0.0	0.0	11.4	13.2	75.3
XCG-1	Y	0.0	-	-	-	-
XCG-2	Y	0.1	0.0	1.4	20.4	78.2
XCG-4	N	0.0	0.0	3.3	6.9	89.8
XCG-5	N	0.0	0.0	2.3	18.8	79.0
XCG-6	N	0.0	0.0	12.3	4.6	83.0
XCG-9	Y	0.1	0.0	2.3	17.2	80.4
XCG-10	N	0.1	0.0	6.5	14.5	79.0
XCG-12	N	0.1	-	-	-	-
XCG-13	N	0.2	-	-	-	-

Notes:
Blank - Not measured because probe was blinded.

Table 4D: Soil Vapour Monitoring Results (September 2021)

Location	Blinded (Y/N)	Soil Gas Pressure (mmHg)	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance Gas (%)
XCG-1	N	0.0	0.0	0.1	19.9	80.0
XCG-12*	Y	0.6	0.0	-	-	-
XCG-13	N	0.4	1.0	16.8	9.1	73.2

Notes:

Blank - Not measured because probe was blinded.

* Sample was taken with a Tedlar bag and vacuum pump as water was present.

Table 4E: Soil Vapour Monitoring Results (November 2021)

Location	Blinded (Y/N)	Soil Gas Pressure (mmHg)	CH_4 (%)	CO_2 (%)	O_2 (%)	Balance Gas (%)
VW-01	N	0.0	0.0	3.5	18.8	77.7
VW-02	N	0.0	0.0	0.6	22.1	77.3
VW-03	N	0.0	0.0	11.0	12.6	76.4
VW-04	N	0.0	0.0	2.5	19.6	77.9
VW-05	N	0.0	0.0	0.2	21.5	78.3
XCG-1	N	*	*	*	*	*
XCG-2	N	0.0	0.0	0.5	20.9	78.6
XCG-4	N	0.0	0.0	2.5	18.4	79.0
XCG-5	N	*	*	*	*	*
XCG-6	N	0.0	0.0	0.1	22.3	77.6
XCG-9	Y	-	-	-	-	-
XCG-10	N	0.0	0.0	2.8	19.4	77.9
XCG-12	N	0.0	0.0	0.1	21.8	78.1
XCG-13	N	0.0	0.0	10.4	13.6	76.0

Notes:

Blank - Not measured because probe was blinded.

*Soil vapour probe was frozen and an accurate measurement could not be taken.

Table 5: Soil Vapour Analytical Results

Parameter	Unit	Generic Soil Vapour Guidelines - Residential Coarse-Grained [1]	Deminimus Screening - Soil Vapour Screening Criteria	VW-04	VW-05			XCG-4 (SVP)				XCG-6 (SVP)				XCG-13 (SVP)		
				23-Nov-2021	19-Sep-2019	20-Nov-2021	20-Nov-2021	19-Sep-2019	19-Sep-2019	01-Apr-2020	20-Nov-2021	20-Sep-2019	01-Apr-2020	01-Apr-2020	20-Nov-2021	19-Sep-2019	01-Apr-2020	20-Nov-2021
Hydrocarbons																		
Benzene	µg/m^3	41	303	<0.32	0.43	<0.32	0.35	<0.32	<0.32	<0.32	<0.32	0.99	0.61	0.51	1.47	0.62	0.48	1.38
Toluene	µg/m^3	75,190	190,000	<0.75	2.70	<0.75	0.82	<0.38	<0.38	<0.38	<0.75	6.47	<0.38	0.51	<0.75	0.92	0.53	<0.75
Ethylbenzene	µg/m^3	68,650	50,000	<0.87	0.52	<0.87	<0.87	<0.43	<0.43	<0.43	<0.87	0.64	<0.43	<0.43	9.4	<0.78	<0.43	<0.87
Xylenes (m & p)	µg/m^3	NG	9,000	<1.7	2.02	<1.7	<1.7	<0.87	<0.87	<0.87	<1.7	2.1	<0.87	<0.87	12.6	<1.6	0.95	<1.7
Xylene (o)	µg/m^3	NG	9,000	<0.87	0.89	<0.87	<0.87	<0.43	<0.43	<0.43	<0.87	0.77	<0.43	<0.43	<0.87	<0.78	<0.43	<0.87
Xylenes Total	µg/m^3	3,520	9,000	<2.0	2.9	<2.0	<2.0	<1.3	<1.3	<1.3	<2.0	2.9	<1.3	<1.3	12.6	<2.3	<1.3	<2.0
Styrene	µg/m^3	3,220	4,600	<0.85	<0.43	<0.85	<0.85	<0.43	<0.43	<0.43	<0.85	<0.43	<0.43	<0.43	<0.85	<0.77	<0.43	<0.85
F1 (C_6 to C_{10}) - BTEX	µg/m^3	867,383	59,532	6800	176	<15	19	99.2	95.2	39.6	1520	58.1	25.8	6.4	154	34.8	8.4	49
F2 (C_{10} to C_{16})	µg/m^3	52,495	27,778	40	136	<15	30	11.3	7.8	<5.0	<15	19.9	<5.0	<5.0	75	17.6	<5.0	<15
Alcohols																		
Ethanol	µg/m^3	NG	1,900,000	-	7.6	-	-	<1.9	<1.9	38.2	-	14.3	19.6	13.6	-	<3.4	17.8	-
Isoropanol	µg/m^3	6,219	491,000	-	<2.5	-	-	<2.5	<2.5	<2.5	-	<2.5	<2.5	<2.5	-	<4.4	<2.5	-
Compressed Gas Parameters																		
Carbon Monoxide	% v/v	NG	-	<0.050	<0.2	<0.050	<0.050	<0.2	<0.2	<0.20	<0.050	<0.2	<0.20	<0.20	<0.050	<0.3	<0.20	<0.050
Carbon Dioxide	% v/v	NG	-	1.45	12.8	7.67	7.70	4.8	5.5	2.3	1.15	0.4	<0.20	<0.20	0.257	<0.3	<0.20	11.1
Methane	% v/v	NG	0.1 to 0.5	<0.050	*<0.2*	<0.050	<0.050	*<0.2*	*<0.2*	*<0.20*	<0.050	*<0.2*	*<0.20*	*<0.20*	<0.050	*<0.3*	*<0.20*	<0.050
Nitrogen	% v/v	NG	-	76.2	76.1	73.6	71.9	77.5	77.5	86.2	77.5	76.9	77.1	77.1	75.4	77.0	77	72.6
Oxygen	% v/v	NG	-	20.8	11.1	18.5	18.1	17.8	17.0	11.5	21.0	22.7	22.8	22.9	21.5	23.0	22.9	13.6
Air Analyses																		
Acetylene	ppm	NG	-	-	<0.24	-	-	<0.19	<0.22	<0.18	-	<0.21	<0.17	<0.18	-	<0.3	<0.21	-
Ethane	ppm	NG	1,000	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
Ethene	ppm	NG	200	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
n-Butane	ppm	NG	-	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
n-Pentane	ppm	NG	-	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
Propane	ppm	NG	1,000	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
Propene	ppm	NG	35	<2.0	<0.24	<2.0	<2.0	<0.19	<0.22	<0.18	<2.0	<0.21	<0.17	<0.18	<2.0	<0.3	<0.21	<2.0
Methane	ppm	NG	1,000 to 5,000	<1.0	<4.9	2.3	7.5	<3.9	<4.4	<3.6	42.1	<4.3	<3.5	<3.6	224	<6	<4.2	2.2
Propyne	ppm	NG	-	-	<0.24	-	-	<0.19	<0.22	<0.18	-	<0.21	<0.17	<0.18	-	<0.3	<0.21	-
Volatile Organic Compounds (VOCs)																		
1,1,1,2-Tetrachloroethane	µg/m^3	NG	-	-	<0.69	-	-	<0.69	<0.69	<0.69	-	<0.69	<0.69	<0.69	-	<1.2	<0.69	-
1,1,1-Trichloroethane	µg/m^3	1,693,510	20,000	1.7	<0.55	<1.1	<1.1	<0.55	<0.55	<0.55	<1.1	<0.55	<0.55	<0.55	<1.1	<0.98	<0.55	<1.1
1,1,2,2-Tetrachloroethane	µg/m^3	11	-	<1.4	<0.69	<1.4	<1.4	<0.69	<0.69	<0.69	<1.4	<0.69	<0.69	<0.69	<1.4	<1.2	<0.69	<1.4
1,1,2-Trichloroethane	µg/m^3	7	-	<1.1	<0.55	<1.1	<1.1	<0.55	<0.55	<0.55	<1.1	<0.55	<0.55	<0.55	<1.1	<0.98	<0.55	<1.1
1,1-Dichloroethane	µg/m^3	430	3,300	<0.81	0.77	<0.81	<0.81	<0.40	<0.40	<0.40	<0.81	<0.40	<0.40	<0.40	<0.81	<0.73	<0.40	<0.81
1,1-Dichloroethene	µg/m^3	6,470	4,000	<0.79	<0.40	<0.79	<0.79	<0.40	<0.40	<0.40	<0.79	<0.40	<0.40	<0.40	<0.79	<0.71	<0.40	<0.79
1,2,4-Trichlorobenzene	µg/m^3	365	-	<1.5	<3.7	<1.5	<1.5	<3.7	<3.7	<3.7	<1.5	<3.7	<3.7	<3.7	<1.5	<6.7	<3.7	<1.5
1,2,4-Trimethylbenzene	µg/m^3	2,235	400	<0.98	<2.5	<0.98	<0.98	<2.5	<2.5	<2.5	<0.98	<2.5	<2.5	<2.5	3.01	<4.4	<2.5	<0.98
1,2-Dibromoethane	µg/m^3	2.2	-	<1.5	<0.77	<1.5	<1.5	<0.77	<0.77	<0.77	<1.5	<0.77	<0.77	<0.77	<1.5	<1.4	<0.77	<1.5
1,2-Dichlorobenzene	µg/m^3	7,072	-	<1.2	<0.60	<1.2	<1.2	<0.60	<0.60	<0.60	<1.2	<0.60	<0.60	<0.60	<1.2	<1.1	<0.60	<1.2
1,2-Dichloroethane	µg/m^3	24	-	<0.81	<0.40	<0.81	<0.81	<0.40	<0.40	<0.40	<0.81	<0.40	<0.40	<0.40	<0.81	<0.73	<0.40	<0.81
1,2-Dichloroethene (cis)	µg/m^3	242	179	<0.79	46.7	54.6	57.8	<0.40	<0.40	<0.40	1.32	<0.40	<0.40	<0.40	<0.79	<0.71	<0.40	3.14
1,2-Dichloroethene (trans)	µg/m^3	1,400	179	<0.79	4.5	7.78	7.81	<0.40	<0.40	<0.40	<0.79	<0.40	<0.40	<0.40	<0.79	<0.71	<0.40	<0.79
1,2-Dichloropropane	µg/m^3	135	-	<0.92	<0.46	<0.92	<0.92	<0.46	<0.46	<0.46	<0.92	<0.46	<0.46	<0.46	<0.92	<0.83	<0.46	<0.92
1,2-Dichlorotetrafluoroethane (freon 114)	µg/m^3	566,335	7,000,000	15.6	188	40.5	37.5	77.7	81.1	86.3	12.0	3.2	<1.2	<1.2	7.5	<2.1	<1.2	330
1,3,5-Trimethylbenzene	µg/m^3	2,235	400	<0.98	<2.5	<0.98	<0.98	<2.5	<2.5	<2.5	<0.98	<2.5	<2.5	<2.5	1.94	<4.4	<2.5	<0.98
1,3-Butadiene	µg/m^3	17	-	<0.44	<1.1	<0.44	<0.44	<1.1	<1.1	<1.1	<0.44	<1.1	<1.1	<1.1	<0.44	<2	<1.1	<0.44
1,3-Dichlorobenzene	µg/m^3	64	-	<1.2	<2.4	<1.2	<1.2	3.2	3.2	<2.4	<1.2	4.6	<2.4	<2.4	<1.2	8.6	<2.4	3.0
1,3-Dichloropropene [cis]	µg/m^3	163	-	<0.91	<0.45	<0.91	<0.91	<0.45	<0.45	<0.45	<0.91	<0.45	<0.45	<0.45	<0.91	<0.82	<0.45	<0.91
1,3-Dichloropropene [trans]	µg/m^3	149	-	<0.91	<0.45	<0.91	<0.91	<0.45	<0.45	<0.45	<0.91	<0.45	<0.45	<0.45	<0.91	<0.82	<0.45	<0.91
1,4-Dichlorobenzene	µg/m^3	64	1,900	<1.2	<0.60	<1.2	<1.2	<0.60	<0.60	<0.60	<1.2	<0.60	<0.60	<0.60	<1.2	<1.1	<0.60	<1.2
1,4-Dioxane	µg/m^3	105	-	<0.72	<3.6	<0.72	<0.72	<3.6	<3.6	<3.6	<0.72	<3.6	<3.6	<3.6	<0.72	<6.5	<3.6	<0.72

Notes:

BOLD - Greater than De minimus Screening Soil Vapour Criteria (XCG 2017).

Italic - Detection limit greater than De minimus Screening Soil Vapour Criteria (XCG 2017).

[1] Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. Refer to Tables 7 to 10 for further information.

Table 5: Soil Vapour Analytical Results

Parameter	Unit	Generic Soil Vapour Guidelines - Residential Coarse-Grained [1]	Deminimus Screening - Soil Vapour Screening Criteria	VW-04	VW-05			XCG-4 (SVP)				XCG-6 (SVP)				XCG-13 (SVP)		
				23-Nov-2021	19-Sep-2019	20-Nov-2021	20-Nov-2021	19-Sep-2019	19-Sep-2019	01-Apr-2020	20-Nov-2021	20-Sep-2019	01-Apr-2020	01-Apr-2020	20-Nov-2021	19-Sep-2019	01-Apr-2020	20-Nov-2021
Volatile Organic Compounds (VOCs)																		
1-Methyl-4 ethyl benzene	µg/m^3	14,461	-	<0.98	<2.5	<0.98	<0.98	<2.5	<2.5	<2.5	<0.98	<2.5	<2.5	<2.5	<0.98	<4.4	<2.5	<0.98
2,2,4-Trimethylpentane	µg/m^3	14,917	64,173	-	<0.93	-	-	<0.93	<0.93	<0.93	-	<0.93	<0.93	<0.93	-	<1.7	<0.93	-
2-Butanone (MEK)	µg/m^3	167,364	100,000	<0.59	1.62	0.96	0.77	0.73	0.97	1.24	0.91	1.65	0.72	0.75	1.42	<1.1	0.91	<0.59
2-Hexanone (MBK)	µg/m^3	1053	-	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<4.1	<7.4	<4.1	<4.1
4-Methyl-2-pentanone (MIBK)	µg/m^3	102,977	-	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<1.5	<0.82	<0.82
Acetone	µg/m^3	918,788	618,000	1.6	15.7	3.5	3.5	3.7	3.7	5.8	10	10.7	5.9	5.2	5.3	8.6	4.9	2.6
Allyl chloride	µg/m^3	32	-	<0.63	-	<0.63	<0.63	-	-	-	<0.63	-	-	-	<0.63	-	-	<0.63
Benzyl chloride	µg/m^3	34	-	<1.0	<2.6	<1.0	<1.0	<2.6	<2.6	<2.6	<1.0	<2.6	<2.6	<2.6	<1.0	<4.7	<2.6	<1.0
Bromodichloromethane	µg/m^3	28	-	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<2.4	<1.3	<1.3
Bromoform	µg/m^3	1,494	-	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<2.1	<3.7	<2.1	<2.1
Bromomethane	µg/m^3	173	-	<0.78	<0.39	<0.78	<0.78	<0.39	<0.39	<0.39	<0.78	<0.39	<0.39	<0.39	<0.78	<0.70	<0.39	<0.78
Carbon disulfide	µg/m^3	21,713	2,000	-	58.2	3.60	3.68	2.6	<1.6	<1.6	<0.62	1.9	<1.6	<1.6	<0.62	<2.8	<1.6	<0.62
Carbon tetrachloride	µg/m^3	113	-	<1.3	<0.63	<1.3	<1.3	<0.63	<0.63	<0.63	<1.3	<0.63	<0.63	<0.63	<1.3	<1.1	<0.63	<1.3
Chlorobenzene	µg/m^3	347	-	<0.92	<0.46	<0.92	<0.92	<0.46	<0.46	<0.46	<0.92	<0.46	<0.46	<0.46	<0.92	<0.83	<0.46	<0.92
Chloroethane	µg/m^3	124,080	200,000	<0.53	<0.79	<0.53	<0.53	<0.79	<0.79	<0.79	<0.53	<0.79	<0.79	<0.79	<0.53	<1.4	<0.79	<0.53
Chloroform	µg/m^3	27	560	6.52	<0.49	<0.98	<0.98	0.61	0.74	<0.49	<0.98	<0.49	<0.49	<0.49	<0.98	<0.88	<0.49	<0.98
Chloromethane	µg/m^3	2,657	1,800	<0.41	<0.62	<0.41	0.54	<0.62	<0.62	<0.62	0.49	1.2	0.94	0.95	0.72	<1.1	1.04	1.04
Cyclohexane	µg/m^3	201,510	120,000	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	1.14	<0.69	<0.69	1.2	<1.2	<0.69	9.18
Dibromochloromethane	µg/m^3	6,070	-	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<3.1	<1.7	<1.7
Dichlorodifluoromethane	µg/m^3	3,584	17,800	76.1	309	110	109	11.1	11.9	45.7	50.7	4.61	2.36	2.67	16.4	3.3	2.76	1890
Ethyl acetate	µg/m^3	2,509	-	<0.72	<3.6	<0.72	<0.72	<3.6	<3.6	<3.6	<0.72	<3.6	<3.6	<3.6	<0.72	<6.5	<3.6	<0.72
Freon 113	µg/m^3	230,627	-	<1.5	-	<1.5	<1.5	-	-	<1.2	<1.5	-	<1.2	<1.2	<1.5	-	1.4	<1.5
Heptane	µg/m^3	14,461	8,000	<0.82	<1.2	<0.82	<0.82	<1.2	<1.2	<1.2	<0.82	1.3	<1.2	<1.2	3.14	<2.2	<1.2	<0.82
Hexachlorobutadiene	µg/m^3	51	-	<2.1	<5.3	<2.1	<2.1	<5.3	<5.3	<5.3	<2.1	<5.3	<5.3	<5.3	<2.1	<9.6	<5.3	<2.1
Hexane	µg/m^3	18,839	14,000	<0.70	<0.70	<0.70	1.00	<0.70	<0.70	<0.70	0.75	1.8	<0.70	<0.70	2.08	1.5	<0.70	<0.70
Isooctane	µg/m^3	14,917	-	<0.93	-	<0.93	<0.93	-	-	-	<0.93	-	-	-	<0.93	-	-	<0.93
iso-Propylbenzene (cumene)	µg/m^3	14,461	-	<0.98	-	<0.98	<0.98	-	-	-	<0.98	-	-	-	<0.98	-	-	<0.98
Methyl t-Butyl Ether (MTBE)	µg/m^3	1153	-	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<0.72	<1.3	<0.72	<0.72
Methylene Chloride	µg/m^3	18,764	-	<0.69	<2.1	<0.69	<0.69	<2.1	<2.1	<2.1	<0.69	<2.1	<2.1	<2.1	<0.69	<3.8	<2.1	<0.69
Naphthalene	µg/m^3	380	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.9	<1.0	<1.0
Propene	µg/m^3	91,723	60,000	<0.34	<0.86	<1.7	<1.7	<0.86	<0.86	<0.86	<2.1	<6.0	<1.5	<1.7	2.63	<6.0	<1.4	0.62
Tetrachloroethene	µg/m^3	1,390	800	**8,950**	0.82	2.2	2.2	33.4	34.3	6.18	40.5	<0.68	<0.68	<0.68	50.4	<1.2	<0.68	8.3
Tetrahydrofuran	µg/m^3	62,828	40,000	<0.59	<1.2	<0.59	<0.59	<1.2	<1.2	<1.2	<0.59	<1.2	<1.2	<1.2	<0.59	<2.1	<1.2	<0.59
Trichloroethene	µg/m^3	70	800	85.6	3.36	<1.1	<1.1	<0.54	<0.54	0.89	<1.1	0.86	<0.54	<0.54	<1.1	<0.97	1.56	6.7
Trichlorotrifluoroethane	µg/m^3	-	-	-	<1.2	-	-	<1.2	<1.2	-	-	<1.2	-	-	-	<2.1	-	-
Trichlorofluoromethane	µg/m^3	34,325	20,000	19.6	7.3	7.6	7.4	1.5	1.5	1.1	1.3	1.1	1.3	1.2	1.2	<2	1.2	<1.1
Vinyl acetate	µg/m^3	6,586	-	<1.8	<0.70	<1.8	<1.8	<0.70	<0.70	<0.70	<1.8	<0.70	<0.70	<0.70	<1.8	<1.3	<0.70	<1.8
Vinyl bromide (bromoethene)	µg/m^3	40	-	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<0.87	<1.6	<0.87	<0.87
Vinyl chloride	µg/m^3	70	114	<0.51	3.72	<0.51	<0.51	<0.26	<0.26	<0.26	2.07	<0.26	<0.26	<0.26	<0.51	<0.46	<0.26	<0.51

Notes:

BOLD - Greater than De minimus Screening Soil Vapour Criteria (XCG 2017).

Italic - Detection limit greater than De minimus Screening Soil Vapour Criteria (XCG 2017).

RED - Greater than CCME soil vapour screening criteria.

[1] Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours. Refer to Tables 7 to

Table 6: Soil Vapour Quality Assurance/Quality Control Analytical Results

Parameter	Unit	RDL	XCG-4 (SVP)	19DUPSVP01	RPD (%)	XCG-6	DUPLICATE	RPD (%)	XCG-6 (SVP)	DUPLICATE-AIR	RPD (%)	VW-05	DUPLICATE	RPD (%)
			19-Sep-2019	19-Sep-2019		1-Apr-2020	1-Apr-2020		1-Apr-2020	1-Apr-2020		20-Nov-2021	20-Nov-2021	
Field Tests														
Air Volume	L	0.01	-	-	-	0.06	0.06	0	-	-	-	-	-	-
Initial Pressure	psig	N/A	-	-	-	-	-	-	-1.7	-3.1	45	-	-	-
Linear & Cyclic Methyl Siloxanes														
Decamethylcyclopentasiloxane, D5(CVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Decamethyltetrasiloxane, MD2M(LVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Dodecamethylcyclohexasiloxane, D6(CVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Dodecamethylpentasiloxane, MD3M(LVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Hexamethylcyclotrisiloxane, D3(CVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Hexamethyldisiloxane, MM(LVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Octamethylcyclotetrasiloxane, D4(CVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Octamethyltrisiloxane, MDM(LVMS)	µg/m^3	17	-	-	-	<170	<170	-	-	-	-	-	-	-
Hydrocarbons														
Benzene	µg/m^3	0.32	<0.32	<0.32	-	-	-	-	0.61	0.51	-	<0.32	0.35	-
Toluene	µg/m^3	0.38	<0.38	<0.38	-	-	-	-	<0.38	0.51	-	<0.75	0.82	-
Ethylbenzene	µg/m^3	0.43	<0.43	<0.43	-	-	-	-	<0.43	<0.43	-	<0.87	<0.87	-
Xylenes (m & p)	µg/m^3	0.87	<0.87	<0.87	-	-	-	-	<0.87	<0.87	-	<1.7	<1.7	-
Xylene (o)	µg/m^3	0.43	<0.43	<0.43	-	-	-	-	<0.43	<0.43	-	<0.87	<0.87	-
Xylenes Total	µg/m^3	1.3	<1.3	<1.3	-	-	-	-	<1.3	<1.3	-	<2.0	<2.0	-
Styrene	µg/m^3	0.43	<0.43	<0.43	-	-	-	-	<0.43	<0.43	-	<0.85	<0.85	-
F1 (C_6 to C_{10}) - BTEX	µg/m^3	5	99.2	95.2	4	-	-	-	25.8	6.4	**75**	<15	19	-
F2 (C_{10} to C_{16})	µg/m^3	5	11.3	7.8	-	-	-	-	<5.0	<5.0	-	<15	30	-
Alcohols														
Ethanol	µg/m^3	1.9	<1.9	<1.9	-	-	-	-	19.6	13.6	31	-	-	-
Isoropanol	µg/m^3	2.5	<2.5	<2.5	-	-	-	-	<2.5	<2.5	-	-	-	-
Compressed Gas Parameters														
Carbon Monoxide	% v/v	0.2	<0.2	<0.2	-	-	-	-	<0.20	<0.20	-	<0.050	<0.050	-
Carbon Dioxide	% v/v	0.2	4.8	5.5	15	-	-	-	<0.20	<0.20	-	7.67	7.70	0.4
Methane	% v/v	0.2	<0.2	<0.2	-	-	-	-	<0.20	<0.20	-	<0.050	<0.050	-
Nitrogen	% v/v	0.2	77.5	77.5	0	-	-	-	77.1	77.1	0	73.6	71.9	2
Oxygen	% v/v	0.2	17.8	17.0	5	-	-	-	22.8	22.9	0.4	18.5	18.1	2
Air Analyses														
Acetylene	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	-	-	-
Ethane	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
Ethene	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
n-Butane	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
n-Pentane	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
Propane	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
Propene	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	<2.0	<2.0	-
Methane	ppm	3.9	<3.9	<4.4	-	-	-	-	<3.5	<3.6	-	2.3	7.5	**106**
Propyne	ppm	0.19	<0.19	<0.22	-	-	-	-	<0.17	<0.18	-	-	-	-
Volatile Organic Compounds (VOCs)														
1,1,1,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	-	-	-	-	<0.69	<0.69	-	-	-	-
1,1,1-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	-	-	-	-	<0.55	<0.55	-	<1.1	<1.1	-
1,1,2,2-Tetrachloroethane	µg/m^3	0.69	<0.69	<0.69	-	-	-	-	<0.69	<0.69	-	<1.4	<1.4	-
1,1,2-Trichloroethane	µg/m^3	0.55	<0.55	<0.55	-	-	-	-	<0.55	<0.55	-	<1.1	<1.1	-
1,1-Dichloroethane	µg/m^3	0.4	<0.40	<0.40	-	-	-	-	<0.40	<0.40	-	<0.81	<0.81	-
1,1-Dichloroethene	µg/m^3	0.4	<0.40	<0.40	-	-	-	-	<0.40	<0.40	-	<0.79	<0.79	-
1,2,4-Trichlorobenzene	µg/m^3	3.7	<3.7	<3.7	-	-	-	-	<3.7	<3.7	-	<1.5	<1.5	-
1,2,4-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	-	-	-	-	<2.5	<2.5	-	<0.98	<0.98	-
1,2-Dibromoethane	µg/m^3	0.77	<0.77	<0.77	-	-	-	-	<0.77	<0.77	-	<1.5	<1.5	-
1,2-Dichlorobenzene	µg/m^3	0.6	<0.60	<0.60	-	-	-	-	<0.60	<0.60	-	<1.2	<1.2	-
1,2-Dichloroethane	µg/m^3	0.4	<0.40	<0.40	-	-	-	-	<0.40	<0.40	-	<0.81	<0.81	-
1,2-Dichloroethene (cis)	µg/m^3	0.4	<0.40	<0.40	-	-	-	-	<0.40	<0.40	-	54.6	57.8	6
1,2-Dichloroethene (trans)	µg/m^3	0.4	<0.40	<0.40	-	-	-	-	<0.40	<0.40	-	7.78	7.81	0.4
1,2-Dichloropropane	µg/m^3	0.46	<0.46	<0.46	-	-	-	-	<0.46	<0.46	-	<0.92	<0.92	-
1,2-Dichlorotetrafluoroethane	µg/m^3	1.2	77.7	81.1	4	-	-	-	<1.2	<1.2	-	40.5	37.5	8
1,3,5-Trimethylbenzene	µg/m^3	2.5	<2.5	<2.5	-	-	-	-	<2.5	<2.5	-	<0.98	<0.98	-
1,3-Butadiene	µg/m^3	1.1	<1.1	<1.1	-	-	-	-	<1.1	<1.1	-	<0.44	<0.44	-
1,3-Dichlorobenzene	µg/m^3	2.4	3.2	3.2	0	-	-	-	<2.4	<2.4	-	<1.2	<1.2	-
1,3-Dichloropropene [cis]	µg/m^3	0.45	<0.45	<0.45	-	-	-	-	<0.45	<0.45	-	<0.91	<0.91	-
1,3-Dichloropropene [trans]	µg/m^3	0.45	<0.45	<0.45	-	-	-	-	<0.45	<0.45	-	<0.91	<0.91	-
1,4-Dichlorobenzene	µg/m^3	0.6	<0.60	<0.60	-	-	-	-	<0.60	<0.60	-	<1.2	<1.2	-
1,4-Dioxane	µg/m^3	3.6	<3.6	<3.6	-	-	-	-	<3.6	<3.6	-	<0.72	<0.72	-

Notes:

-	Not analyzed or RPD not calculated.
<	Concentration is less than the laboratory detection limit indicated.
RDL	Laboratory Reportable Detection Limit.
RPD	RPD is Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.
	RPDs have only been calculated where a concentration is greater than 5 times the RDL.
BOLD	High RPDs are in bold (acceptable RPD is 60% for organic vapours as recommended by BC Ministry of Environment Q&A, and BC Environmental Laboratory Manual).

Table 6: Soil Vapour Quality Assurance/Quality Control Analytical Results

Parameter	Unit	RDL	XCG-4 (SVP)	19DUPSVP01	RPD (%)	XCG-6	DUPLICATE	RPD (%)	XCG-6 (SVP)	DUPLICATE-AIR	RPD (%)	VW-05	DUPLICATE	RPD (%)
			19-Sep-2019	19-Sep-2019		1-Apr-2020	1-Apr-2020		1-Apr-2020	1-Apr-2020		20-Nov-2021	20-Nov-2021	
Volatile Organic Compounds (VOCs)														
1-Methyl-4 ethyl benzene	µg/m^3	2.5	<2.5	<2.5	-	-	-	-	<2.5	<2.5	-	<0.98	<0.98	-
2,2,4-Trimethylpentane	µg/m^3	0.93	<0.93	<0.93	-	-	-	-	<0.93	<0.93	-	-	-	-
2-Butanone (MEK)	µg/m^3	0.59	0.73	0.97	-	-	-	-	0.72	0.75	-	0.96	0.77	-
2-Hexanone (MBK)	µg/m^3	4.1	<4.1	<4.1	-	-	-	-	<4.1	<4.1	-	<4.1	<4.1	-
4-Methyl-2-pentanone (MIBK)	µg/m^3	0.82	<0.82	<0.82	-	-	-	-	<0.82	<0.82	-	<0.82	<0.82	-
Acetone	µg/m^3	1.4	3.7	3.7	0	-	-	-	5.9	5.2	-	3.5	3.5	-
Allyl chloride	µg/m^3	0.63	-	-	-	-	-	-	-	-	-	<0.63	<0.63	-
Benzyl chloride	µg/m^3	2.6	<2.6	<2.6	-	-	-	-	<2.6	<2.6	-	<1.0	<1.0	-
Bromodichloromethane	µg/m^3	1.3	<1.3	<1.3	-	-	-	-	<1.3	<1.3	-	<1.3	<1.3	-
Bromoform	µg/m^3	2.1	<2.1	<2.1	-	-	-	-	<2.1	<2.1	-	<2.1	<2.1	-
Bromomethane	µg/m^3	0.39	<0.39	<0.39	-	-	-	-	<0.39	<0.39	-	<0.78	<0.78	-
Carbon disulfide	µg/m^3	1.6	2.6	<1.6	-	-	-	-	<1.6	<1.6	-	3.60	3.68	2
Carbon tetrachloride	µg/m^3	0.63	<0.63	<0.63	-	-	-	-	<0.63	<0.63	-	<1.3	<1.3	-
Chlorobenzene	µg/m^3	0.46	<0.46	<0.46	-	-	-	-	<0.46	<0.46	-	<0.92	<0.92	-
Chloroethane	µg/m^3	0.79	<0.79	<0.79	-	-	-	-	<0.79	<0.79	-	<0.53	<0.53	-
Chloroform	µg/m^3	0.49	0.61	0.74	-	-	-	-	<0.49	<0.49	-	<0.98	<0.98	-
Chloromethane	µg/m^3	0.62	<0.62	<0.62	-	-	-	-	0.94	0.95	-	<0.41	0.54	-
Cyclohexane	µg/m^3	0.69	<0.69	<0.69	-	-	-	-	<0.69	<0.69	-	<0.69	<0.69	-
Dibromochloromethane	µg/m^3	1.7	<1.7	<1.7	-	-	-	-	<1.7	<1.7	-	<1.7	<1.7	-
Dichlorodifluoromethane	µg/m^3	0.99	11.1	11.9	7	-	-	-	2.36	2.67	-	110	109	1
Ethyl acetate	µg/m^3	3.6	<3.6	<3.6	-	-	-	-	<3.6	<3.6	-	<0.72	<0.72	-
Freon 113	µg/m^3	1.2	-	-	-	-	-	-	<1.2	<1.2	-	<1.5	<1.5	-
Heptane	µg/m^3	1.2	<1.2	<1.2	-	-	-	-	<1.2	<1.2	-	<0.82	<0.82	-
Hexachlorobutadiene	µg/m^3	5.3	<5.3	<5.3	-	-	-	-	<5.3	<5.3	-	<2.1	<2.1	-
Hexane	µg/m^3	0.7	<0.70	<0.70	-	-	-	-	<0.70	<0.70	-	<0.70	1.00	-
Isooctane	µg/m^4	0.93	-	-	-	-	-	-	-	-	-	<0.93	<0.93	-
iso-Propylbenzene (cumene)	µg/m^5	0.98	-	-	-	-	-	-	-	-	-	<0.98	<0.98	-
Methyl t-Butyl Ether (MTBE)	µg/m^3	0.72	<0.72	<0.72	-	-	-	-	<0.72	<0.72	-	<0.72	<0.72	-
Methylene Chloride	µg/m^3	2.1	<2.1	<2.1	-	-	-	-	<2.1	<2.1	-	<0.69	<0.69	-
Naphthalene	µg/m^3	1	<1.0	<1.0	-	-	-	-	<1.0	<1.0	-	<1.0	<1.0	-
Propene	µg/m^3	0.86	<0.86	<0.86	-	-	-	-	<1.5	<1.7	-	<1.7	<1.7	-
Tetrachloroethene	µg/m^3	0.68	33.4	34.3	3	-	-	-	<0.608	<0.608	-	2.2	2.2	-
Tetrahydrofuran	µg/m^3	1.2	<1.2	<1.2	-	-	-	-	<1.2	<1.2	-	<0.59	<0.59	-
Trichloroethene	µg/m^3	0.54	<0.54	<0.54	-	-	-	-	<0.54	<0.54	-	<1.1	<1.1	-
Trichlorotrifluoroethane	µg/m^3	1.2	<1.2	<1.2	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	µg/m^3	1.1	1.5	1.5	0	-	-	-	1.3	1.2	-	7.6	7.4	3
Vinyl acetate	µg/m^3	0.7	<0.70	<0.70	-	-	-	-	<0.70	<0.70	-	<1.8	<1.8	-
Vinyl bromide (bromoethene)	µg/m^3	0.87	<0.87	<0.87	-	-	-	-	<0.87	<0.87	-	<0.87	<0.87	-
Vinyl chloride	µg/m^3	0.26	<0.26	<0.26	-	-	-	-	<0.26	<0.26	-	<0.51	<0.51	-

Notes:

-	Not analyzed or RPD not calculated.
<	Concentration is less than the laboratory detection limit indicated.
RDL	Laboratory Reportable Detection Limit.
RPD	RPD is Relative Percentage Difference calculated as RPD(%)=(|V1-V2|)/[(V1+V2)/2])*100 where V1,V2 = concentrations of parent and duplicate sample, respectively.
	RPDs have only been calculated where a concentration is greater than 5 times the RDL.
BOLD	High RPDs are in bold (acceptable RPD is 60% for organic vapours as recommended by BC Ministry of Environment Q&A, and BC Environmental Laboratory Manual).

Table 7: Chemical, Physical, and Toxicological Properties

Parameter		TC	RsC	H'	D_{air}	D_{water}	BAF	MF		
		Tolerable Concentration	Risk-specific Concentration	Unitless Henry's Law Constant	Pure Component Molecular Diffusivity in Air	Pure Component Molecular Diffusivity in Water	Bioattenuation Factor	Mass Fraction in Soil (Coarse and Fine)	Mass Fraction in Soil Vapour - Coarse Soil	Mass Fraction in Soil Vapour - Fine Soil
Units		mg/m^3	mg/m^3	unitless	cm^2/s	cm^2/s	unitless	unitless	unitless	unitless
Benzene		--	0.000625	0.225	0.088	1.00E-05	10	--	--	--
Toluene		2.3	--	0.274	0.087	9.20E-06	10	--	--	--
Ethylbenzene		2	--	0.358	0.075	8.50E-06	10	--	--	--
Xylenes		0.1	--	0.252	0.078	9.90E-06	10	--	--	--
Naphthalene		0.01	--	0.017	0.059	7.50E-06	10	--	--	--
F1	Aliphatic C>6-C8	18.4	--	50	0.05	0.00001	10	0.55	0.854	0.842
	Aliphatic C>8-C10	1	--	80	0.05	0.00001	10	0.36	0.141	0.153
	Aromatic C>8-C10	0.2	--	0.48	0.05	0.00001	10	0.09	0.005	0.005
F2	Aliphatic C>10-C12	1	--	120	0.05	0.00001	10	0.36	0.767	0.766
	Aliphatic C>12-C16	1	--	520	0.05	0.00001	10	0.44	0.205	0.206
	Aromatic C>10-C12	0.2	--	0.14	0.05	0.00001	10	0.09	0.023	0.023
	Aromatic C>12-C16	0.2	--	0.053	0.05	0.00001	10	0.11	0.005	0.005
1,1,1-Trichloroethane		5	--	0.688	0.078	0.000009	10	--	--	--
1,1,2,2-Tetrachloroethane		--	0.000172	0.019	0.071	0.000008	10	--	--	--
1,1,2-Trichloroethane		0.0002	0.000625	0.038	0.078	0.000009	10	--	--	--
1,1-Dichloroethane		--	0.006250	0.240	0.074	0.000011	10	--	--	--
1,1-Dichloroethene		0.2	--	0.942	0.090	0.000010	10	--	--	--
1,2,4-Trichlorobenzene		0.007	--	0.112	0.030	0.000008	10	--	--	--
1,2,4-Trimethylbenzene		0.06	--	0.230	0.061	0.000008	10	--	--	--
1,2-Dibromoethane		0.0093	0.000017	0.027	0.022	0.000012	10	--	--	--
1,2-Dichlorobenzene		0.2	--	0.072	0.069	0.000008	10	--	--	--
1,2-Dichloroethane		0.007	0.000385	0.049	0.104	0.000010	10	--	--	--
1,2-Dichloropropane		0.004	0.002703	0.110	0.078	0.000009	10	--	--	--
1,3,5-Trimethylbenzene		0.06	--	0.359	0.060	0.000008	10	--	--	--
1,3-Butadiene		0.002	0.000333	3.009	0.249	0.000011	10	--	--	--
1,3-Dichlorobenzene		0.095	0.000909	0.128	0.069	0.000008	10	--	--	--
1,4-Dichlorobenzene		0.06	0.000909	0.098	0.069	0.000008	10	--	--	--
1,4-Dioxane		0.03	0.002000	0.000	0.229	0.000010	10	--	--	--
2-Hexanone		0.03	--	0.004	0.070	0.000008	10	--	--	--
Acetone		31	--	0.002	0.124	0.000011	10	--	--	--
Allyl chloride		0.001	--	0.450	0.094	0.000011	10	--	--	--
Benzyl chloride		0.001	--	0.017	0.075	0.000008	10	--	--	--
Bromodichloromethane		--	0.000270	0.098	0.030	0.000011	10	--	--	--
Bromoform		--	0.009091	0.024	0.015	0.000010	10	--	--	--
Bromomethane		0.005	--	0.255	0.073	0.000012	10	--	--	--
Carbon Disulfide		0.7	--	0.705	0.104	0.000010	10	--	--	--
Carbon Tetrachloride		0.1	0.001667	1.183	0.078	0.000009	10	--	--	--
Chlorobenzene		0.01	--	0.148	0.073	0.000009	10	--	--	--
Chloroethane		4	--	0.073	0.271	0.000012	10	--	--	--
Chloroform		0.028	0.000435	0.154	0.104	0.000010	10	--	--	--
Chloromethane		0.09	--	0.388	0.126	0.000007	10	--	--	--
cis-1,2-Dichloroethene		0.007	--	0.302	0.074	0.000011	10	--	--	--
cis-1,3-Dichloropropene		0.02	0.002500	0.053	0.087	0.000010	10	--	--	--
Cyclohexane		6	--	7.618	0.080	0.000009	10	--	--	--
Dibromochloromethane		0.08949	--	0.040	0.020	0.000011	10	--	--	--
Dichlorodifluoromethane		0.1	--	16.475	0.067	0.000010	10	--	--	--
4-Ethyltoluene		0.40	--	0.205	0.065	0.000007	10	--	--	--
Ethyl acetate		0.07	--	0.006	0.067	0.000010	10	--	--	--
Freon 113		5	--	21.500	0.038	0.000009	10	--	--	--
Freon 114		17	--	115.000	0.082	0.000009	10	--	--	--
Heptane		0.4	--	83.709	0.065	0.000007	10	--	--	--
Hexachlorobutadiene		--	0.000455	0.421	0.027	0.000007	10	--	--	--
Isooctane		0.4	--	30.500	0.060	0.000007	10	--	--	--
Isopropyl alcohol		0.2	--	0.000331	0.103	0.000011	10	--	--	--
Isopropylbenzene		0.4	--	0.591	0.065	0.000007	10	--	--	--
Methyl ethyl ketone		5	--	0.001	0.081	0.000010	10	--	--	--
Methyl isobutyl ketone		3	--	0.006	0.075	0.000008	10	--	--	--
Methylene chloride		0.6	1	0.151	0.101	0.000012	10	--	--	--
MTBE		0.037	--	0.028	0.102	0.000011	10	--	--	--
n-Hexane		0.7	--	73.916	0.200	0.000008	10	--	--	--
Propylene		3	--	8.013	0.110	0.000011	10	--	--	--
Styrene		0.092	--	0.130	0.071	0.000008	10	--	--	--
Tetrachloroethylene		0.04	0.038462	1.077	0.072	0.000008	10	--	--	--
Tetrahydrofuran		2	--	0.003	0.099	0.000011	10	--	--	--
trans-1,2-Dichloroethene		0.04	--	0.277	0.071	0.000012	10	--	--	--
trans-1,3-Dichloropropene		0.02	0.002500	0.053	0.087	0.000010	10	--	--	--
Trichloroethylene		0.002	0.002439	0.477	0.079	0.000009	10	--	--	--
Trichlorofluoromethane		1.05	--	5.200	0.087	0.000010	10	--	--	--
Vinyl acetate		0.2	--	0.024	0.085	0.000009	10	--	--	--
Vinyl bromide		0.003	0.000667	0.260	0.100	0.000012	10	--	--	--
Vinyl chloride		0.1	0.001136	3.236	0.106	0.000012	10	--	--	--
Hydrogen Sulfide		0.002	--	0.350	0.188	0.000022	10	--	--	--

Notes:

cm^2/s Square centimetres per second.
F1 Fraction 1 (C6-C10).
F2 Fraction 2 (C>10-C16).
mg/m^3 Milligrams per cubic metre.
PHC Petroleum hydrocarbon.
-- Not applicable.

References: Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Table 8: Soil Properties for Evaluation of Vapour Transport

Parameter		Units	Coarse-Grained Soil	Fine-Grained Soil
θ_a	Vapour-filled porosity	unitless	0.31	0.303
ρ_b	Dry bulk density	g/cm^3	1.7	1.4
n	Total soil porosity	unitless	0.36	0.47
θ_w	Moisture-filled porosity	unitless	0.05	0.167
Q_{soil}	Soil gas flow rate	cm^3/s	167	16.7

Notes: Values from CCME (2014).

cm Centimetre.

cm^2 Square centimetre.

g/cm^3 Grams per cubic centimetre.

PHC Petroleum hydrocarbon.

References: Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Table 9: Building Properties for Evaluation of Vapour Transport

Parameter		Units	Residential Land Use
			Basement
L_B	Building length	cm	1,225
W_B	Building width	cm	1,225
A_B	Building area exposed to soil, including basement wall area	cm^2	2.7E+06
H_B	Building height	cm	360
L_{crack}	Thickness of the foundation	cm	11.25
A_{crack}	Area of cracks through which contaminant vapours enter the building	cm^2	994.5
ACH	Air exchanges per hour	h^{-1}	0.5

Notes: Values taken from CCME (2014).

cm Centimetre.

cm^2 Square centimetre.

h^{-1} Per hour.

References: Canadian Council of Ministers of the Environment (CCME). 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures via Inhalation of Vapours.

Table 10: Generic Soil Vapour Criteria

Parameter	Residential Land Use			
	Basement and Slab-on-Grade			
	Units	Coarse-Grained	Units	Coarse-Grained
Benzene	mg/m^3	0.041	µg/m^3	41
Toluene		75		75,190
Ethylbenzene		69		68,650
Xylenes		4		3,520
PHC F1		867		867,380
PHC F2		53		52,500
Naphthalene		0.38		380
Isopropanol		6.22		6,219
1,1,1-Trichloroethane		1,694		1,693,510
1,1,2,2-Tetrachloroethane		0.01		11
1,1,2-Trichloroethane		0.01		7
1,1-Dichloroethane		0.43		430
1,1-Dichloroethene		6.47		6,470
1,2,4-Trichlorobenzene		0.36		365
1,2,4-Trimethylbenzene		2.23		2,235
1,2-Dibromoethane		0.0022		2.2
1,2-Dichlorobenzene		7.07		7,072
1,2-Dichloroethane		0.02		24
1,2-Dichloroethene (cis)		0.24		242
1,2-Dichloroethene (trans)		1.40		1,400
1,2-Dichloropropane		0.14		135
1,3,5-Trimethylbenzene		2.23		2,235
1,3-Butadiene		0.02		17
1,3-Dichlorobenzene		0.06		64
1,3-Dichloropropene [cis]		0.16		163
1,3-Dichloropropene [trans]		0.15		149
1,4-Dichlorobenzene		0.06		64
1,4-Dioxane		0.11		105
1-Methyl-4 ethyl benzene		14.46		14,461
2-Butanone (MEK)		167		167,364
2-Hexanone (MBK)		1.05		1,053
4-Methyl-2-pentanone (MIBK)		103		102,977
Acetone		919		918,788
Allyl chloride		0.03		32
Benzyl chloride		0.03		34
Bromodichloromethane		0.03		28
Bromoform		1.49		1,494
Bromomethane		0.17		173
Carbon disulfide		21.71		21,713
Carbon tetrachloride		0.11		113
Chlorobenzene		0.35		347
Chloroethane		124		124,080
Chloroform		0.03		27
Chloromethane		2.66		2,657
Cyclohexane		202		201,510
Dibromochloromethane		6.07		6,070
Dichlorodifluoromethane		3.58		3,584
Ethyl acetate		2.51		2,509
Freon 113		231		230,627
Freon 114		566		566,335
Heptane		14.46		14,461
Hexachlorobutadiene		0.05		51
Hexane		18.84		18,839
Isooctane		14.92		14,917
iso-Propylbenzene (cumene)		14.46		14,461
Methyl t-Butyl Ether (MTBE)		1.15		1,153
Methylene Chloride		18.76		18,764
Propylene		92		91,723
Styrene		3.22		3,220
Tetrachloroethene		1.39		1,390
Tetrahydrofuran		62.83		62,828
Trichloroethene		0.07		70
Trichlorofluoromethane		34.32		34,325
Vinyl acetate		6.59		6,586
Vinyl bromide (bromoethene)		0.04		40
Vinyl chloride		0.07		70

Notes:

mg/m^3 milligrams per cubic metre
µg/m^3 micrograms per cubic metre

Table 11: Soil Vapour Risk Evaluation

Parameter	Unit	Soil Vapour Screening Criteria [a]	Soil Vapour Results (µg/m^3)											
			VW04	VW05		XCG-4 (SVP)			XCG-6 (SVP)			XCG-13 (SVP)		
			20-Nov-21	19-Sep-19	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21
Benzene	µg/m^3	41	<0.32	0.43	0.35	<0.32	<0.32	<0.32	0.99	0.61	1.47	0.62	0.48	1.38
Toluene	µg/m^3	75,190	<0.75	2.70	0.82	<0.38	<0.38	<0.75	6.47	<0.38	<0.75	0.92	0.53	<0.75
Ethylbenzene	µg/m^3	68,650	<0.87	0.52	<0.87	<0.43	<0.43	<0.87	0.64	<0.43	9.4	<0.78	<0.43	<0.87
Xylenes Total	µg/m^3	3,520	<2.0	2.9	<2.0	<1.3	<1.3	<2.0	2.9	<1.3	12.6	<2.3	<1.3	<2.0
F1 (C_6-C_{10})	µg/m^3	867,383	6800	176	19	99.2	39.6	1520	58.1	25.8	154	34.8	8.4	49
F2 (C_{10}-C_{16})	µg/m^3	52,495	40	136	30	11.3	<5.0	<15	19.9	<5.0	75	17.6	<5.0	<15
1,1,1-Trichloroethane	µg/m^3	1,693,510	1.7	<0.55	<1.1	<0.55	<0.55	<1.1	<0.55	<0.55	<1.1	<0.98	<0.55	<1.1
1,1-Dichloroethane	µg/m^3	430	<0.81	0.77	<0.81	<0.40	<0.40	<0.81	<0.40	<0.40	<0.81	<0.73	<0.40	<0.81
1,2,4-Trimethylbenzene	µg/m^3	2,235	<0.98	<2.5	<0.98	<2.5	<2.5	<0.98	<2.5	<2.5	3.01	<2.5	<4.4	<0.98
1,2-Dichloroethene (cis)	µg/m^3	242	<0.79	46.7	57.8	<0.40	<0.40	1.32	<0.40	<0.40	<0.79	<0.71	<0.40	3.14
1,2-Dichloroethene (trans)	µg/m^3	1,400	<0.79	4.5	7.81	<0.40	<0.40	<0.79	<0.40	<0.40	<0.79	<0.71	<0.40	<0.79
1,2-Dichlorotetrafluoroethane	µg/m^3	566,335	15.6	188	40.5	77.7	86.3	12.0	3.2	<1.2	7.5	<2.1	<1.2	330
1,3,5-Trimethylbenzene	µg/m^3	2235	<0.698	<2.5	<0.98	<2.5	<2.5	<0.98	<2.5	<2.5	1.94	<4.4	<2.5	<0.98
1,3-Dichlorobenzene	µg/m^3	3359 / 64 [e]	<1.2	<2.4	<1.2	3.2	<2.4	<1.2	4.6	<2.4	<1.2	8.6	<2.4	3.0
2-Butanone (MEK)	µg/m^3	167,364	<0.59	1.62	0.96	0.73	1.24	0.91	1.65	0.72	1.42	<1.1	0.91	<0.59
Acetone	µg/m^3	918,788	1.6	15.7	3.5	3.7	5.8	10	10.7	5.9	5.3	8.6	4.9	2.6
Carbon disulfide	µg/m^3	21,713	-	58.2	3.68	2.6	<1.6	<0.62	1.9	<1.6	<0.62	<2.8	<1.6	<0.62
Chloroform	µg/m^3	869 / 27 [e]	6.52	<0.49	<0.98	0.61	<0.49	<0.98	<0.49	<0.49	<0.98	<0.88	<0.49	<0.98
Chloromethane	µg/m^3	2,657	<0.41	<0.62	0.54	<0.62	<0.62	0.49	1.2	0.94	0.72	<1.1	1.04	1.04
Cyclohexane	µg/m^3	201,510	<0.69	<0.69	<0.69	<0.69	<0.69	<0.69	1.14	<0.69	1.2	<1.2	<0.69	9.18
Dichlorodifluoromethane	µg/m^3	3,584	76.1	309	110	11.1	45.7	50.7	4.61	2.36	16.4	3.3	2.76	1890
Heptane	µg/m^3	14,461	<0.82	<1.2	<0.82	<1.2	<1.2	<0.82	1.3	<1.2	3.14	<2.2	<1.2	<0.82
Hexane	µg/m^3	18,839	<0.70	<0.70	1.00	<0.70	<0.70	0.75	1.8	<0.70	2.08	1.5	<0.70	<0.70
Propene	µg/m^3	91,723	<0.34	<0.86	<1.7	<0.86	<0.86	<2.1	<6.0	<1.7	2.63	<6.0	<1.4	0.62
Tetrachloroethene	µg/m^3	1392 / 2679 [e]	8950	0.82	2.2	33.4	6.18	40.5	<0.68	<0.68	50.4	<1.2	<0.68	8.3
Trichloroethene	µg/m^3	67.5 / 153 [e]	85.6	3.36	<1.1	<0.54	0.89	<1.1	0.86	<0.54	<1.1	<0.97	1.56	6.7
Trichlorofluoromethane	µg/m^3	34,325	19.6	7.3	7.6	1.5	1.1	1.3	1.1	1.3	1.2	<2	1.2	<1.1
Vinyl chloride	µg/m^3	3,086 / 70[e]	<0.51	3.72	<0.51	<0.26	<0.26	2.07	<0.26	<0.26	<0.51	<0.46	<0.26	<0.51

Notes:

< – not detected. Listed value is the corresponding detection limit.

- = Screening criteria not calculated as appropriate toxicity data not available.

Bold = Identifies estimated risks and hazards that exceed the target risk level of 1 x 10^{-5} or target hazard level of 1.

[a] Listed soil vapour screening criteria derived in accordance with CCME, 2014.

[b] Estimated cancer risk = (soil vapour concentration/cancer soil vapour screening level) x 10^{-5}.

[c] Estimated hazard quotient = (soil vapour concentration/non-cancer soil vapour screening level).

[d] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

[e] Soil vapour screening criteria shows both the threshold criteria and non-threshold criteria. Target risk and hazard levels are calculated with the appropriate criteria.

* = Detection limit raised above the criteria.

Table 11: Soil Vapour Risk Evaluation

Parameter	Unit	Soil Vapour Screening Criteria [a]	Comparisons of Soil Vapour Measurements to Soil Vapour Criteria																							
			Estimated Cancer Risk [b]												Estimated Hazard Quotients [c]											
			VW04	VW05		XCG-4 (SVP)			XCG-6 (SVP)			XCG-13 (SVP)			VW04	VW05		XCG-4 (SVP)			XCG-6 (SVP)			XCG-13 (SVP)		
			20-Nov-21	19-Sep-19	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	20-Nov-21	19-Sep-19	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21	19-Sep-19	1-Apr-20	20-Nov-21
Benzene	µg/m^3	41	ND	1.0E-07	8.5E-08	ND	ND	ND	2.4E-07	1.5E-07	3.6E-07	1.5E-07	1.2E-07	3.4E-07	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	µg/m^3	75,190	-	-	-	-	-	-	-	-	-	-	-	-	ND	3.59E-05	1.09E-05	ND	ND	ND	8.60E-05	ND	ND	1.22E-05	7.05E-06	ND
Ethylbenzene	µg/m^3	68,650	-	-	-	-	-	-	-	-	-	-	-	-	ND	7.57E-06	ND	ND	ND	ND	9.32E-06	ND	1.37E-04	ND	ND	ND
Xylenes Total	µg/m^3	3,520	-	-	-	-	-	-	-	-	-	-	-	-	ND	8.24E-04	ND	ND	ND	ND	8.24E-04	ND	3.58E-03	ND	ND	ND
F1 (C_6-C_{10})	µg/m^3	867,383	-	-	-	-	-	-	-	-	-	-	-	-	7.84E-03	2.03E-04	2.19E-05	1.14E-04	4.57E-05	1.75E-03	6.70E-05	2.97E-05	1.78E-04	4.01E-05	9.68E-06	5.65E-05
F2 (C_{10}-C_{16})	µg/m^3	52,495	-	-	-	-	-	-	-	-	-	-	-	-	7.62E-04	2.59E-03	5.71E-04	2.15E-04	ND	ND	3.79E-04	ND	1.43E-03	3.35E-04	ND	ND
1,1,1-Trichloroethane	µg/m^3	1,693,510	-	-	-	-	-	-	-	-	-	-	-	-	1.00E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	µg/m^3	430	ND	1.8E-08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	µg/m^3	2,235	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	1.35E-03	ND	ND	ND
1,2-Dichloroethene (cis)	µg/m^3	242	-	-	-	-	-	-	-	-	-	-	-	-	ND	1.93E-01	2.39E-01	ND	ND	5.46E-03	ND	ND	ND	ND	ND	1.30E-02
1,2-Dichloroethene (trans)	µg/m^3	1,400	-	-	-	-	-	-	-	-	-	-	-	-	ND	3.21E-03	5.58E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorotetrafluoroethane	µg/m^3	566,335	-	-	-	-	-	-	-	-	-	-	-	-	2.75E-05	3.32E-04	7.15E-05	1.37E-04	1.52E-04	2.12E-05	5.65E-06	ND	1.32E-05	ND	ND	5.83E-04
1,3,5-Trimethylbenzene	µg/m^3	2235	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	8.68E-04	ND	ND	ND
1,3-Dichlorobenzene	µg/m^3	3359 / 64 [e]	ND	ND	ND	5.0E-07	ND	ND	7.2E-07	ND	ND	1.3E-06	ND	4.7E-07	ND	ND	ND	9.53E-04	ND	ND	1.37E-03	ND	ND	2.56E-03	ND	8.93E-04
2-Butanone (MEK)	µg/m^3	167,364	-	-	-	-	-	-	-	-	-	-	-	-	ND	9.68E-06	5.74E-06	4.36E-06	7.41E-06	5.44E-06	9.86E-06	4.30E-06	8.48E-06	ND	5.44E-06	ND
Acetone	µg/m^3	918,788	-	-	-	-	-	-	-	-	-	-	-	-	1.74E-06	1.71E-05	3.81E-06	4.03E-06	6.31E-06	1.09E-05	1.16E-05	6.42E-06	5.77E-06	9.36E-06	5.33E-06	2.83E-06
Carbon disulfide	µg/m^3	21,713	-	-	-	-	-	-	-	-	-	-	-	-	ND	2.68E-03	1.69E-04	1.20E-04	ND	ND	8.75E-05	ND	ND	ND	ND	ND
Chloroform	µg/m^3	869 / 27 [e]	2.4E-06	ND	ND	2.3E-07	ND	ND	ND	ND	ND	ND	ND	ND	7.50E-03	ND	ND	7.02E-04	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	µg/m^3	2,657	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	2.03E-04	ND	ND	1.84E-04	4.52E-04	3.54E-04	2.71E-04	ND	3.91E-04	3.91E-04
Cyclohexane	µg/m^3	201,510	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	5.66E-06	ND	5.96E-06	ND	ND	4.56E-05
Dichlorodifluoromethane	µg/m^3	3,584	-	-	-	-	-	-	-	-	-	-	-	-	2.12E-02	8.62E-02	3.07E-02	3.10E-03	1.28E-02	1.41E-02	1.29E-03	6.58E-04	4.58E-03	9.21E-04	7.70E-04	5.27E-01
Heptane	µg/m^3	14,461	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	8.99E-05	ND	2.17E-04	ND	ND	ND
Hexane	µg/m^3	18,839	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	5.31E-05	ND	ND	3.98E-05	9.55E-05	ND	1.10E-04	7.96E-05	ND	ND
Propene	µg/m^3	91,723	-	-	-	-	-	-	-	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	2.87E-05	ND	ND	6.76E-06
Tetrachloroethene	µg/m^3	1392 / 2679 [e]	**3.3E-05**	3.1E-09	8.2E-09	1.2E-07	2.3E-08	1.5E-07	ND	ND	1.9E-07	ND	ND	3.1E-08	**6.43E+00**	5.89E-04	1.58E-03	2.40E-02	4.44E-03	2.91E-02	ND	ND	3.62E-02	ND	ND	5.96E-03
Trichloroethene	µg/m^3	67.5 / 153 [e]	5.6E-06	2.2E-07	ND	ND	5.8E-08	ND	5.6E-08	ND	ND	ND	1.0E-07	4.4E-07	**1.27E+00**	4.98E-02	ND	ND	1.32E-02	ND	1.27E-02	ND	ND	ND	2.31E-02	9.93E-02
Trichlorofluoromethane	µg/m^3	34,325	-	-	-	-	-	-	-	-	-	-	-	-	5.71E-04	2.13E-04	2.21E-04	4.37E-05	3.20E-05	3.79E-05	3.20E-05	3.79E-05	3.50E-05	ND	3.50E-05	ND
Vinyl chloride	µg/m^3	3,086 / 70[e]	ND	5.3E-07	ND	ND	ND	3.0E-07	ND	ND	ND	ND	ND	ND	ND	1.21E-03	ND	ND	ND	6.71E-04	ND	ND	ND	ND	ND	ND
Cumulative Risk and Hazard Index [d]			**4.1E-05**	8.8E-07	9.4E-08	8.5E-07	8.1E-08	4.5E-07	1.0E-06	1.5E-07	5.5E-07	1.5E-06	2.2E-07	1.3E-06	**7.736**	0.341	0.278	0.029	0.031	0.051	0.018	0.001	0.049	0.004	0.024	0.648
Target Risk and Hazard Levels			**1.0×10^{-5}**												**1.00**											

Notes:

< – not detected. Listed value is the corresponding detection limit.

- = Screening criteria not calculated as appropriate toxicity data not available.

Bold = Identifies estimated risks and hazards that exceed the target risk level of 1×10^{-5} or target hazard level of 1.

[a] Listed soil vapour screening criteria derived in accordance with CCME, 2014.

[b] Estimated cancer risk = (soil vapour concentration/cancer soil vapour screening level) x 10^{-5}.

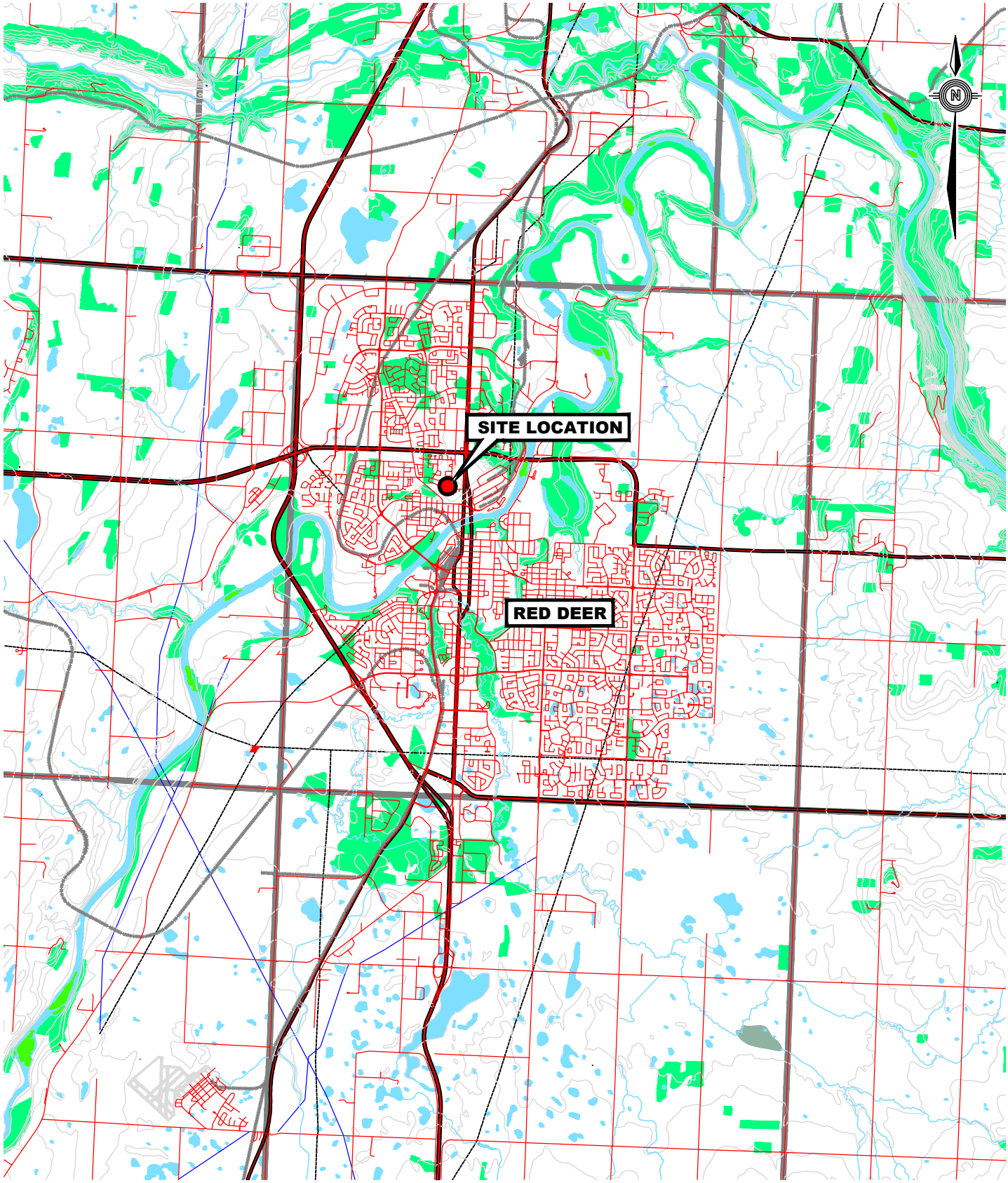
[c] Estimated hazard quotient = (soil vapour concentration/non-cancer soil vapour screening level).

[d] Cumulative risk and hazard index represent the sum of chemical-specific cancer risks and hazard quotients.

[e] Soil vapour screening criteria shows both the threshold criteria and non-threshold criteria. Target risk and hazard levels are calculated with the appropriate criteria.

* = Detection limit raised above the criteria.

FIGURES



0 50 000 m

Scale: 1: 100 000

CLIENT

THE CITY OF Red Deer

TETRA TECH

2021 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT FORMER MONTFORT LANDFILL SITE

Site Location Plan

PROJECT NO.	DWN	CKD	REV
SWOP04071-02.009	DBD/MRV	NH	0
OFFICE	DATE		
Tt-EDM	May 2022		

Figure 1

Q:\Edmonton\Drafting\PROJECTS\704-SWM.SWOP\SWM.SWOP04071-02\Task009\Acad\SWOP04071-02_Figure1_SiteLocation.dwg [FIGURE 1] May 09, 2022 - 1:43:05 pm (BY: VERBURG, MEGAN)

LEGEND:

- BOREHOLE LOCATION (2019)
- GROUNDWATER MONITORING WELL LOCATION (TIAMAT, 2014)
- GROUNDWATER MONITORING WELL LOCATION (DECOMMISSIONED MAY 2021)
- TEST HOLE LOCATION
- SOIL VAPOUR MONITORING WELL LOCATION
- MONITORING WELL LOCATION (XCG, JANUARY 2017)
- SOIL VAPOUR MONITORING LOCATION (XCG, JANUARY 2017)
- BOREHOLE LOCATION (XCG, JANUARY 2017)
- APPROXIMATE LIMIT OF WASTE

0 50 m

Scale: 1: 1000

CLIENT

THE CITY OF Red Deer

TETRA TECH

2021 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT FORMER MONTFORT LANDFILL SITE

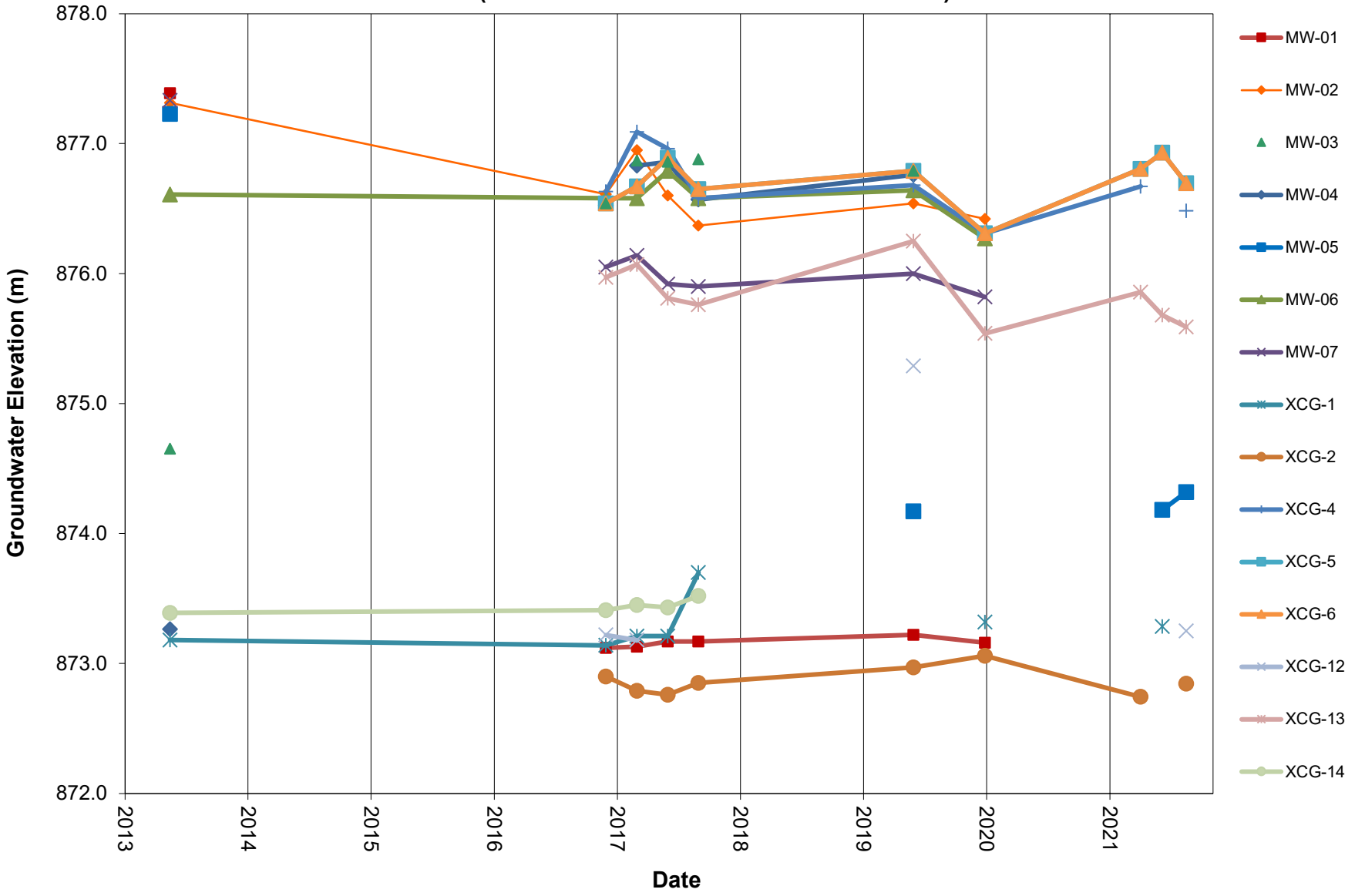
Site Plan

PROJECT NO.	DWN	CKD	REV
SWOP04071-02.009	DBD/MRV	NH	0
OFFICE	DATE		
Tt-EDM	June 2022		

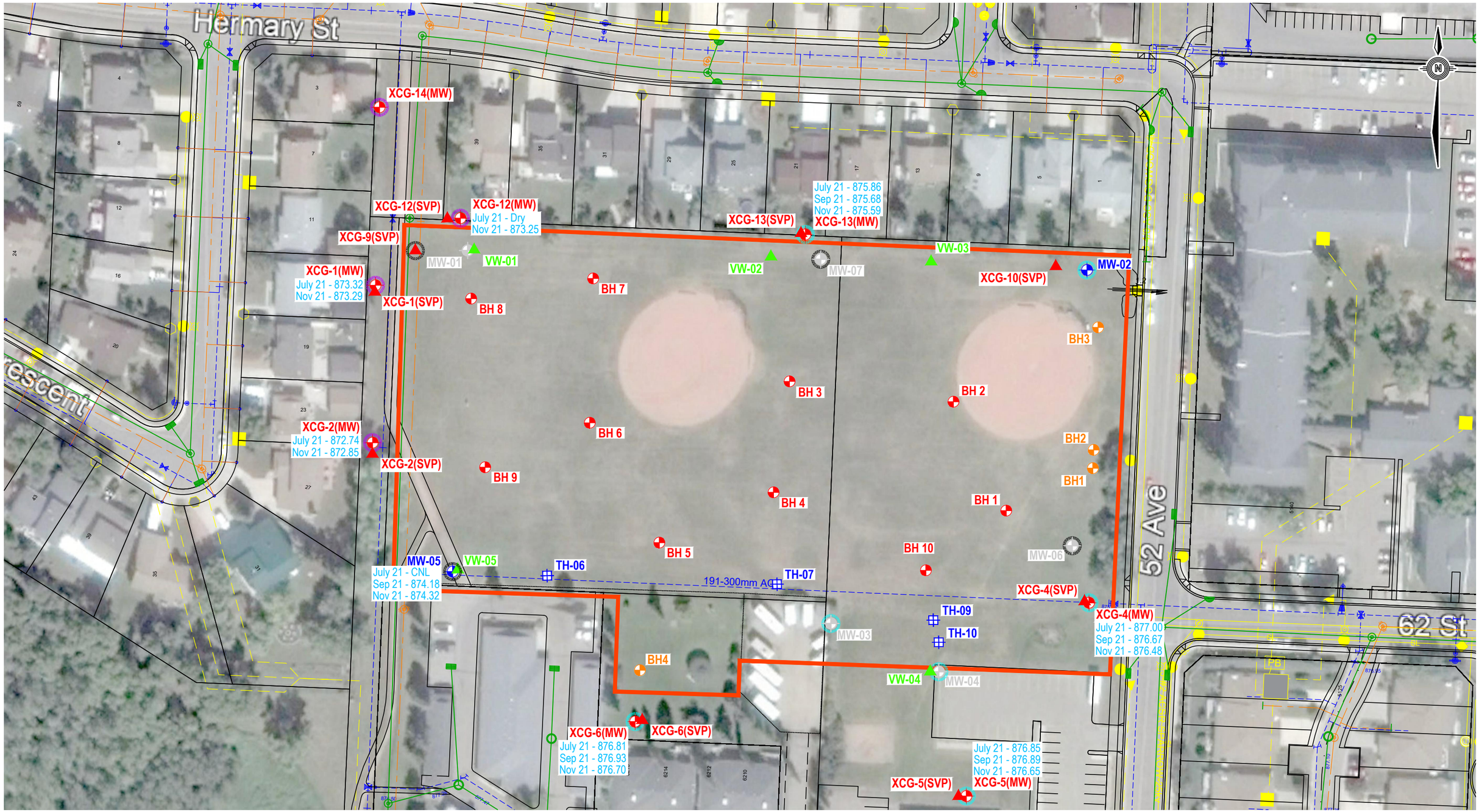
Figure 2

Q:\Edmonton\Drafting\PROJECTS\704-SWM.SWOP\SWM.SWOP04071-02\Task009\Acad\SWOP04071-02_Figure2_SitePlan.dwg [FIGURE 2] June 08, 2022 - 11:43:18 am (BY: VERBURG, MEGAN)

FIGURE 3
HISTORICAL GROUNDWATER ELEVATIONS
(GROUNDWATER MONITORING WELLS)



TETRA TECH



LEGEND:

- BOREHOLE LOCATION (2019)
- GROUNDWATER MONITORING WELL LOCATION (TIAMAT, 2014)
- GROUNDWATER MONITORING WELL LOCATION (DECOMMISSIONED MAY 2021)
- TEST HOLE LOCATION
- SOIL VAPOUR MONITORING WELL LOCATION
- MONITORING WELL LOCATION (XCG, JANUARY 2017)
- SOIL VAPOUR MONITORING LOCATION (XCG, JANUARY 2017)
- BOREHOLE LOCATION (XCG, JANUARY 2017)
- APPROXIMATE LIMIT OF WASTE
- CNL: COULD NOT LOCATE

0 50 m

Scale: 1: 1000

GROUNDWATER LEGEND

(###.##) - GROUNDWATER ELEVATION (m)
- NO UNIT IDENTIFIED
- PERCHED GROUNDWATER UNIT
- SHALLOW GROUNDWATER UNIT

UTILITY LEGEND

- ELECTRICAL
- SANITARY
- STORM
- WATER

CLIENT

THE CITY OF Red Deer

TETRA TECH

2021 GROUNDWATER AND SOIL VAPOUR MONITORING REPORT FORMER MONTFORT LANDFILL SITE

Groundwater Elevations 2021

PROJECT NO.	DWN	CKD	REV
SWOP04071-02.009	DBD/MRV	NH	0
OFFICE	DATE		
Tt-EDM	June 2022		

Figure 4

Q:\Edmonton\Drafting\PROJECTS\704-SWM.SWOP\SWM.SWOP04071-02\Tasks\09\Acad\SWOP04071-02_Figure4_GWelevations.dwg [FIGURE 4] June 08, 2022 - 11:51:16 am (BY: VERBURG, MEGAN)

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOENVIRONMENTAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

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The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by TETRA TECH in its reasonably exercised discretion.

APPENDIX B

SITE SETTING, HISTORICAL INFORMATION

1.0 SITE HISTORY

The following section summarizes the history of the Former Montfort Landfill (Montfort) site and was developed for the 2019 groundwater and soil vapour monitoring report[1].

Municipal records indicate that the waste disposal at the site occurred between approximately 1968 and 1969 (approximately two years). This would indicate that the estimated age of the waste material would be approximately 51 to 52 years old. After the landfill was closed, it was transformed into a park space in the 1970s. Residential development in the area began between 1950 and 1962.

Historical municipal solid waste (MSW) disposal was identified during the Phase I environmental site assessment[2] (ESA) to be located within two subdivided land parcels at the site. The first is south of the residences on Hermary Street and the second is along the west side of 52 Avenue. The estimated waste area is identified on Figure 2. The MSW ranged in thickness from 3 m at the south side of the site to 4.3 m on the north side. The waste was bedded on a native clay or sand layer. During the investigation, bedrock was not encountered. The estimated footprint of the waste is 21,300 m^2 [3].

Results of the 2014 Phase II ESA[4] indicated that the north limit of the waste is near the property boundaries of the residential homes along Hermary Street, the east limit is the sidewalk along 52 Avenue, and the west limit is the pedestrian pathway in the park. The south limit on the west side of site is the property line and the south limit on the east side is within the parking lot at Montfort Centre.

2.0 HISTORICAL MONITORING AND INVESTIGATION SUMMARY

Several historical investigations have been undertaken at the site, including by Tiamat Environmental Consultants Ltd. (Tiamat) in 2013 and 2014, and XCG Consulting Limited (XCG) in 2017 and 2018. Previous reports prepared by Tiamat for the site include the following:

- Phase I Environmental Site Assessment, Historic Waste Disposal Site, Montfort Site, The City of Red Deer. September 24, 2013[2].
- Phase II Environmental Site Assessment, Historic Waste Disposal Site, Montfort Landfill, The City of Red Deer. February 26, 2014[4].
- Environmental Risk Management Plan, Historic Waste Disposal Site, Montfort Landfill Site, The City of Red Deer. November 21, 2014[3].

The Phase II ESA consisted of advancing 13 testholes. The testholes ranged in depths from 3.0 m to 9.1 m. Seven monitoring wells (MW-01 to MW-07) and five vapour wells (VW-01 to VW-05) were installed in the testholes. Waste was observed in nine of the testholes during the drilling program. In August 2013, groundwater monitoring and sampling was completed at all monitoring wells. The results of the Phase II ESA[4] indicated the following:

[1] Tetra Tech Canada Inc. 2020. 2019 and 2020 Groundwater and Soil Vapour Monitoring Report – Former Montfort Landfill Site. Prepared for The City of Red Deer. December 2020. Project Number: 704-SWM.SWOP04071-01.004.
[2] Tiamat Environmental Consultants Ltd. 2013. Phase I Environmental Site Assessment, Historic Waste Disposal Site, Montfort Landfill, The City of Red Deer. September 24, 2013.
[3] Tiamat Environmental Consultants Ltd. 2014. Environmental Risk Management Plan, Historic Waste Disposal Sites, Montfort Landfill, The City of Red Deer. November 21, 2014.
[4] Tiamat Environmental Consultants Ltd. 2014. Phase II Environmental Site Assessment, Historic Waste Disposal Site, Montfort Landfill, The City of Red Deer. February 26, 2014.

- Groundwater sampling confirmed that there were impacts to the quality by leachate. Contamination from petroleum hydrocarbons (PHCs), volatile organic compounds (VOCs), and chlorinated hydrocarbons exceeded the 2010 Alberta Tier 1 Guidelines.
- Soil vapour samples taken from four vapour wells indicated that VOCs, non-petroleum organics, aliphatic and aromatic hydrocarbons, and siloxanes had mild to moderate concentrations. Tiamat indicated that these concentrations could lead to adverse exposure levels to nearby homes.

The recommendations of the program were as follows, as identified in the Phase II ESA[4]:

- Continue to monitor groundwater elevations and soil vapour data quarterly for one hydrogeological cycle.
- Collect an additional set of soil vapour and groundwater analytical data, groundwater elevations, and volatile headspace measurement during the winter months to determine seasonal changes in soil vapour concentrations.
- Collect indoor air samples from the basement of two to three homes adjacent to the site. Samples should be analyzed for carcinogenic VOCs and benzene. Based on the results of these samples, additional sampling may need to occur.
- Develop a risk management plan (RMP) addressing environmental concerns in conjunction with future land use. The RMP should focus on lands down-gradient of the historical waste disposal area.
- Review all new data and update the site RMP with all new information and findings.

The RMP was subsequently prepared[3] and provided the following recommendations:

- The RMP identified the primary concerns for the site as leachate and landfill gas (LFG), including PHCs and VOCs in the groundwater and vapours.
- Passive and active risk management strategies should be implemented for properties within 100 m of the landfill, and passive risk management strategies should be implemented for properties greater than 100 m from the site.
- Information presented in the preliminary quantitative risk assessment (PQRA) should be updated with new site-specific information. Once the PQRA is updated, the environmental RMP should be reviewed.
- Reviews and amendments to the environmental RMP should be completed at five years (or less) intervals. The review should confirm that the levels of acceptable risk to human exposure or LFGs are still within the reasonable limit.

The City subsequently retained XCG to assess the environmental recommendations from Tiamat's previous reports and address the current site conditions, delineate impacts, and analyze the risk to indoor air receptors. During the investigation, XCG advanced eight monitoring wells and nine vapour probes in December 2016. Quarterly groundwater and vapour monitoring were completed, as well as soil vapour sampling and indoor air monitoring at select locations. Site specific vapour screening criteria were developed after the monitoring and sampling programs and data review and delineation.

The conclusions of the vapour intrusion assessment and environmental monitoring report[5] were as follows:

[5] XCG Consultants Ltd. 2018. Vapour Intrusion Assessment and Environmental Monitoring Report, Montfort Landfill, Red Deer, Alberta. April 23, 2018.

- The groundwater monitoring results indicated a perched water table above the clay layer and a shallow groundwater unit present in the deeper clay.
- The groundwater flow direction was north to south in the shallow groundwater within the clay layer, and the wells above the clay showed radial flow outwards from the previous landfill area.
- Methane was detected at concentrations up to 39% Gas (v/v) at seven of fourteen vapour probes in 2017. Methane was detected within the waste limit as well as outside of the waste area on the north side (Hermary Street) and south side (Montfort Heights) of the site.
- XCG-14 (MW) is located northwest of the site. It is expected to represent background conditions and is located hydraulically up-gradient of the former waste area. In 2017, concentrations of most parameters at this well were less than the 2016 Alberta Tier 1 Guidelines except for total dissolved solids (TDS) and manganese.
- Monitoring wells located within the MSW footprint were found to have impacts with parameters related to leachate.
- XCG-5 (MW) is located south of the landfill's east side and did not exhibit leachate characteristics and had no concentrations of parameters greater than the 2016 Alberta Tier 1 Guidelines. XCG-6 (MW) located on the south side of the landfill's west side had leachate indicator impacts (TDS, manganese, nitrate) greater than the 2016 Tier 1 Guidelines. XCG-13 (MW) located north of the MSW area also had leachate indicator parameter exceedances of TDS, chloride, and manganese. XCG-12 (MW), also along the north of the MSW area was also interpreted to be likely impacted based on elevated dissolved metals concentrations greater than the 2016 Tier 1 Guidelines. XCG-1 (MW) and XCG-2 (MW) had no indications of leachate impacts.
- Soil vapour results indicated methane, vinyl chloride, and cis-1,2-dichloroethylene concentrations greater than the screening criteria were present at four locations. Two were located within the limit of waste material (southeast and southwest) and two were outside of the waste (north and south).
- Indoor air quality testing completed at ten residences immediately adjacent to the site indicated no detectable concentrations of the above reported parameters indicating the impacted soil vapour was likely not migrating into the residences in close proximity to the site.
- Risk characterization was completed for commercial, industrial, and residential receptors based on groundwater and soil vapour exposures, which confirmed risks above acceptable levels for each of the receptors. However, based on the worst-case scenario (frozen conditions) directly measured indoor air results, the risk levels were acceptable. Risk characterization based on the worst-case vapour concentrations were identified as a potential risk to utility workers exposed to soil vapours during utility excavations.
- Methane was detected at XCG-13 (SVP), XCG-6 (SVP), and XCG-4 (SVP) at concentrations up to 1% Gas (v/v); therefore, additional monitoring was recommended for soil vapour probes XCG-1, XCG-2, XCG-4, XCG-5, XCG-6, XCG-9, XCG-10, XCG-12. and XCG-13 to be monitored semi-annually in September and March. If methane was detected above 2.5% Gas (v/v), it was recommended an indoor air sample be collected at the nearest residence. The semi-annual program was recommended to continue for three years.
- Select historically installed monitoring wells were recommended to be decommissioned since they are screened across the waste layer. The wells hydraulically connect the leachate impacted groundwater to the deeper groundwater unit on site.

A meeting was held between Alberta Environment and Parks (AEP), Alberta Health Services (AHS), and The City in June 2019 to discuss the results and recommendations from the XCG report. An updated recommendation was agreed upon and included groundwater monitoring and handheld vapour monitoring at all soil vapour probes along with soil vapour and groundwater sampling at targeted locations (XCG-4, XCG-6, XCG-13, and VW-05/MW-05) during the September monitoring event.

Recently, in August 2019, The City conducted a drilling assessment consisting of 10 shallow boreholes to assess the thickness and nature of soils covering the waste, in response to inquiries from AEP. The investigation confirmed that the waste across the site is on average at a depth greater than 0.6 m below grade (mbg) and that the waste footprint has been covered with sandy silt fill material overlain by topsoil and grass.

In January 2020, a follow-up meeting was held between AEP, AHS, Tetra Tech Canada Inc. (Tetra Tech), and The City to discuss the results from the September 2019 monitoring and decide upon next steps. It was recommended during the meeting that additional groundwater and soil vapour monitoring wells be installed in the vicinity of XCG-13 to better evaluate the potential risk from low level concentrations of VOC parameters at this location. However, after reaching out to owners of the properties directly north of the site in February 2020 and March 2020, The City was not granted permission to access private properties to install the additional monitoring locations. Therefore, a round of monitoring at the existing selected locations was completed on April 1, 2020 to satisfy the recommendation for monitoring and sampling under frozen ground conditions.

3.0 SITE SETTING

The following section presents an overview of the regional and local setting for the site.

3.1 Geology

The following sections summarize the regional and local geology.

3.1.1 Geological Setting and Stratigraphy

The site is located above the Red Deer River Valley. The Red Deer River is located approximately 700 m south of the site. The topography on site has a slight slope to the south and eventually a large decrease in elevation to the river valley. The Red Deer River is approximately 30 m below the elevation of the site.

Key elements of the geological setting are presented below from Tiamat's 2013 Phase I ESA[2]:

"The structural integrity of the site (Paskapoo Formation) is closely related to the Rocky Mountains, which generated regional stresses and subsequent fracturing of the Paskapoo Formation. The fracture patterns are predominantly oriented perpendicular to the trend of the Rocky Mountains and are expressed as southwest to northeast trending vertical fractures. The fracture patterns may also be accompanied by sub-horizontal fractures. Overlying the bedrock in the Red Deer River Valley is pre-glacial gravel and sand. The gravel sediments range in thickness from 6 to 12 m and are a groundwater source."

3.1.2 Local Geology

The municipal solid waste is approximately 3 m thick at the south portion of the site and 4.3 m thick on the north side. Waste material is bedded on native clay or sand. The area of historical waste is estimated to be 21,300 m^2.

Key elements of the geological setting are presented below from XCG's 2018 Vapour Intrusion and Environmental Monitoring Report[5]:

"The geology underlying the site is characterized by Tertiary bedrock units overlain by Quaternary surficial deposits of clay, silt, sand and gravel. The bedrock is from the Mid-Late Paleocene-aged Paskapoo Formation and is at approximately 20 meters below ground in areas around the site. The Paskapoo Formation is comprised of layers of mudstone, siltstone and sandstone."

During the 2016 drilling on site, XCG encountered regular topsoil, overlying clay, clayey silt, and or sand. Some fill material was also encountered consisting of dry topsoil with clay components. Topsoil was primarily dark brown with silt and sand, with some oxidation present. The clay layers had high plasticity, were dark brown to black in color and had reduced (blue pockets). The silty sand layer had pockets of red and blue striations amongst the overall medium to dark brown coloring. Sand intervals had fine silt contents[5].

3.2 Hydrogeology

The following sections summarize the regional and local hydrogeology.

3.2.1 Regional Hydrogeology

The regional hydrogeology is most influenced by the presence of the river sediments situated within the valley along the Red Deer River and a bedrock valley trending north-northeast in the vicinity of the site.

Key elements of the hydrogeological setting are presented below from Tiamat's 2013 Phase I ESA report[2]:

"A significant buried valley and aquifer resource trending northeastward through the city has been partially mapped and lies in the SE 28-38-27 W4M (east of Montfort). This buried valley extends to a depth of 21 m, more or less and may extend to the south into north portions of 21-28-27 W4M." Mapping by the Alberta Geological Survey[6] shows the valley approximately 1,500 m southeast of the site, trending in a north-northeast direction; however, the width of the valley is not defined.

"The dominant type of near-surface groundwater in the Paskapoo Formation in the area of assessment is sodium bicarbonate. Notable concentrations of sodium sulphate type groundwater have also been reported. The quality of groundwater for potable use is generally suitable to depths of 300 m on the west side of Red Deer and decreases to 90 m, more or less in the east.

Areas of recharge (downward flow) in unsaturated heterogeneous sediments include most areas above the river and creek valleys, whereas; the river valleys will generally exhibit discharge. The distribution of groundwater in the area can also be influenced by the local geology, topographic relief, areas of artesian flow, springs and reasonable yielding water source wells.

Numerous permanent surface water features within The City of Red Deer and vicinity include Red Deer River, Waskasoo Creek, Gaetz Lakes, Hazlett Lake, Bower Ponds (result of formerly mining gravel resources), various sloughs in the fringe areas of the city and an assortment of other smaller creeks and springs."

The regional groundwater flow is expected to follow the bedrock topography and will be influenced by the varying distribution of sediments in the river valley, which will have been deposited in various historical channels since filled in under varying depositional environments.

3.2.2 Local Hydrogeology

The Red Deer River is located 700 m south of the site. Shallow groundwater is assumed to flow towards the river in a southeasterly direction. Seasonal variations influence the groundwater flow levels. At the site there are two aquifers that were encountered during the Phase II ESA drilling. According to Tiamat, an upper aquifer of the

[6] Andriashek, L. comp. 2018. Thalwegs of Bedrock Valleys, Alberta (GIS data, line features); Alberta Energy Regulator, AER/AGS Digital Data 2018-0001.

Paskapoo Formation and glacial drift deposits exists as well as a lower aquifer belonging to the lower Paskapoo Formation sandstone. The lower layer is confined by thick layers of shale and clays and silts[2].

XCG identified in 2017 that the site contained two groundwater tables; a shallow groundwater table (which includes monitoring wells XCG-1, XCG-2, XCG-12, and XCG-14) and a perched groundwater table near the waste area (which includes XCG-4, XCG-5, XCG-6, XCG-13, MW-02, MW-03, and MW-04). Monitoring wells MW-01, MW-05, MW-06, and MW-07 were not identified as belonging to either unit. The shallow groundwater wells are located in the northwest portion of the site and are installed in clay and clayey silt material. The perched water table wells are located on the east, northeast, and south portions of the site, and are installed in sand, clayey silt, and clay material, depending on the location. Some MSW was identified on the borehole log for MW-03.

3.3 Groundwater Resource Usage

A search of the Alberta Water Well Database for groundwater users within a 1 km radius of the site, identified eight groundwater wells; seven of the wells are listed as for domestic use and one is listed for investigation use[7].

The nearest water well is located 275 m northwest (up-gradient) of the site and is drilled to 58 mbg. The well was drilled in 1969. The proposed well use is listed as domestic; however, the current status and use of this well is not known. The water wells within a 1 km radius of site range from 24 mbg to 58 mbg. The status and use of the surrounding groundwater wells were not confirmed and they were not field verified.

4.0 HAZARD QUOTIENTS

4.1 2019 Hazard Quotient Calculations

Using the soil vapour screening levels described above and the soil vapour sampling results, estimated cancer risks (for carcinogens) and estimated hazard quotients (for non-carcinogens) were calculated for the site.

Estimated risks were calculated by dividing the soil vapour concentration by the corresponding soil vapour screening level for carcinogenic effects and multiplying the ratio by the target risk level of 1×10^{-5}. Similarly, the estimated hazard quotients represent the soil vapour concentration divided by the corresponding soil vapour screening level for non-carcinogenic effects.

Risk estimates for non-carcinogenic chemicals of potential concern (COPCs) are defined as hazard quotients. Hazard quotients are calculated based on a ratio of the estimated exposure and the toxicity reference values (TRVs) identified as the tolerable daily intake (TDI) or Tolerable Concentration (TC) according to the following equation:

$$\text{Hazard Quotient} = \frac{\text{Estimated Daily Dose (mg/kg-day or mg/m}^3\text{)}}{\text{Tolerable Daily Intake (mg/kg-day) or Tolerable Concentration (mg/m}^3\text{)}}$$

Non-carcinogenic risk characterization in the assessment was completed for all COPCs.

When the hazard quotient is greater than the target risk value, the scenario poses a potential concern and requires further evaluation or risk management. It is important to note that hazard quotients greater than the target risk value do not necessarily indicate that adverse health effects will occur. This is because of the conservative assumptions used in estimating concentrations and in setting the target values. Hazard quotients that are less than the target

[7] Alberta Environment and Parks. 2019. Water Well Database. http://www.telusgeomatics.com/tgpub/ag_water/.

risk value indicate that exposure is within acceptable levels and no further risk management is necessary in relation to those results. Hazard quotients greater than the target risk value suggest that further investigation or risk management (e.g., remediation) may be warranted in relation to those results.

For non-carcinogens, the individual target risk value used is 0.2 and the cumulative target risk value used is 1.0. This cumulative target risk value accounts for additional exposure to the chemicals of concern from sources other than the site. Therefore, the cumulative target risk value of 1.0 represents an allocation of 20% (the 0.2 target risk value from the individual compound) of a person's daily exposure from site sources and the remaining 80% would come from other sources. Other sources of exposure include ambient air, household products, and soil and water contact from locations other than the site.

For carcinogens, the risk of cancer is assumed to be proportional to dose with the assumption that any exposure results in a nonzero probability of risk. Carcinogenic risk probabilities were calculated by multiplying the estimated exposure level by the route-specific cancer slope factor (SF) or unit risk factor (URF) for each carcinogen:

$$R = E \times SF \text{ (or URF)}$$

Where:

R = Estimated individual excess lifetime cancer risk

E = Exposure level for each chemical of potential concern (mg/kg/day or mg/m^3)

SF = Route- and chemical-specific SF $((mg/kg/day)^{-1}$ or URF $((mg/m^3)^{-1})$

Risk probabilities determined for each carcinogen were also considered to be additive over all exposure pathways so that an overall risk of cancer was estimated for each group of potentially exposed receptors.

When assessing risks posed by exposure to carcinogenic substances, Health Canada and other regulatory agencies assume that any level of exposure is associated with some hypothetical cancer risk. As a result, it is necessary for regulatory agencies to specify an acceptable risk level. Per Health Canada guidance[8][9], cancer risks are deemed essentially negligible where the estimated cumulative incremental lifetime cancer risk is less than or equal to 1 in 100,000 (1×10^{-5}).

4.2 Review of the 2014 Hazard Quotients from the Risk Management Plan

The 2014 RMP presented a proposed site-specific environmental RMP as a tool to assist with the review of future subdivision applications on lands lying within the regulated setback distance from the site (300 m). The focus was on potential ingress of soil gas for COPCs with a hazard quotient greater than 1.0. Residential land use was considered most sensitive, and exposure ratings for other land uses (e.g. school, public institutions, commercial complexes) were considered to not be greater than residential; however, unique exceptions would have to be reviewed and addressed on a site-specific basis[4]. Further, underground utility workers and subsurface utility infrastructure were considered relevant to potential exposure.

The RMP applied a 10x factor of safety to the hazard quotients to address uncertainties. Hazard quotients from the RMP ranged up to 27,742 (including the 10x factor of safety). Based on these, the RMP then provided recommended generic mitigative measures based on the calculated hazard quotients, ranging from passive to

[8] Health Canada. 2021. Federal Contaminated Site Risk Assessment in Canada: Guidance on Human Health Preliminary Quantitative Risk Assessment, Version 3.0.

[9] Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part V: Guidance on Human Health Detailed Quantitative Risk Assessment for Chemicals (DQRAchem).

active measures, recognizing that the ultimate approach would require a design professional for the proposed development.

Following the 2014 RMP, the Canadian Council of Ministers of the Environment (CCME) released the document "A Protocol for the Derivation of Soil Vapour Quality Guidelines for Protection of Human Exposures Via Inhalation of Vapours"[10], designed to provide guidance for developing site-appropriate soil vapour quality guidelines. The guidelines developed using the methods outlined in the CCME document were used for this current study and are included with the vapour sampling results in Table 5. Hazard quotients were calculated using estimated dose (based on concentrations measured at the site) and divided by tolerable daily intake. Soil vapour concentrations from the Phase II ESA conducted in 2013 were not compared to soil vapour quality guidelines; however, spot checks of five target compounds with the highest hazard quotients in the 2013 work (cis-1,2-dichloroethene, 1,2,4-trimethylbenzene, vinyl chloride, tetrachloroethene, and 1,3,5-trimethylbenzene) identified that vinyl chloride would have unacceptable hazard quotients using the updated CCME methodology in samples VW-03 and VW-05. Soil vapour concentrations from the 2017 vapour assessment and monitoring report from XCG identified that concentrations of vinyl chloride in samples VW-05 and XCG-6 were greater than the soil vapour screening criteria and above target risk and hazard levels calculated using the updated CCME methodology.

The 2014 RMP was prepared concurrent to RMPs at several other former City landfills, and a common set of mitigative measures was applied based on the hazard quotients. Subsequent to the 2014 RMP and to the release of the CCME Protocol document, XCG revised the 2014 RMP criteria ranges for each generic mitigative measure category to include a Cancer Risk range to allow comparison of the 2014 RMP ranges with the individual hazard quotients and Cancer Risks calculated by XCG[5]. From that work, XCG identified the following generic mitigative measures for developments within a 300 m setback of these landfills (based on Tiamat 2014), and these have been adopted for this site:

Passive Measures

1. Passive Measures – Level A: for Cancer Risk of > $1E^{-5}$ and < $5E^{-5}$ and/or HQ >0.2 and <1.

   Compacted clay liner with a minimum thickness of 1m and confirmed maximum hydraulic conductivity of 10^{-6} cm/sec.

2. Passive Measures – Level B: for Cancer Risk of > $5E^{-5}$ and < $5E^{-4}$ and/or HQ >1 and <5.

   Synthetic liner with type of material, thickness and installation details dependent on the design professional.

3. Passive Measures – Level C: for Cancer Risk of > $5E^{-4}$ and < $1E^{-3}$ and/or HQ >5 and <50.

   Passive sub-slab depressurization (SSD) system with a minimum depressurization of 4 Pa to 10 Pa. In some instances (such as a pervious subgrade), the actual depressurization necessary may require an active SSD or alternative active ventilation system.

Active Measures

Field verify the presence of the identified chemicals of concern and other potential chemicals in the soil gas state at the development site. If confirmed, determine the most appropriate manner to prevent soil vapour intrusion.

1. Active Measures – Level D: for Cancer Risk of > $1E^{-3}$ and < $2E^{-3}$ and/or HQ values >50 and <100.

[10] Canadian Council of Ministers of the Environment. 2014. A Protocol for the Derivation of Soil Vapour Quality Guidelines for Exposure Protection of Human Exposures via Inhalation of Vapours. Available online: http://ceqg-rcqe.ccme.ca/en/index.html#void.

Active SSD must be configured to compensate for depressurization of the building and have adequate negative pressure gradients across the entire footprint of the foundation.

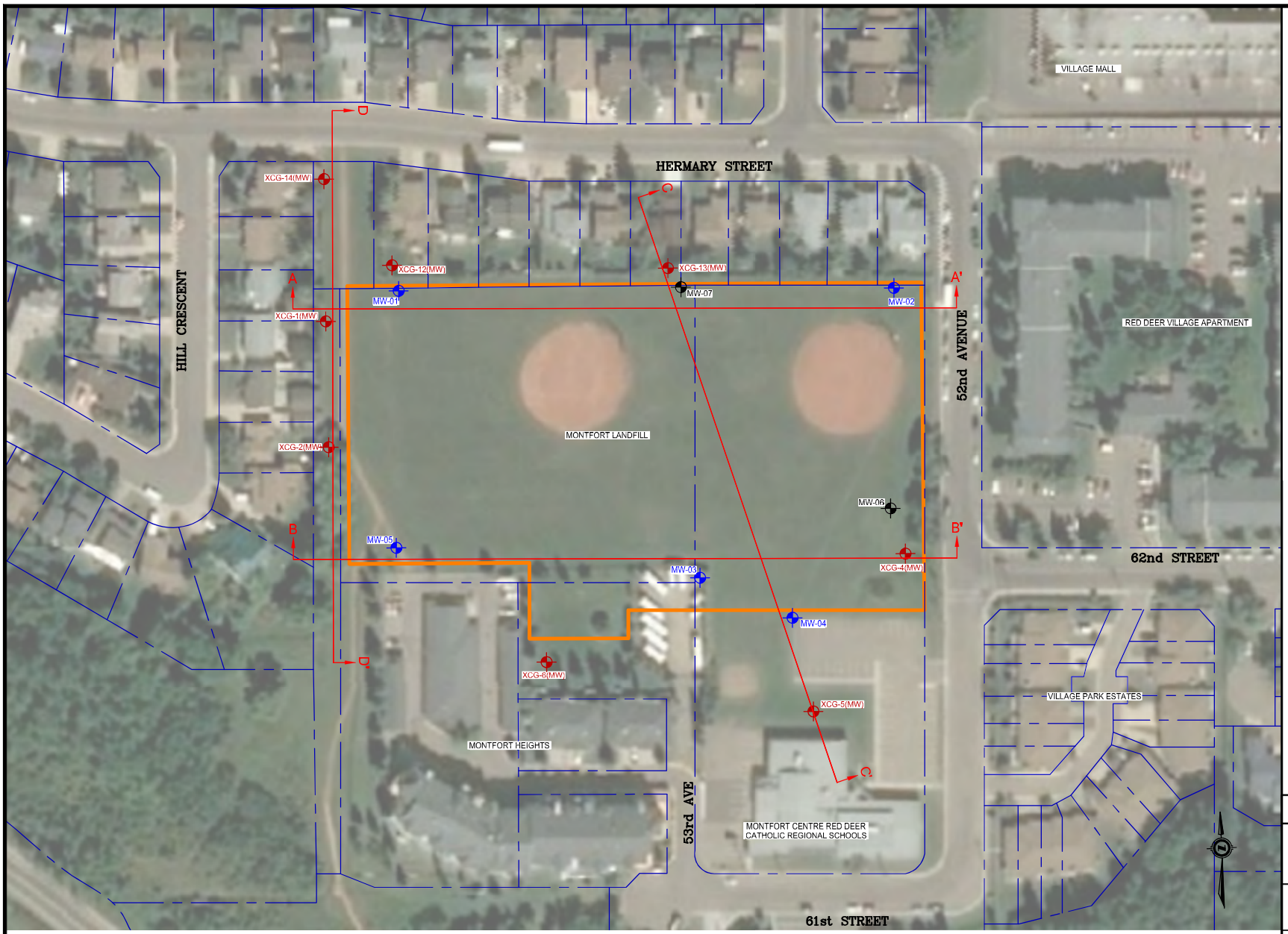
2. Active Measures - Level E: for Cancer Risk of >$2E^{-3}$ and/or HQ values >100.

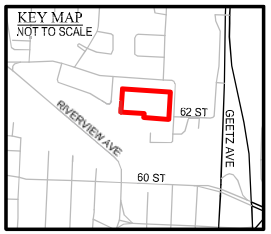
   Installation of geomembrane and active soil vapour extraction with system fault notification alarm.

The sampling in 2013 and 2017 had identified several concentrations greater than the target risks, relating to implementation of either Passive Measures Level A or B. The soil vapour concentrations measured in 2019 and 2020 were overall lower than those data. Based on the 2019 and 2020 program, the greatest individual hazard quotient calculated for the site was 0.193 (vs target individual hazard level of 0.2) and the greatest cumulative hazard quotient was 0.308 (vs target cumulative hazard level of 1.0). The greatest estimated cancer risk (individual or cumulative) was 2.7×10^{-7} (vs target Risk of 1.0×10^{-5}).

APPENDIX C

CROSS-SECTIONS (XCG 2018)





LEGEND:

- APPROXIMATE PROPERTY BOUNDARIES
- SANITARY LINE
- STORM LINE
- GAS LINE
- UNDERGROUND ELECTRICAL TRENCH
- APPROXIMATE LIMIT OF WASTE
- GROUNDWATER MONITORING WELL LOCATION (TIAMAT, 2014)
- GROUNDWATER MONITORING WELL LOCATION (OTHERS)
- SOIL VAPOUR MONITORING WELL
- MONITORING WELL LOCATION (XCG, JAN. 2017)
- SOIL VAPOUR MONITORING LOCATION (XCG, JAN. 2017)
- BOREHOLE LOCATION (XCG, JAN. 2017)
- SECTION LOCATION

0 25 50m

CROSS SECTION LOCATIONS

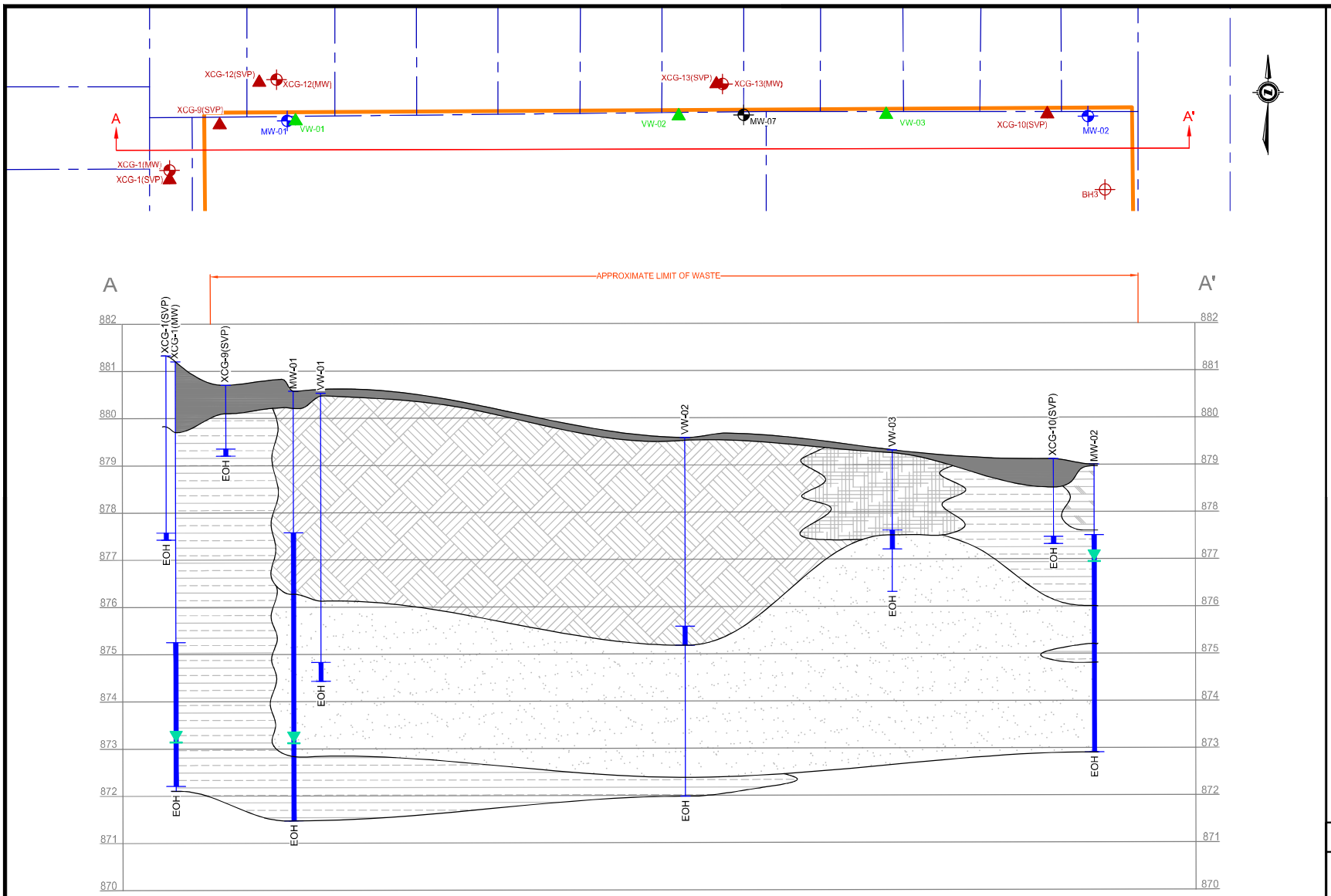
VAPOUR INTRUSION ASSESSMENT
ENVIRONMENTAL MONITORING REPORT
FORMER MONTFORT LANDFILL SITE
CITY OF RED DEER, ALBERTA

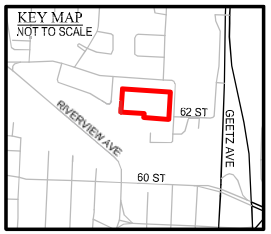
XCG Environmental Engineers & Scientists

DATE	JOB NO.	FIGURE NO.
JAN. 2018	4-2352-04-03	2

DRAWING REFERENCE: Figure based on Phase II ESA (Tiamat Environmental Consultants Ltd., April 2014), City of Red Deer online mapping and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R423520403006FIG02.pdf
FILE: R423520403006.dwg





LEGEND:

- MONITORING WELL / BOREHOLE
- MONITORING WELL SCREEN INTERVAL
- WATER LEVEL (MEASURED JUNE 2017)
- TOPSOIL
- MUNICIPAL SOLID WASTE
- SILT FILL
- SAND / LOAM FILL
- NATIVE SAND
- CLAY

0 2 4m
VERTICAL SCALE

0 20 40m
HORIZONTAL SCALE

SECTION A – A'
RESULTS

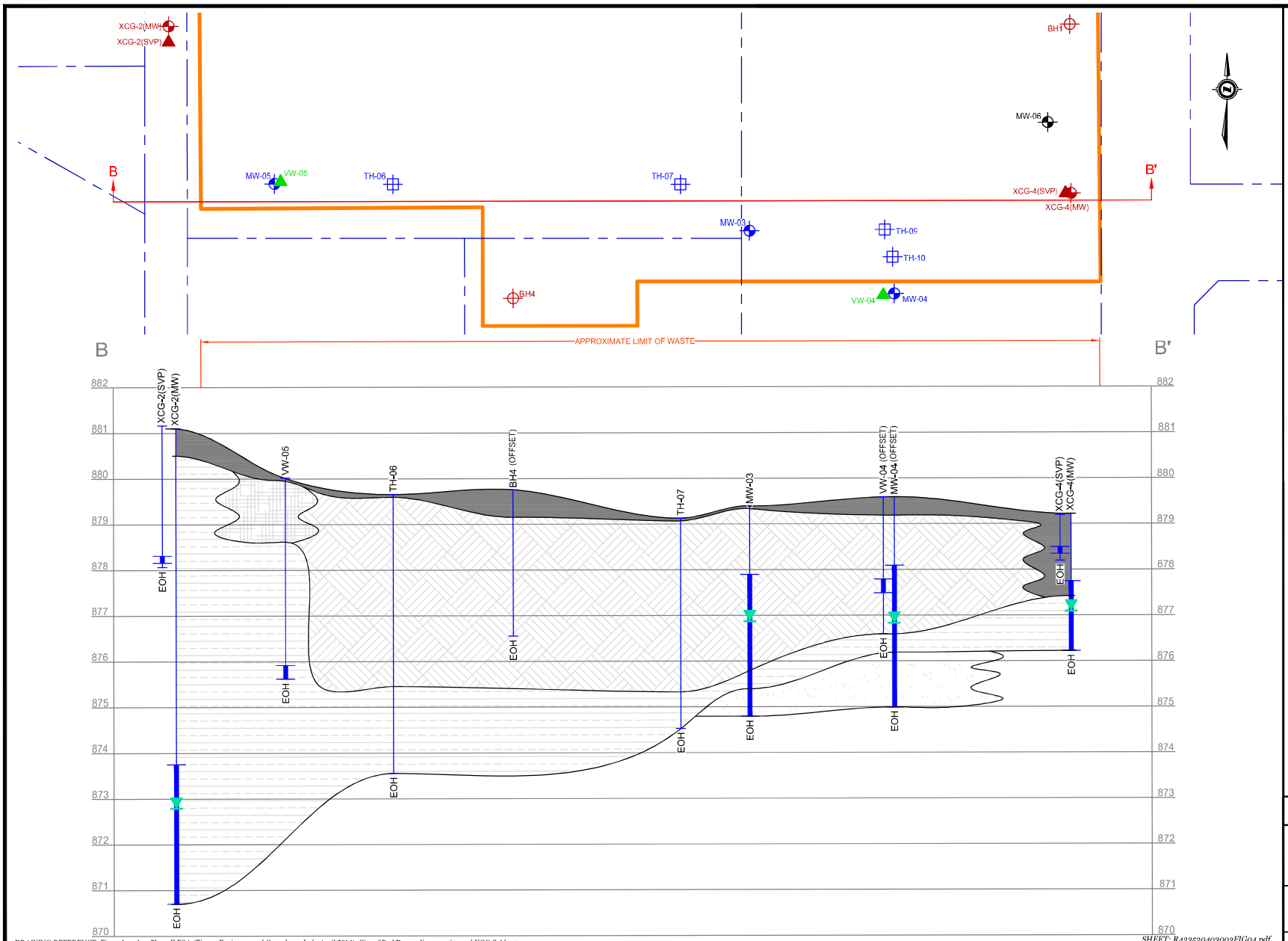
VAPOUR INTRUSION ASSESSMENT AND
ENVIRONMENTAL MONITORING REPORT
FORMER MONTFORT LANDFILL SITE
CITY OF RED DEER, ALBERTA

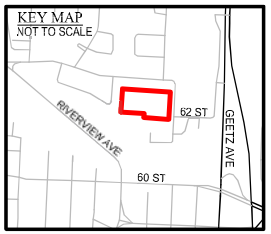
XCG
Environmental Engineers & Scientists

DATE	JOB NO.	FIGURE NO.
FEB. 2018	4–2352–04–03	3

DRAWING REFERENCE: Figure based on Phase II ESA (Tiamat Environmental Consultants Ltd., April 2014), City of Red Deer online mapping and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R423520403003FIG03.pdf
FILE: R423520403006.dwg





LEGEND:

- MONITORING WELL / BOREHOLE
- MONITORING WELL SCREEN INTERVAL
- WATER LEVEL (MEASURED JUNE 2017)
- TOPSOIL
- MUNICIPAL SOLID WASTE
- SAND / LOAM FILL
- NATIVE SAND
- CLAY

0 2 4m
VERTICAL SCALE

0 20 40m
HORIZONTAL SCALE

SECTION B – B'
RESULTS

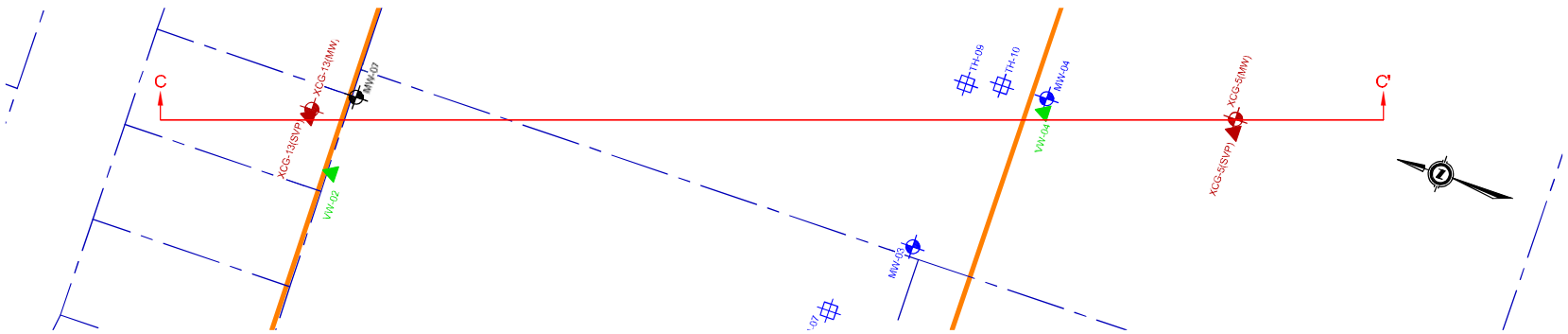
VAPOUR INTRUSION ASSESSMENT AND
ENVIRONMENTAL MONITORING REPORT
FORMER MONTFORT LANDFILL SITE
CITY OF RED DEER, ALBERTA

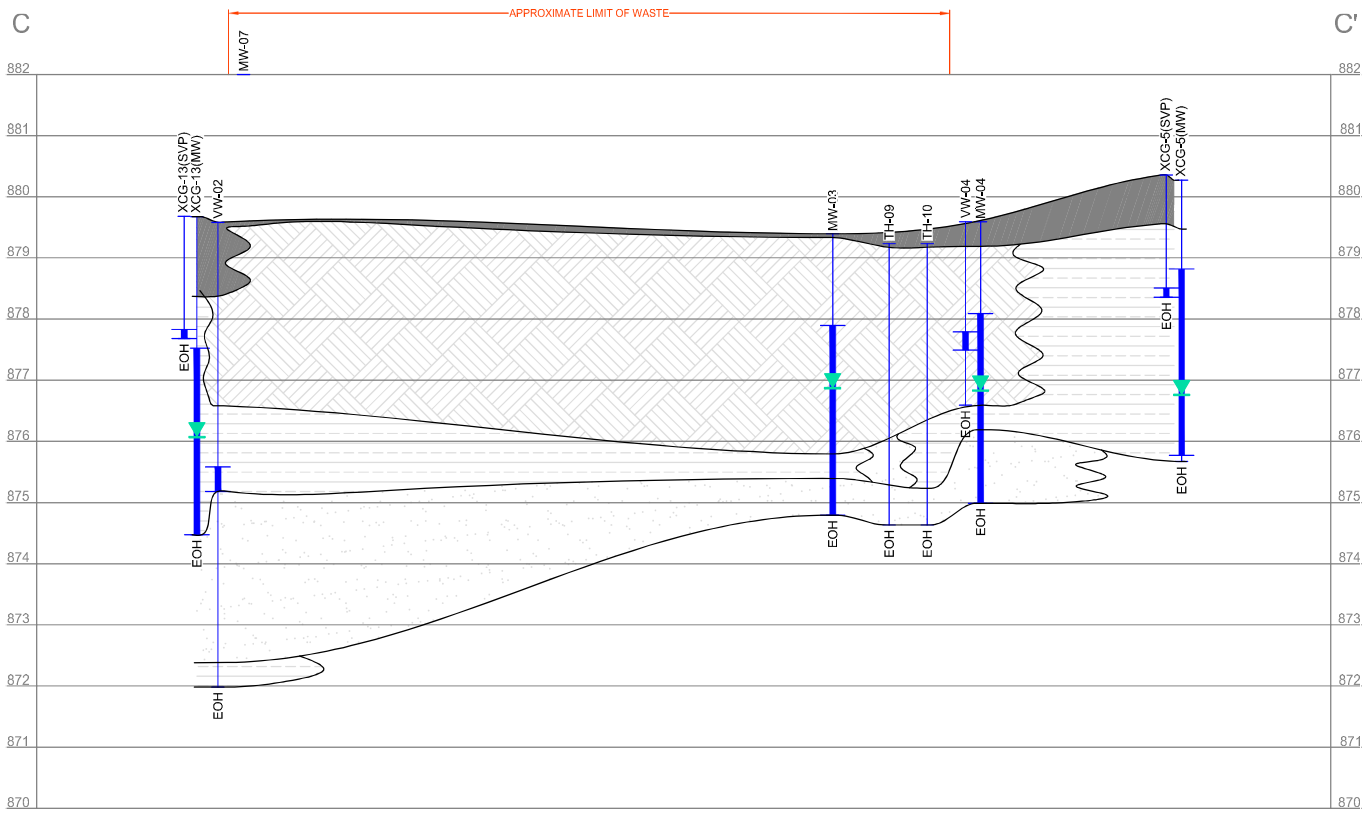
XCG
Environmental Engineers & Scientists

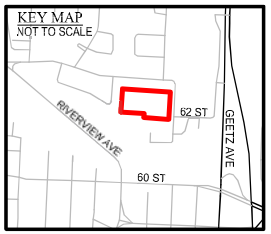
DATE	JOB NO.	FIGURE NO.
FEB. 2018	4–2352–04–03	4

DRAWING REFERENCE: Figure based on Phase II ESA (Tiamat Environmental Consultants Ltd., April 2014), City of Red Deer online mapping and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R423520403003FIG04.pdf
FILE: R423520403006.dwg







LEGEND:

- MONITORING WELL / BOREHOLE
- MONITORING WELL SCREEN INTERVAL
- WATER LEVEL (MEASURED JUNE 2017)
- TOPSOIL
- MUNICIPAL SOLID WASTE
- SILT FILL
- NATIVE SAND
- CLAY

0 2 4m
VERTICAL SCALE

0 20 40m
HORIZONTAL SCALE

SECTION C – C'
RESULTS

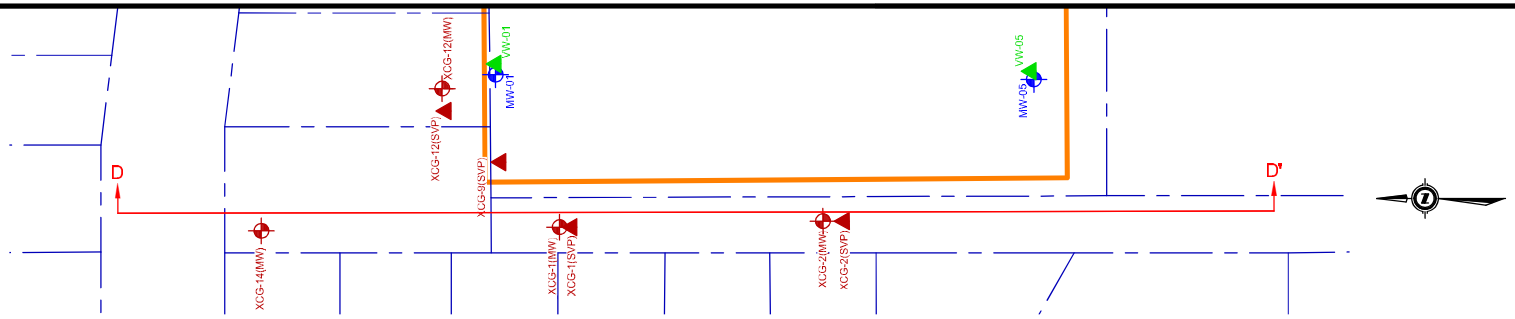
VAPOUR INTRUSION ASSESSMENT AND
ENVIRONMENTAL MONITORING REPORT
FORMER MONTFORT LANDFILL SITE
CITY OF RED DEER, ALBERTA

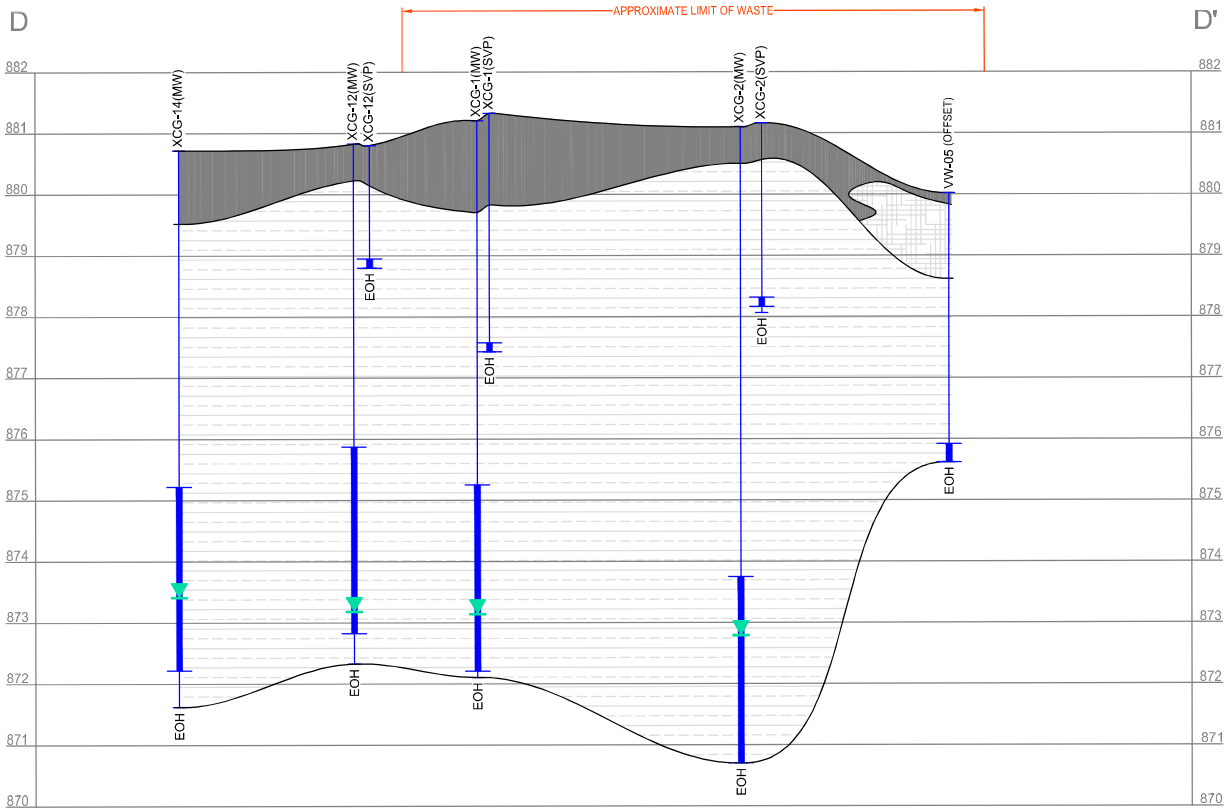
XCG Environmental Engineers & Scientists

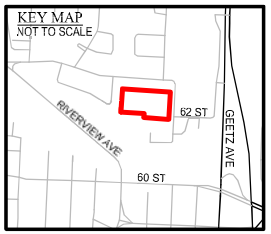
DATE	JOB NO.	FIGURE NO.
FEB. 2018	4–2352–04–03	5

DRAWING REFERENCE: Figure based on Phase II ESA (Tiamat Environmental Consultants Ltd., April 2014), City of Red Deer online mapping and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R423520403003FIG05.pdf
FILE: R423520403006.dwg







LEGEND:

- MONITORING WELL / BOREHOLE
- MONITORING WELL SCREEN INTERVAL
- WATER LEVEL (MEASURED JUNE 2017)
- TOPSOIL
- SAND / LOAM FILL
- CLAY

0 2 4m
VERTICAL SCALE

0 20 40m
HORIZONTAL SCALE

SECTION D – D'

VAPOUR INTRUSION ASSESSMENT AND ENVIRONMENTAL MONITORING REPORT
FORMER MONTFORT LANDFILL SITE
CITY OF RED DEER, ALBERTA

XCG Environmental Engineers & Scientists

DATE	JOB NO.	FIGURE NO.
FEB. 2018	4–2352–04–03	6

DRAWING REFERENCE: Figure based on Phase II ESA (Tiamat Environmental Consultants Ltd., April 2014), City of Red Deer online mapping and XCG field notes.
NOTE: Location of building, underground utilities, etc. are for reference only and should not be relied upon for detailed design, renovation, or construction purposes. Property boundary and building locations shown may not represent actual surveyed boundaries.

SHEET: R423520403003FIG06.pdf
FILE: R423520403006.dwg

APPENDIX D

LABORATORY ANALYTICAL REPORTS

TETRA TECH CANADA INC.
ATTN: Darby Madalena
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Date Received: 10-SEP-21
Report Date: 23-SEP-21 20:22 (MT)
Version: FINAL

Client Phone: 403-723-6867

Certificate of Analysis

Lab Work Order #: L2638370

Project P.O. #: SWM.SWOP04071-02.009
Job Reference: SWM.SWOP04071-02.009
C of C Numbers: CORD MONFORT
Legal Site Desc:

Milica Papic
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-1 MW-05							
Sampled By: RYAN MILLER on 10-SEP-21 @ 11:50							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	70.1		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	96.9		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	82.8		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	0.408		0.050	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	235		2.5	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	<0.0050	DLDS	0.0050	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	<0.00050	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.0103	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	0.525	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.113	DLDS	0.050	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	<0.000025	DLDS	0.000025	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	227	DLDS	0.25	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	<0.00050	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	<0.0010	DLDS	0.0010	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	2.19	DLDS	0.050	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	<0.00025	DLDS	0.00025	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	100	DLDS	0.025	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.689	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.0084	DLDS	0.0025	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	4.43	DLDS	0.25	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.00056	DLDS	0.00025	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000050	DLDS	0.000050	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	22.5	DLDS	0.25	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.0124	DLDS	0.000050	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	<0.0050	DLDS	0.0050	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	<0.10	DLDS	0.10	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	93.8			%		23-SEP-21	
TDS (Calculated)	1060			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-1 MW-05							
Sampled By: RYAN MILLER on 10-SEP-21 @ 11:50							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	979			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	<0.10	DLDS	0.10	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	<0.11		0.11	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLDS	0.050	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	10.4		1.5	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	7.58		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	1870		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	927		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	760		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-1 MW-05							
Sampled By: RYAN MILLER on 10-SEP-21 @ 11:50							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	70.1		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-2 XCG-4(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 09:15							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	77.2		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.1		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	93.0		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	70.1		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	0.267		0.050	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	49.6		2.5	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	0.0013		0.0010	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	0.00059		0.00010	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.00066		0.00010	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	0.260		0.00010	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.042		0.010	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	0.0000160		0.0000050	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	171		0.050	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	0.00170		0.00020	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	0.146		0.010	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	37.4		0.0050	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.144		0.00010	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.00724		0.00050	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	24.7		0.050	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.00159		0.000050	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	51.4		0.050	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.00207		0.000010	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	0.0049		0.0010	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	<0.10	DLDS	0.10	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	104			%		23-SEP-21	
TDS (Calculated)	716			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-2 XCG-4(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 09:15							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	581			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	0.69		0.10	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.69		0.11	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLDS	0.050	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	11.3		1.5	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	7.97		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	1180		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	747		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	613		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-2 XCG-4(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 09:15							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.1		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	77.2		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-3 XCG-5(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 12:45							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	73.8		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.3		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	93.5		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	74.0		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	0.181		0.050	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	13.0		0.50	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	0.0095		0.0010	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	0.00068		0.00010	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.00226		0.00010	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	0.246		0.00010	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.037		0.010	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	0.0000230		0.0000050	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	90.2		0.050	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	0.00217		0.00020	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	0.425		0.010	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	29.9		0.0050	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.292		0.00010	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.00440		0.00050	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	6.47		0.050	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.000264		0.000050	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	5.30		0.050	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.000982		0.000010	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	0.0291		0.0010	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	0.106		0.020	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	101			%		23-SEP-21	
TDS (Calculated)	359			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-3 XCG-5(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 12:45							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	348			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	1.32		0.020	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	1.32		0.022	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.010		0.010	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	8.06		0.30	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	8.16		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	628		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	407		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	334		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-3 XCG-5(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 12:45							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.3		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	73.8		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-4 XCG-12(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 13:20							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	74.3		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.9		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	95.1		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	74.3		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	1.09		0.50	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	9.4		2.5	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	0.0069		0.0010	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	0.00039		0.00010	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.00168		0.00010	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	0.351		0.00010	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.341		0.010	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	0.000117		0.0000050	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	201		0.050	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	0.00443		0.00020	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	0.096		0.010	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	0.000056		0.000050	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	38.5		0.0050	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.290		0.00010	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.0110		0.00050	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	8.91		0.050	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.000705		0.000050	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	33.8		0.050	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.00171		0.000010	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	0.187		0.0010	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	0.10		0.10	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	100			%		23-SEP-21	
TDS (Calculated)	819			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-4 XCG-12(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 13:20							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	660			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	27.7		0.10	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	27.8		0.11	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	0.096		0.050	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	60.6		1.5	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	7.75		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	1270		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	699		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	573		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-4 XCG-12(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 13:20							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	97.9		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	74.3		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-5 XCG-13(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 10:30							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	76.2		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.8		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	91.5		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	96.5		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	0.067		0.050	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	205		2.5	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	0.0039	DLDS	0.0010	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	0.00015	DLDS	0.00010	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.00259	DLDS	0.00010	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	1.00	DLDS	0.00010	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.051	DLDS	0.010	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	<0.0000050	DLDS	0.0000050	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	188	DLDS	0.050	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	0.00013	DLDS	0.00010	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	0.00056	DLDS	0.00020	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	3.68	DLDS	0.010	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	<0.000050	DLDS	0.000050	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	140	DLDS	0.0050	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.668	DLDS	0.00010	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.0130	DLDS	0.00050	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	3.11	DLDS	0.050	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.000663	DLDS	0.000050	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000010	DLDS	0.000010	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	38.4	DLDS	0.050	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.0109	DLDS	0.000010	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	0.0073	DLDS	0.0010	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	<0.10	DLDS	0.10	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	96.6			%		23-SEP-21	
TDS (Calculated)	1110			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-5 XCG-13(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 10:30							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	1050			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	0.13		0.10	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	0.13		0.11	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	<0.050	DLDS	0.050	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	6.6		1.5	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	7.51		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	1980		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	1070		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	877		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	0.0023		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-5 XCG-13(MW)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 10:30							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	0.00153		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	0.0014		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	0.00186		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	0.00066		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	0.0275		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.8		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	76.2		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-6 DUPLICATE							
Sampled By: RYAN MILLER on 10-SEP-21							
Matrix: WATER							
BTEX, F1 (C6-C10),F2 (>C10-C16)							
BTEX and Styrene							
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	76.9		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	19-SEP-21	20-SEP-21	R5588700
CCME F2-4 Hydrocarbons							
F2: (C10-C16)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588442
Surrogate: 2-Bromobenzotrifluoride	97.6		60-140	%	19-SEP-21	20-SEP-21	R5588442
F1 (C6-C10)							
F1(C6-C10)	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
F1-BTEX	<0.10		0.10	mg/L	19-SEP-21	20-SEP-21	R5588703
Surrogate: 3,4-Dichlorotoluene	95.0		70-130	%	19-SEP-21	20-SEP-21	R5588703
Sum of Xylene Isomer Concentrations							
Xylenes	<0.00071		0.00071	mg/L		20-SEP-21	
Miscellaneous Parameters							
Ammonia, Total (as N)	1.09		0.50	mg/L		23-SEP-21	R5596361
Major Ions & Trace Dissolved Metals							
Chloride in Water by IC							
Chloride (Cl)	9.5		2.5	mg/L		13-SEP-21	R5586355
Dissolved Mercury in Water by CVAAS							
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L		18-SEP-21	R5586840
Dissolved Mercury Filtration Location	FIELD					18-SEP-21	R5586843
Dissolved Metals in Water by CRC ICPMS							
Dissolved Metals Filtration Location	FIELD					20-SEP-21	R5587838
Aluminum (Al)-Dissolved	0.0049		0.0010	mg/L		20-SEP-21	R5588578
Antimony (Sb)-Dissolved	0.00039		0.00010	mg/L		20-SEP-21	R5588578
Arsenic (As)-Dissolved	0.00170		0.00010	mg/L		20-SEP-21	R5588578
Barium (Ba)-Dissolved	0.352		0.00010	mg/L		20-SEP-21	R5588578
Boron (B)-Dissolved	0.351		0.010	mg/L		20-SEP-21	R5588578
Cadmium (Cd)-Dissolved	0.000111		0.0000050	mg/L		20-SEP-21	R5588578
Calcium (Ca)-Dissolved	207		0.050	mg/L		20-SEP-21	R5588578
Chromium (Cr)-Dissolved	<0.00010		0.00010	mg/L		20-SEP-21	R5588578
Copper (Cu)-Dissolved	0.00364		0.00020	mg/L		20-SEP-21	R5588578
Iron (Fe)-Dissolved	0.092		0.010	mg/L		20-SEP-21	R5588578
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L		20-SEP-21	R5588578
Magnesium (Mg)-Dissolved	38.4		0.0050	mg/L		20-SEP-21	R5588578
Manganese (Mn)-Dissolved	0.286		0.00010	mg/L		20-SEP-21	R5588578
Nickel (Ni)-Dissolved	0.0109		0.00050	mg/L		20-SEP-21	R5588578
Potassium (K)-Dissolved	8.65		0.050	mg/L		20-SEP-21	R5588578
Selenium (Se)-Dissolved	0.000714		0.000050	mg/L		20-SEP-21	R5588578
Silver (Ag)-Dissolved	<0.000010		0.000010	mg/L		20-SEP-21	R5588578
Sodium (Na)-Dissolved	33.9		0.050	mg/L		20-SEP-21	R5588578
Uranium (U)-Dissolved	0.00168		0.000010	mg/L		20-SEP-21	R5588578
Zinc (Zn)-Dissolved	0.185		0.0010	mg/L		20-SEP-21	R5588578
Fluoride in Water by IC							
Fluoride (F)	0.10		0.10	mg/L		13-SEP-21	R5586355
Ion Balance Calculation							
Ion Balance	102			%		23-SEP-21	
TDS (Calculated)	822			mg/L		23-SEP-21	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-6 DUPLICATE							
Sampled By: RYAN MILLER on 10-SEP-21							
Matrix: WATER							
Ion Balance Calculation							
Hardness (as CaCO3)	675			mg/L		23-SEP-21	
Nitrate in Water by IC							
Nitrate (as N)	27.6		0.10	mg/L		13-SEP-21	R5586355
Nitrate+Nitrite							
Nitrate and Nitrite (as N)	27.7		0.11	mg/L		17-SEP-21	
Nitrite in Water by IC							
Nitrite (as N)	0.106		0.050	mg/L		13-SEP-21	R5586355
Sulfate in Water by IC							
Sulfate (SO4)	60.1		1.5	mg/L		13-SEP-21	R5586355
pH, Conductivity and Total Alkalinity							
pH	7.67		0.10	pH		18-SEP-21	R5586928
Conductivity (EC)	1260		2.0	uS/cm		18-SEP-21	R5586928
Bicarbonate (HCO3)	695		5.0	mg/L		18-SEP-21	R5586928
Carbonate (CO3)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Hydroxide (OH)	<5.0		5.0	mg/L		18-SEP-21	R5586928
Alkalinity, Total (as CaCO3)	570		2.0	mg/L		18-SEP-21	R5586928
EPA 8260 Volatile Organics							
VOCs in Water							
1,1,1,2-Tetrachloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,1-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2,2-Tetrachloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1,2-Trichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,1-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,3-Trichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trichlorobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2,4-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dibromo-3-chloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,2-Dichloropropane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3,5-Trimethylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
1,3-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
1,4-Dichlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
2,2-Dichloropropane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
2-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
4-Chlorotoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
p-Isopropyltoluene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Benzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromobenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromochloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromodichloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromoform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Bromomethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Carbon tetrachloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chlorobenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloroform	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Chloromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638370-6 DUPLICATE							
Sampled By: RYAN MILLER on 10-SEP-21							
Matrix: WATER							
VOCs in Water							
cis-1,2-Dichloroethene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
cis-1,3-Dichloropropene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromochloromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dibromomethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Dichlorodifluoromethane	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylbenzene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Ethylene dibromide	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Hexachlorobutadiene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Isopropylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
m+p-Xylenes	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Methylene chloride	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
n-Propylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
o-Xylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
sec-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Styrene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
tert-Butylbenzene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Tetrachloroethylene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Toluene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,2-Dichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
trans-1,3-Dichloropropene	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichloroethene	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Trichlorofluoromethane	<0.0010		0.0010	mg/L	19-SEP-21	20-SEP-21	R5588700
Vinyl chloride	<0.00050		0.00050	mg/L	19-SEP-21	20-SEP-21	R5588700
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	19-SEP-21	20-SEP-21	R5588700
Surrogate: 4-Bromofluorobenzene	76.9		70-130	%	19-SEP-21	20-SEP-21	R5588700

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTXS-HS-MS-CL	Water	BTEX and Styrene	EPA 8260C/5021A

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. BTEX Target compound concentrations are measured using mass spectrometry detection.

CL-IC-N-CL	Water	Chloride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F-IC-N-CL	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-HS-FID-CL	Water	F1 (C6-C10)	EPA 5021A / CWS PHC Tier 1

This analysis is based on the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2001." For F1 (C6-C10) analysis, the water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a GC-FID for analysis.

F2-4-ME-FID-CL	Water	CCME F2-4 Hydrocarbons	EPA 3511/ CCME PHC CWS GC-FID

Water samples are spiked with 2-BBTF surrogate, and extracted by reciprocal action shaker for 30 minutes using a single micro-extraction with hexane. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Tier 1 Method, CCME, December 2001.

HG-D-CVAA-CL	Water	Dissolved Mercury in Water by CVAAS	APHA 3030B/EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

IONBALANCE-CL	Water	Ion Balance Calculation	APHA 1030E
MET-D-CCMS-CL	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

N2N3-CALC-CL	Water	Nitrate+Nitrite	CALCULATION
NH3-F-CL	Water	Ammonia by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-IC-N-CL	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-CL	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH/EC/ALK-CL	Water	pH, Conductivity and Total Alkalinity	APHA 4500H,2510,2320

All samples analyzed by this method for pH will have exceeded the 15 minute recommended hold time from time of sampling (field analysis is recommended for pH where highly accurate results are needed)
pH measurement is determined from the activity of the hydrogen ions using a hydrogen electrode and a reference electrode.
Alkalinity measurement is based on the sample's capacity to neutralize acid
Conductivity measurement is based on the sample's capacity to convey an electric current

SO4-IC-N-CL	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

VOC-HS-MS-CL	Water	VOCs in Water	EPA 8260C/5021A

The water sample, with added reagents, is heated in a sealed vial to equilibrium. The headspace from the vial is transferred into a gas chromatograph. VOC Target compound concentrations are measured using mass spectrometry detection.

XYLENES-CALC-CL	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Calculation of Total Xylenes

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
CL	ALS ENVIRONMENTAL - CALGARY, ALBERTA, CANADA

Chain of Custody Numbers:

CORD MONFORT

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Routine Water Chemistry Report

L2638370

Lab ID	Sample ID				
L2638370-1	MW-05				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	93.8	%			
Routine Anions					
Bicarbonate	927	mg/L	15.19	36	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	235	mg/L	6.63	16	
Sulfate	10.4	mg/L	0.22	1	
Nitrate+Nitrite-N		mg/L	0	0	
Anion Sum			22.04	52	
Routine Cations					
Calcium	227	mg/L	11.33	27	
Magnesium	100	mg/L	8.23	19	
Sodium	22.5	mg/L	0.98	2	
Potassium	4.43	mg/L	0.11	0	
Ammonium	0.408	mg/L	0.03	0	
Cation Sum			20.68	48	

Lab ID	Sample ID				
L2638370-2	XCG-4(MW)				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	104	%			
Routine Anions					
Bicarbonate	747	mg/L	12.24	43	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	49.6	mg/L	1.40	5	
Sulfate	11.3	mg/L	0.24	1	
Nitrate+Nitrite-N		mg/L	0.05	0	
Anion Sum			13.93	49	
Routine Cations					
Calcium	171	mg/L	8.53	30	
Magnesium	37.4	mg/L	3.08	11	
Sodium	51.4	mg/L	2.24	8	
Potassium	24.7	mg/L	0.63	2	
Ammonium	0.267	mg/L	0.02	0	
Cation Sum			14.50	51	

L2638370-3	XCG-5(MW)				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	101	%			
Routine Anions					
Bicarbonate	407	mg/L	6.67	45	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	13.0	mg/L	0.37	2	
Sulfate	8.06	mg/L	0.17	1	
Nitrate+Nitrite-N		mg/L	0.09	1	
Anion Sum			7.30	50	
Routine Cations					
Calcium	90.2	mg/L	4.50	31	
Magnesium	29.9	mg/L	2.46	17	
Sodium	5.30	mg/L	0.23	2	
Potassium	6.47	mg/L	0.17	1	
Ammonium	0.181	mg/L	0.01	0	
Cation Sum			7.37	50	

L2638370-4	XCG-12(MW)				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	100	%			
Routine Anions					
Bicarbonate	699	mg/L	11.46	38	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	9.4	mg/L	0.27	1	
Sulfate	60.6	mg/L	1.26	4	
Nitrate+Nitrite-N		mg/L	1.98	7	
Anion Sum			14.97	50	
Routine Cations					
Calcium	201	mg/L	10.03	33	
Magnesium	38.5	mg/L	3.17	11	
Sodium	33.8	mg/L	1.47	5	
Potassium	8.91	mg/L	0.23	1	
Ammonium	1.09	mg/L	0.08	0	
Cation Sum			14.97	50	

ALS Routine Water Chemistry Report

L2638370

Lab ID	Sample ID				
L2638370-5	XCG-13(MW)				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	96.6	%			
Routine Anions					
Bicarbonate	1070	mg/L	17.54	38	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	205	mg/L	5.78	13	
Sulfate	6.6	mg/L	0.14	0	
Nitrate+Nitrite-N		mg/L	0.01	0	
Anion Sum			23.46	51	
Routine Cations					
Calcium	188	mg/L	9.38	20	
Magnesium	140	mg/L	11.52	25	
Sodium	38.4	mg/L	1.67	4	
Potassium	3.11	mg/L	0.08	0	
Ammonium	0.067	mg/L	0	0	
Cation Sum			22.66	49	

Lab ID	Sample ID				
L2638370-6	DUPLICATE				
Sample Date:	10-SEP-21				
Matrix:	WATER				
	Result	**UNITS**	**MEQ/L**	**MEQ %**	
Ion Balance	102	%			
Routine Anions					
Bicarbonate	695	mg/L	11.39	38	
Carbonate	<5.0	mg/L	0	0	
Hydroxide	<5.0	mg/L	0	0	
Chloride	9.5	mg/L	0.27	1	
Sulfate	60.1	mg/L	1.25	4	
Nitrate+Nitrite-N		mg/L	1.98	7	
Anion Sum			14.89	49	
Routine Cations					
Calcium	207	mg/L	10.33	34	
Magnesium	38.4	mg/L	3.16	10	
Sodium	33.9	mg/L	1.47	5	
Potassium	8.65	mg/L	0.22	1	
Ammonium	1.09	mg/L	0.08	0	
Cation Sum			15.26	51	

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L2638370

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-5 DUP		**L2638356-1**						
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Ethylbenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
m+p-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
WG3621120-2 LCS								
Benzene			103.8		%		70-130	20-SEP-21
Toluene			88.1		%		70-130	20-SEP-21
Ethylbenzene			104.1		%		70-130	20-SEP-21
o-Xylene			95.9		%		70-130	20-SEP-21
m+p-Xylene			118.4		%		70-130	20-SEP-21
WG3621120-8 LCS								
Benzene			101.6		%		70-130	20-SEP-21
Toluene			94.5		%		70-130	20-SEP-21
Ethylbenzene			89.8		%		70-130	20-SEP-21
o-Xylene			88.9		%		70-130	20-SEP-21
m+p-Xylene			116.6		%		70-130	20-SEP-21
WG3621120-1 MB								
Benzene			<0.00050		mg/L		0.0005	20-SEP-21
Toluene			<0.00050		mg/L		0.0005	20-SEP-21
Ethylbenzene			<0.00050		mg/L		0.0005	20-SEP-21
o-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
m+p-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
Surrogate: 4-Bromofluorobenzene			75.9		%		70-130	20-SEP-21
Surrogate: 1,4-Difluorobenzene			99.9		%		70-130	20-SEP-21
WG3621120-7 MB								
Benzene			<0.00050		mg/L		0.0005	20-SEP-21
Toluene			<0.00050		mg/L		0.0005	20-SEP-21
Ethylbenzene			<0.00050		mg/L		0.0005	20-SEP-21
o-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
m+p-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
Surrogate: 4-Bromofluorobenzene			72.0		%		70-130	20-SEP-21
Surrogate: 1,4-Difluorobenzene			98.1		%		70-130	20-SEP-21
WG3621120-6 MS		**L2638356-1**						

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTXS-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-6 MS		**L2638356-1**						
Benzene			102.4		%		50-140	20-SEP-21
Toluene			100.6		%		50-140	20-SEP-21
Ethylbenzene			110.8		%		50-140	20-SEP-21
o-Xylene			106.7		%		50-140	20-SEP-21
m+p-Xylene			137.0		%		50-140	20-SEP-21
CL-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-7 DUP		**L2638365-2**						
Chloride (Cl)		0.68	0.62		mg/L	9.5	20	13-SEP-21
WG3619782-6 LCS								
Chloride (Cl)			99.7		%		90-110	13-SEP-21
WG3619782-5 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-21
WG3619782-8 MS		**L2638365-2**						
Chloride (Cl)			85.2		%		75-125	13-SEP-21
F-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-7 DUP		**L2638365-2**						
Fluoride (F)		0.299	0.302		mg/L	1.1	20	13-SEP-21
WG3619782-6 LCS								
Fluoride (F)			94.5		%		90-110	13-SEP-21
WG3619782-5 MB								
Fluoride (F)			<0.020		mg/L		0.02	13-SEP-21
WG3619782-8 MS		**L2638365-2**						
Fluoride (F)			83.2		%		75-125	13-SEP-21
F1-HS-FID-CL	**Water**							
Batch R5588703								
WG3621127-3 DUP		**L2638356-1**						
F1(C6-C10)		<0.10	<0.10	RPD-NA	mg/L	N/A	30	20-SEP-21
WG3621127-2 LCS								
F1(C6-C10)			86.9		%		70-130	20-SEP-21
WG3621127-1 MB								
F1(C6-C10)			<0.10		mg/L		0.1	20-SEP-21
Surrogate: 3,4-Dichlorotoluene			84.9		%		70-130	20-SEP-21
F2-4-ME-FID-CL	**Water**							

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-4-ME-FID-CL	**Water**							
Batch	**R5588442**							
WG3620363-2	**LCS**							
F2: (C10-C16)			86.7		%		70-130	20-SEP-21
WG3620363-1	**MB**							
F2: (C10-C16)			<0.10		mg/L		0.1	20-SEP-21
Surrogate: 2-Bromobenzotrifluoride			98.7		%		60-140	20-SEP-21
HG-D-CVAA-CL	**Water**							
Batch	**R5586840**							
WG3620318-7	**DUP**	**L2639364-8**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	18-SEP-21
WG3620318-6	**LCS**							
Mercury (Hg)-Dissolved			103.0		%		80-120	18-SEP-21
WG3620318-5	**MB**							
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	18-SEP-21
WG3620318-8	**MS**	**L2639364-8**						
Mercury (Hg)-Dissolved			112.0		%		70-130	18-SEP-21
MET-D-CCMS-CL	**Water**							
Batch	**R5588578**							
WG3620908-3	**DUP**	**L2638293-1**						
Aluminum (Al)-Dissolved		0.130	0.133		mg/L	2.2	20	20-SEP-21
Antimony (Sb)-Dissolved		0.00021	0.00021		mg/L	0.9	20	20-SEP-21
Arsenic (As)-Dissolved		0.00036	0.00035		mg/L	2.2	20	20-SEP-21
Barium (Ba)-Dissolved		0.372	0.372		mg/L	0.2	20	20-SEP-21
Boron (B)-Dissolved		0.019	0.020		mg/L	3.1	20	20-SEP-21
Cadmium (Cd)-Dissolved		0.0000595	0.0000605		mg/L	1.8	20	20-SEP-21
Calcium (Ca)-Dissolved		113	113		mg/L	0.2	20	20-SEP-21
Chromium (Cr)-Dissolved		0.00272	0.00279		mg/L	2.5	20	20-SEP-21
Copper (Cu)-Dissolved		0.00349	0.00348		mg/L	0.2	20	20-SEP-21
Iron (Fe)-Dissolved		0.178	0.173		mg/L	3.0	20	20-SEP-21
Lead (Pb)-Dissolved		0.000355	0.000361		mg/L	1.9	20	20-SEP-21
Magnesium (Mg)-Dissolved		21.4	21.6		mg/L	1.0	20	20-SEP-21
Manganese (Mn)-Dissolved		0.112	0.113		mg/L	1.0	20	20-SEP-21
Nickel (Ni)-Dissolved		0.00557	0.00559		mg/L	0.5	20	20-SEP-21
Potassium (K)-Dissolved		0.716	0.722		mg/L	0.9	20	20-SEP-21
Selenium (Se)-Dissolved		0.000339	0.000341		mg/L	0.7	20	20-SEP-21
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch	**R5588578**							
WG3620908-3	**DUP**	**L2638293-1**						
Sodium (Na)-Dissolved		23.1	23.2		mg/L	0.5	20	20-SEP-21
Uranium (U)-Dissolved		0.00168	0.00169		mg/L	0.5	20	20-SEP-21
Zinc (Zn)-Dissolved		0.0113	0.0115		mg/L	1.7	20	20-SEP-21
WG3620908-7	**DUP**	**L2639109-1**						
Aluminum (Al)-Dissolved		0.0024	0.0027		mg/L	9.7	20	20-SEP-21
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	20-SEP-21
Arsenic (As)-Dissolved		0.00033	0.00031		mg/L	5.3	20	20-SEP-21
Barium (Ba)-Dissolved		1.82	1.83		mg/L	0.5	20	20-SEP-21
Boron (B)-Dissolved		0.161	0.165		mg/L	2.7	20	20-SEP-21
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	20-SEP-21
Calcium (Ca)-Dissolved		28.6	28.3		mg/L	1.2	20	20-SEP-21
Chromium (Cr)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	20-SEP-21
Copper (Cu)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	20-SEP-21
Iron (Fe)-Dissolved		0.426	0.422		mg/L	0.8	20	20-SEP-21
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	20-SEP-21
Magnesium (Mg)-Dissolved		16.8	16.8		mg/L	0.1	20	20-SEP-21
Manganese (Mn)-Dissolved		0.0502	0.0495		mg/L	1.4	20	20-SEP-21
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	20-SEP-21
Potassium (K)-Dissolved		0.90	0.91		mg/L	0.9	20	20-SEP-21
Selenium (Se)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	20-SEP-21
Silver (Ag)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	20-SEP-21
Sodium (Na)-Dissolved		61.0	60.9		mg/L	0.2	20	20-SEP-21
Uranium (U)-Dissolved		0.000108	0.000107		mg/L	1.7	20	20-SEP-21
Zinc (Zn)-Dissolved		0.0017	0.0019		mg/L	9.0	20	20-SEP-21
WG3620908-1	**MB**							
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-SEP-21
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-SEP-21
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	20-SEP-21
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5588578								
WG3620908-1 MB								
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	20-SEP-21
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-SEP-21
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-21
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-SEP-21
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-21
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-21
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-21
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-21
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	20-SEP-21
WG3620908-5 MB								
Aluminum (Al)-Dissolved			<0.0010		mg/L		0.001	20-SEP-21
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Boron (B)-Dissolved			<0.010		mg/L		0.01	20-SEP-21
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	20-SEP-21
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Chromium (Cr)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	20-SEP-21
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	20-SEP-21
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-21
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	20-SEP-21
Manganese (Mn)-Dissolved			<0.00010		mg/L		0.0001	20-SEP-21
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	20-SEP-21
Potassium (K)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	20-SEP-21
Silver (Ag)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-21
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	20-SEP-21
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	20-SEP-21
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	20-SEP-21
WG3620908-4 MS		**L2638293-2**						

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5588578								
WG3620908-4 MS		**L2638293-2**						
Aluminum (Al)-Dissolved			87.1		%		70-130	20-SEP-21
Antimony (Sb)-Dissolved			86.2		%		70-130	20-SEP-21
Arsenic (As)-Dissolved			83.6		%		70-130	20-SEP-21
Barium (Ba)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Boron (B)-Dissolved			93.1		%		70-130	20-SEP-21
Cadmium (Cd)-Dissolved			91.4		%		70-130	20-SEP-21
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Chromium (Cr)-Dissolved			89.3		%		70-130	20-SEP-21
Copper (Cu)-Dissolved			89.4		%		70-130	20-SEP-21
Iron (Fe)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Lead (Pb)-Dissolved			94.4		%		70-130	20-SEP-21
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Nickel (Ni)-Dissolved			87.7		%		70-130	20-SEP-21
Potassium (K)-Dissolved			88.4		%		70-130	20-SEP-21
Selenium (Se)-Dissolved			90.9		%		70-130	20-SEP-21
Silver (Ag)-Dissolved			83.7		%		70-130	20-SEP-21
Sodium (Na)-Dissolved			83.5		%		70-130	20-SEP-21
Uranium (U)-Dissolved			77.5		%		70-130	20-SEP-21
Zinc (Zn)-Dissolved			86.5		%		70-130	20-SEP-21
WG3620908-8 MS		**L2639109-2**						
Aluminum (Al)-Dissolved			99.8		%		70-130	20-SEP-21
Antimony (Sb)-Dissolved			108.8		%		70-130	20-SEP-21
Arsenic (As)-Dissolved			97.9		%		70-130	20-SEP-21
Barium (Ba)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Boron (B)-Dissolved			101.8		%		70-130	20-SEP-21
Cadmium (Cd)-Dissolved			97.0		%		70-130	20-SEP-21
Calcium (Ca)-Dissolved			99.8		%		70-130	20-SEP-21
Chromium (Cr)-Dissolved			99.0		%		70-130	20-SEP-21
Copper (Cu)-Dissolved			98.5		%		70-130	20-SEP-21
Iron (Fe)-Dissolved			98.3		%		70-130	20-SEP-21
Lead (Pb)-Dissolved			103.0		%		70-130	20-SEP-21
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Manganese (Mn)-Dissolved			100.6		%		70-130	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-CL	**Water**							
Batch R5588578								
WG3620908-8 MS		**L2639109-2**						
Nickel (Ni)-Dissolved			99.4		%		70-130	20-SEP-21
Potassium (K)-Dissolved			105.4		%		70-130	20-SEP-21
Selenium (Se)-Dissolved			101.2		%		70-130	20-SEP-21
Silver (Ag)-Dissolved			88.7		%		70-130	20-SEP-21
Sodium (Na)-Dissolved			N/A	MS-B	%		-	20-SEP-21
Uranium (U)-Dissolved			84.3		%		70-130	20-SEP-21
Zinc (Zn)-Dissolved			99.7		%		70-130	20-SEP-21
NH3-F-CL	**Water**							
Batch R5596361								
WG3623939-8 DUP		**L2638356-1**						
Ammonia, Total (as N)		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-SEP-21
WG3623939-6 LCS								
Ammonia, Total (as N)			103.8		%		85-115	23-SEP-21
WG3623939-5 MB								
Ammonia, Total (as N)			<0.050		mg/L		0.05	23-SEP-21
WG3623939-7 MS		**L2638356-1**						
Ammonia, Total (as N)			97.2		%		75-125	23-SEP-21
NO2-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-7 DUP		**L2638365-2**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	13-SEP-21
WG3619782-6 LCS								
Nitrite (as N)			102.6		%		90-110	13-SEP-21
WG3619782-5 MB								
Nitrite (as N)			<0.010		mg/L		0.01	13-SEP-21
WG3619782-8 MS		**L2638365-2**						
Nitrite (as N)			86.2		%		75-125	13-SEP-21
NO3-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-7 DUP		**L2638365-2**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	13-SEP-21
WG3619782-6 LCS								
Nitrate (as N)			100.1		%		90-110	13-SEP-21
WG3619782-5 MB								
Nitrate (as N)			<0.020		mg/L		0.02	13-SEP-21
WG3619782-8 MS		**L2638365-2**						

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-8 MS		**L2638365-2**						
Nitrate (as N)			84.5		%		75-125	13-SEP-21
PH/EC/ALK-CL	**Water**							
Batch R5586928								
WG3620423-14 DUP		**L2638330-9**						
pH		5.32	5.31	J	pH	0.01	0.2	18-SEP-21
Conductivity (EC)		<2.0	<2.0	RPD-NA	uS/cm	N/A	10	18-SEP-21
Bicarbonate (HCO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	18-SEP-21
Carbonate (CO3)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	18-SEP-21
Hydroxide (OH)		<5.0	<5.0	RPD-NA	mg/L	N/A	20	18-SEP-21
Alkalinity, Total (as CaCO3)		<2.0	<2.0	RPD-NA	mg/L	N/A	20	18-SEP-21
WG3620423-4 LCS								
Alkalinity, Total (as CaCO3)			101.7		%		85-115	18-SEP-21
WG3620423-3 MB								
Conductivity (EC)			<2.0		uS/cm		2	18-SEP-21
Bicarbonate (HCO3)			<5.0		mg/L		5	18-SEP-21
Carbonate (CO3)			<5.0		mg/L		5	18-SEP-21
Hydroxide (OH)			<5.0		mg/L		5	18-SEP-21
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	18-SEP-21
SO4-IC-N-CL	**Water**							
Batch R5586355								
WG3619782-7 DUP		**L2638365-2**						
Sulfate (SO4)		62.2	62.2		mg/L	0.0	20	13-SEP-21
WG3619782-6 LCS								
Sulfate (SO4)			101.6		%		90-110	13-SEP-21
WG3619782-5 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	13-SEP-21
WG3619782-8 MS		**L2638365-2**						
Sulfate (SO4)			81.4		%		75-125	13-SEP-21
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-5 DUP		**L2638356-1**						
1,1,1,2-Tetrachloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1,1-Trichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1,2,2-Tetrachloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-5	**DUP**	**L2638356-1**						
1,1,2-Trichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloropropene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,3-Trichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,3-Trichloropropane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,4-Trichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,4-Trimethylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dibromo-3-chloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichloropropane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3,5-Trimethylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3-Dichloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,4-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
2,2-Dichloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
2-Chlorotoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
4-Chlorotoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
p-Isopropyltoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	20-SEP-21
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromochloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromodichloromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromoform		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromomethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Carbon tetrachloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloroform		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
cis-1,2-Dichloroethene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
cis-1,3-Dichloropropene		<0.00050	<0.00050		mg/L			20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-5	**DUP**	**L2638356-1**						
cis-1,3-Dichloropropene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dibromochloromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dibromomethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dichlorodifluoromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Ethylbenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Ethylene dibromide		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Hexachlorobutadiene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Isopropylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
m+p-Xylenes		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Methylene chloride		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
n-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
n-Propylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
sec-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Styrene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
tert-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Tetrachloroethylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
trans-1,2-Dichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
trans-1,3-Dichloropropene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Trichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Trichlorofluoromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Vinyl chloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
WG3621120-9	**DUP**	**L2638309-3**						
1,1,1,2-Tetrachloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1,1-Trichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1,2,2-Tetrachloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1,2-Trichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloroethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,1-Dichloropropene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,3-Trichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,3-Trichloropropane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-9	**DUP**	**L2638309-3**						
1,2,4-Trichlorobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2,4-Trimethylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dibromo-3-chloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,2-Dichloropropane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3,5-Trimethylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
1,3-Dichloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
1,4-Dichlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
2,2-Dichloropropane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
2-Chlorotoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
4-Chlorotoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
p-Isopropyltoluene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	20-SEP-21
Benzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromobenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromochloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromodichloromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromoform		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Bromomethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Carbon tetrachloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chlorobenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloroethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloroform		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Chloromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
cis-1,2-Dichloroethene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
cis-1,3-Dichloropropene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dibromochloromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dibromomethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Dichlorodifluoromethane		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Ethylbenzene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Ethylene dibromide		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Hexachlorobutadiene		<0.0010	<0.0010		mg/L			20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-9	**DUP**	**L2638309-3**						
Hexachlorobutadiene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Isopropylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
m+p-Xylenes		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Methylene chloride		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
n-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
n-Propylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
o-Xylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
sec-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Styrene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
tert-Butylbenzene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Tetrachloroethylene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Toluene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
trans-1,2-Dichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
trans-1,3-Dichloropropene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Trichloroethene		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
Trichlorofluoromethane		<0.0010	<0.0010	RPD-NA	mg/L	N/A	30	20-SEP-21
Vinyl chloride		<0.00050	<0.00050	RPD-NA	mg/L	N/A	30	20-SEP-21
WG3621120-2	**LCS**							
1,1,1,2-Tetrachloroethane			114.0		%		70-130	20-SEP-21
1,1,1-Trichloroethane			114.1		%		70-130	20-SEP-21
1,1,2,2-Tetrachloroethane			100.0		%		70-130	20-SEP-21
1,1,2-Trichloroethane			109.1		%		70-130	20-SEP-21
1,1-Dichloroethane			74.0		%		70-130	20-SEP-21
1,1-Dichloroethene			117.2		%		70-130	20-SEP-21
1,1-Dichloropropene			96.6		%		70-130	20-SEP-21
1,2,3-Trichlorobenzene			102.5		%		70-130	20-SEP-21
1,2,3-Trichloropropane			99.0		%		70-130	20-SEP-21
1,2,4-Trichlorobenzene			114.9		%		70-130	20-SEP-21
1,2,4-Trimethylbenzene			104.4		%		70-130	20-SEP-21
1,2-Dibromo-3-chloropropane			89.3		%		70-130	20-SEP-21
1,2-Dichlorobenzene			117.3		%		70-130	20-SEP-21
1,2-Dichloroethane			109.5		%		70-130	20-SEP-21
1,2-Dichloropropane			99.9		%		70-130	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-2 LCS								
1,3,5-Trimethylbenzene			105.0		%		70-130	20-SEP-21
1,3-Dichlorobenzene			123.3		%		70-130	20-SEP-21
1,3-Dichloropropane			104.9		%		70-130	20-SEP-21
1,4-Dichlorobenzene			112.4		%		70-130	20-SEP-21
2,2-Dichloropropane			73.5		%		70-130	20-SEP-21
2-Chlorotoluene			104.7		%		70-130	20-SEP-21
4-Chlorotoluene			111.1		%		70-130	20-SEP-21
p-Isopropyltoluene			99.7		%		50-150	20-SEP-21
Benzene			103.8		%		70-130	20-SEP-21
Bromobenzene			117.3		%		70-130	20-SEP-21
Bromochloromethane			120.2		%		70-130	20-SEP-21
Bromodichloromethane			107.1		%		70-130	20-SEP-21
Bromoform			101.0		%		70-130	20-SEP-21
Bromomethane			129.7		%		60-140	20-SEP-21
Carbon tetrachloride			104.9		%		70-130	20-SEP-21
Chlorobenzene			122.0		%		70-130	20-SEP-21
Chloroethane			121.5		%		60-140	20-SEP-21
Chloroform			119.8		%		70-130	20-SEP-21
Chloromethane			121.4		%		60-140	20-SEP-21
cis-1,2-Dichloroethene			117.8		%		70-130	20-SEP-21
cis-1,3-Dichloropropene			76.0		%		70-130	20-SEP-21
Dibromochloromethane			92.4		%		70-130	20-SEP-21
Dibromomethane			100.9		%		70-130	20-SEP-21
Dichlorodifluoromethane			117.8		%		60-140	20-SEP-21
Ethylbenzene			104.1		%		70-130	20-SEP-21
Ethylene dibromide			100.0		%		70-130	20-SEP-21
Hexachlorobutadiene			128.0		%		70-130	20-SEP-21
Isopropylbenzene			101.3		%		70-130	20-SEP-21
m+p-Xylenes			118.4		%		70-130	20-SEP-21
Methylene chloride			124.8		%		60-140	20-SEP-21
n-Butylbenzene			107.7		%		70-130	20-SEP-21
n-Propylbenzene			101.5		%		70-130	20-SEP-21
o-Xylene			95.9		%		70-130	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-2	**LCS**							
sec-Butylbenzene			122.9		%		70-130	20-SEP-21
Styrene			83.5		%		70-130	20-SEP-21
tert-Butylbenzene			109.8		%		70-130	20-SEP-21
Tetrachloroethylene			120.0		%		70-130	20-SEP-21
Toluene			88.1		%		70-130	20-SEP-21
trans-1,2-Dichloroethene			120.8		%		70-130	20-SEP-21
trans-1,3-Dichloropropene			73.2		%		70-130	20-SEP-21
Trichloroethene			106.9		%		70-130	20-SEP-21
Trichlorofluoromethane			125.6		%		60-140	20-SEP-21
Vinyl chloride			110.2		%		60-140	20-SEP-21
WG3621120-8	**LCS**							
1,1,1,2-Tetrachloroethane			96.7		%		70-130	20-SEP-21
1,1,1-Trichloroethane			107.3		%		70-130	20-SEP-21
1,1,2,2-Tetrachloroethane			99.1		%		70-130	20-SEP-21
1,1,2-Trichloroethane			108.7		%		70-130	20-SEP-21
1,1-Dichloroethane			110.0		%		70-130	20-SEP-21
1,1-Dichloroethene			112.1		%		70-130	20-SEP-21
1,1-Dichloropropene			97.6		%		70-130	20-SEP-21
1,2,3-Trichlorobenzene			102.4		%		70-130	20-SEP-21
1,2,3-Trichloropropane			92.5		%		70-130	20-SEP-21
1,2,4-Trichlorobenzene			102.0		%		70-130	20-SEP-21
1,2,4-Trimethylbenzene			100.2		%		70-130	20-SEP-21
1,2-Dibromo-3-chloropropane			94.9		%		70-130	20-SEP-21
1,2-Dichlorobenzene			108.6		%		70-130	20-SEP-21
1,2-Dichloroethane			98.3		%		70-130	20-SEP-21
1,2-Dichloropropane			96.3		%		70-130	20-SEP-21
1,3,5-Trimethylbenzene			103.5		%		70-130	20-SEP-21
1,3-Dichlorobenzene			103.4		%		70-130	20-SEP-21
1,3-Dichloropropane			104.3		%		70-130	20-SEP-21
1,4-Dichlorobenzene			98.5		%		70-130	20-SEP-21
2,2-Dichloropropane			95.4		%		70-130	20-SEP-21
2-Chlorotoluene			97.0		%		70-130	20-SEP-21
4-Chlorotoluene			99.4		%		70-130	20-SEP-21
p-Isopropyltoluene			90.9		%		50-150	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-8	**LCS**							
Benzene			101.6		%		70-130	20-SEP-21
Bromobenzene			107.0		%		70-130	20-SEP-21
Bromochloromethane			109.4		%		70-130	20-SEP-21
Bromodichloromethane			107.5		%		70-130	20-SEP-21
Bromoform			93.6		%		70-130	20-SEP-21
Bromomethane			120.7		%		60-140	20-SEP-21
Carbon tetrachloride			98.0		%		70-130	20-SEP-21
Chlorobenzene			103.0		%		70-130	20-SEP-21
Chloroethane			114.6		%		60-140	20-SEP-21
Chloroform			110.5		%		70-130	20-SEP-21
Chloromethane			126.9		%		60-140	20-SEP-21
cis-1,2-Dichloroethene			111.5		%		70-130	20-SEP-21
cis-1,3-Dichloropropene			75.3		%		70-130	20-SEP-21
Dibromochloromethane			93.1		%		70-130	20-SEP-21
Dibromomethane			99.4		%		70-130	20-SEP-21
Dichlorodifluoromethane			111.2		%		60-140	20-SEP-21
Ethylbenzene			89.8		%		70-130	20-SEP-21
Ethylene dibromide			96.5		%		70-130	20-SEP-21
Hexachlorobutadiene			94.2		%		70-130	20-SEP-21
Isopropylbenzene			96.0		%		70-130	20-SEP-21
m+p-Xylenes			116.6		%		70-130	20-SEP-21
Methylene chloride			112.5		%		60-140	20-SEP-21
n-Butylbenzene			95.4		%		70-130	20-SEP-21
n-Propylbenzene			86.7		%		70-130	20-SEP-21
o-Xylene			88.9		%		70-130	20-SEP-21
sec-Butylbenzene			103.3		%		70-130	20-SEP-21
Styrene			84.2		%		70-130	20-SEP-21
tert-Butylbenzene			100.4		%		70-130	20-SEP-21
Tetrachloroethylene			112.0		%		70-130	20-SEP-21
Toluene			94.5		%		70-130	20-SEP-21
trans-1,2-Dichloroethene			112.8		%		70-130	20-SEP-21
trans-1,3-Dichloropropene			75.6		%		70-130	20-SEP-21
Trichloroethene			103.7		%		70-130	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-8	**LCS**							
Trichlorofluoromethane			123.5		%		60-140	20-SEP-21
Vinyl chloride			103.4		%		60-140	20-SEP-21
WG3621120-1	**MB**							
1,1,1,2-Tetrachloroethane			<0.0010		mg/L		0.001	20-SEP-21
1,1,1-Trichloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1,2,2-Tetrachloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1,2-Trichloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1-Dichloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1-Dichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
1,1-Dichloropropene			<0.0010		mg/L		0.001	20-SEP-21
1,2,3-Trichlorobenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2,3-Trichloropropane			<0.00050		mg/L		0.0005	20-SEP-21
1,2,4-Trichlorobenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2,4-Trimethylbenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dibromo-3-chloropropane			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
1,2-Dichloroethane			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dichloropropane			<0.00050		mg/L		0.0005	20-SEP-21
1,3,5-Trimethylbenzene			<0.0010		mg/L		0.001	20-SEP-21
1,3-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
1,3-Dichloropropane			<0.0010		mg/L		0.001	20-SEP-21
1,4-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
2,2-Dichloropropane			<0.0010		mg/L		0.001	20-SEP-21
2-Chlorotoluene			<0.0010		mg/L		0.001	20-SEP-21
4-Chlorotoluene			<0.0010		mg/L		0.001	20-SEP-21
p-Isopropyltoluene			<0.0010		mg/L		0.001	20-SEP-21
Benzene			<0.00050		mg/L		0.0005	20-SEP-21
Bromobenzene			<0.0010		mg/L		0.001	20-SEP-21
Bromochloromethane			<0.0010		mg/L		0.001	20-SEP-21
Bromodichloromethane			<0.00050		mg/L		0.0005	20-SEP-21
Bromoform			<0.00050		mg/L		0.0005	20-SEP-21
Bromomethane			<0.0010		mg/L		0.001	20-SEP-21
Carbon tetrachloride			<0.00050		mg/L		0.0005	20-SEP-21
Chlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-1	**MB**							
Chloroethane			<0.0010		mg/L		0.001	20-SEP-21
Chloroform			<0.00050		mg/L		0.0005	20-SEP-21
Chloromethane			<0.0010		mg/L		0.001	20-SEP-21
cis-1,2-Dichloroethene			<0.0010		mg/L		0.001	20-SEP-21
cis-1,3-Dichloropropene			<0.00050		mg/L		0.0005	20-SEP-21
Dibromochloromethane			<0.00050		mg/L		0.0005	20-SEP-21
Dibromomethane			<0.00050		mg/L		0.0005	20-SEP-21
Dichlorodifluoromethane			<0.00050		mg/L		0.0005	20-SEP-21
Ethylbenzene			<0.00050		mg/L		0.0005	20-SEP-21
Ethylene dibromide			<0.00050		mg/L		0.0005	20-SEP-21
Hexachlorobutadiene			<0.0010		mg/L		0.001	20-SEP-21
Isopropylbenzene			<0.0010		mg/L		0.001	20-SEP-21
m+p-Xylenes			<0.00050		mg/L		0.0005	20-SEP-21
Methylene chloride			<0.0010		mg/L		0.001	20-SEP-21
n-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
n-Propylbenzene			<0.0010		mg/L		0.001	20-SEP-21
o-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
sec-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
Styrene			<0.00050		mg/L		0.0005	20-SEP-21
tert-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
Tetrachloroethylene			<0.00050		mg/L		0.0005	20-SEP-21
Toluene			<0.00050		mg/L		0.0005	20-SEP-21
trans-1,2-Dichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
trans-1,3-Dichloropropene			<0.0010		mg/L		0.001	20-SEP-21
Trichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
Trichlorofluoromethane			<0.0010		mg/L		0.001	20-SEP-21
Vinyl chloride			<0.00050		mg/L		0.0005	20-SEP-21
Surrogate: 1,4-Difluorobenzene			99.9		%		70-130	20-SEP-21
Surrogate: 4-Bromofluorobenzene			75.9		%		70-130	20-SEP-21
WG3621120-7	**MB**							
1,1,1,2-Tetrachloroethane			<0.0010		mg/L		0.001	20-SEP-21
1,1,1-Trichloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1,2,2-Tetrachloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1,2-Trichloroethane			<0.00050		mg/L		0.0005	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-7 MB								
1,1-Dichloroethane			<0.00050		mg/L		0.0005	20-SEP-21
1,1-Dichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
1,1-Dichloropropene			<0.0010		mg/L		0.001	20-SEP-21
1,2,3-Trichlorobenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2,3-Trichloropropane			<0.00050		mg/L		0.0005	20-SEP-21
1,2,4-Trichlorobenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2,4-Trimethylbenzene			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dibromo-3-chloropropane			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
1,2-Dichloroethane			<0.0010		mg/L		0.001	20-SEP-21
1,2-Dichloropropane			<0.00050		mg/L		0.0005	20-SEP-21
1,3,5-Trimethylbenzene			<0.0010		mg/L		0.001	20-SEP-21
1,3-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
1,3-Dichloropropane			<0.0010		mg/L		0.001	20-SEP-21
1,4-Dichlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
2,2-Dichloropropane			<0.0010		mg/L		0.001	20-SEP-21
2-Chlorotoluene			<0.0010		mg/L		0.001	20-SEP-21
4-Chlorotoluene			<0.0010		mg/L		0.001	20-SEP-21
p-Isopropyltoluene			<0.0010		mg/L		0.001	20-SEP-21
Benzene			<0.00050		mg/L		0.0005	20-SEP-21
Bromobenzene			<0.0010		mg/L		0.001	20-SEP-21
Bromochloromethane			<0.0010		mg/L		0.001	20-SEP-21
Bromodichloromethane			<0.00050		mg/L		0.0005	20-SEP-21
Bromoform			<0.00050		mg/L		0.0005	20-SEP-21
Bromomethane			<0.0010		mg/L		0.001	20-SEP-21
Carbon tetrachloride			<0.00050		mg/L		0.0005	20-SEP-21
Chlorobenzene			<0.00050		mg/L		0.0005	20-SEP-21
Chloroethane			<0.0010		mg/L		0.001	20-SEP-21
Chloroform			<0.00050		mg/L		0.0005	20-SEP-21
Chloromethane			<0.0010		mg/L		0.001	20-SEP-21
cis-1,2-Dichloroethene			<0.0010		mg/L		0.001	20-SEP-21
cis-1,3-Dichloropropene			<0.00050		mg/L		0.0005	20-SEP-21
Dibromochloromethane			<0.00050		mg/L		0.0005	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-7 MB								
Dibromomethane			<0.00050		mg/L		0.0005	20-SEP-21
Dichlorodifluoromethane			<0.00050		mg/L		0.0005	20-SEP-21
Ethylbenzene			<0.00050		mg/L		0.0005	20-SEP-21
Ethylene dibromide			<0.00050		mg/L		0.0005	20-SEP-21
Hexachlorobutadiene			<0.0010		mg/L		0.001	20-SEP-21
Isopropylbenzene			<0.0010		mg/L		0.001	20-SEP-21
m+p-Xylenes			<0.00050		mg/L		0.0005	20-SEP-21
Methylene chloride			<0.0010		mg/L		0.001	20-SEP-21
n-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
n-Propylbenzene			<0.0010		mg/L		0.001	20-SEP-21
o-Xylene			<0.00050		mg/L		0.0005	20-SEP-21
sec-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
Styrene			<0.00050		mg/L		0.0005	20-SEP-21
tert-Butylbenzene			<0.0010		mg/L		0.001	20-SEP-21
Tetrachloroethylene			<0.00050		mg/L		0.0005	20-SEP-21
Toluene			<0.00050		mg/L		0.0005	20-SEP-21
trans-1,2-Dichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
trans-1,3-Dichloropropene			<0.0010		mg/L		0.001	20-SEP-21
Trichloroethene			<0.00050		mg/L		0.0005	20-SEP-21
Trichlorofluoromethane			<0.0010		mg/L		0.001	20-SEP-21
Vinyl chloride			<0.00050		mg/L		0.0005	20-SEP-21
Surrogate: 1,4-Difluorobenzene			98.1		%		70-130	20-SEP-21
Surrogate: 4-Bromofluorobenzene			72.0		%		70-130	20-SEP-21
WG3621120-10 MS		**L2638309-3**						
1,1,1,2-Tetrachloroethane			109.8		%		50-140	20-SEP-21
1,1,1-Trichloroethane			112.6		%		50-140	20-SEP-21
1,1,2,2-Tetrachloroethane			106.2		%		50-140	20-SEP-21
1,1,2-Trichloroethane			112.9		%		50-140	20-SEP-21
1,1-Dichloroethane			117.0		%		50-140	20-SEP-21
1,1-Dichloroethene			115.0		%		50-140	20-SEP-21
1,1-Dichloropropene			94.0		%		50-140	20-SEP-21
1,2,3-Trichlorobenzene			92.1		%		50-140	20-SEP-21
1,2,3-Trichloropropane			103.0		%		70-130	20-SEP-21
1,2,4-Trichlorobenzene			89.8		%		50-140	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-10 MS		**L2638309-3**						
1,2,4-Trimethylbenzene			68.9		%		50-140	20-SEP-21
1,2-Dibromo-3-chloropropane			105.0		%		50-140	20-SEP-21
1,2-Dichlorobenzene			95.6		%		50-140	20-SEP-21
1,2-Dichloroethane			112.6		%		50-140	20-SEP-21
1,2-Dichloropropane			103.0		%		50-140	20-SEP-21
1,3,5-Trimethylbenzene			67.7		%		50-140	20-SEP-21
1,3-Dichlorobenzene			94.9		%		50-140	20-SEP-21
1,3-Dichloropropane			107.2		%		50-140	20-SEP-21
1,4-Dichlorobenzene			84.9		%		50-140	20-SEP-21
2,2-Dichloropropane			78.4		%		50-140	20-SEP-21
2-Chlorotoluene			78.4		%		50-140	20-SEP-21
4-Chlorotoluene			76.9		%		50-140	20-SEP-21
p-Isopropyltoluene			68.8		%		50-140	20-SEP-21
Benzene			103.2		%		50-140	20-SEP-21
Bromobenzene			100.9		%		50-140	20-SEP-21
Bromochloromethane			123.0		%		50-140	20-SEP-21
Bromodichloromethane			108.7		%		50-140	20-SEP-21
Bromoform			104.7		%		50-140	20-SEP-21
Bromomethane			133.1		%		50-140	20-SEP-21
Carbon tetrachloride			98.4		%		50-140	20-SEP-21
Chlorobenzene			105.6		%		50-140	20-SEP-21
Chloroethane			127.4		%		50-140	20-SEP-21
Chloroform			118.5		%		50-140	20-SEP-21
Chloromethane			138.3		%		50-140	20-SEP-21
cis-1,2-Dichloroethene			116.5		%		50-140	20-SEP-21
cis-1,3-Dichloropropene			75.3		%		50-140	20-SEP-21
Dibromochloromethane			94.3		%		50-140	20-SEP-21
Dibromomethane			105.8		%		50-140	20-SEP-21
Dichlorodifluoromethane			118.2		%		50-140	20-SEP-21
Ethylbenzene			84.9		%		50-140	20-SEP-21
Ethylene dibromide			104.0		%		50-140	20-SEP-21
Hexachlorobutadiene			87.7		%		50-140	20-SEP-21
Isopropylbenzene			71.1		%		50-140	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch	**R5588700**							
WG3621120-10	**MS**	**L2638309-3**						
m+p-Xylenes			89.4		%		50-140	20-SEP-21
Methylene chloride			124.1		%		50-140	20-SEP-21
n-Butylbenzene			122.4		%		50-140	20-SEP-21
n-Propylbenzene			65.1		%		50-140	20-SEP-21
o-Xylene			79.6		%		50-140	20-SEP-21
sec-Butylbenzene			72.1		%		50-140	20-SEP-21
Styrene			69.5		%		50-140	20-SEP-21
tert-Butylbenzene			71.9		%		50-140	20-SEP-21
Tetrachloroethylene			95.9		%		50-140	20-SEP-21
Toluene			82.2		%		50-140	20-SEP-21
trans-1,2-Dichloroethene			112.0		%		50-140	20-SEP-21
trans-1,3-Dichloropropene			71.5		%		50-140	20-SEP-21
Trichloroethene			100.7		%		50-140	20-SEP-21
Trichlorofluoromethane			131.7		%		50-140	20-SEP-21
Vinyl chloride			117.8		%		50-140	20-SEP-21
WG3621120-6	**MS**	**L2638356-1**						
1,1,1,2-Tetrachloroethane			109.5		%		50-140	20-SEP-21
1,1,1-Trichloroethane			107.1		%		50-140	20-SEP-21
1,1,2,2-Tetrachloroethane			106.5		%		50-140	20-SEP-21
1,1,2-Trichloroethane			108.5		%		50-140	20-SEP-21
1,1-Dichloroethane			106.7		%		50-140	20-SEP-21
1,1-Dichloroethene			105.0		%		50-140	20-SEP-21
1,1-Dichloropropene			102.2		%		50-140	20-SEP-21
1,2,3-Trichlorobenzene			123.5		%		50-140	20-SEP-21
1,2,3-Trichloropropane			102.4		%		70-130	20-SEP-21
1,2,4-Trichlorobenzene			118.7		%		50-140	20-SEP-21
1,2,4-Trimethylbenzene			119.4		%		50-140	20-SEP-21
1,2-Dibromo-3-chloropropane			108.3		%		50-140	20-SEP-21
1,2-Dichlorobenzene			122.6		%		50-140	20-SEP-21
1,2-Dichloroethane			98.8		%		50-140	20-SEP-21
1,2-Dichloropropane			98.5		%		50-140	20-SEP-21
1,3,5-Trimethylbenzene			122.0		%		50-140	20-SEP-21
1,3-Dichlorobenzene			121.2		%		50-140	20-SEP-21
1,3-Dichloropropane			105.7		%		50-140	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-6 MS		**L2638356-1**						
1,4-Dichlorobenzene			116.9		%		50-140	20-SEP-21
2,2-Dichloropropane			63.7		%		50-140	20-SEP-21
2-Chlorotoluene			117.6		%		50-140	20-SEP-21
4-Chlorotoluene			118.1		%		50-140	20-SEP-21
p-Isopropyltoluene			109.6		%		50-140	20-SEP-21
Benzene			102.4		%		50-140	20-SEP-21
Bromobenzene			126.6		%		50-140	20-SEP-21
Bromochloromethane			109.1		%		50-140	20-SEP-21
Bromodichloromethane			106.1		%		50-140	20-SEP-21
Bromoform			103.8		%		50-140	20-SEP-21
Bromomethane			113.4		%		50-140	20-SEP-21
Carbon tetrachloride			94.6		%		50-140	20-SEP-21
Chlorobenzene			120.9		%		50-140	20-SEP-21
Chloroethane			109.8		%		50-140	20-SEP-21
Chloroform			107.7		%		50-140	20-SEP-21
Chloromethane			119.5		%		50-140	20-SEP-21
cis-1,2-Dichloroethene			105.1		%		50-140	20-SEP-21
cis-1,3-Dichloropropene			79.1		%		50-140	20-SEP-21
Dibromochloromethane			93.2		%		50-140	20-SEP-21
Dibromomethane			100.2		%		50-140	20-SEP-21
Dichlorodifluoromethane			98.4		%		50-140	20-SEP-21
Ethylbenzene			110.8		%		50-140	20-SEP-21
Ethylene dibromide			101.1		%		50-140	20-SEP-21
Hexachlorobutadiene			110.4		%		50-140	20-SEP-21
Isopropylbenzene			116.1		%		50-140	20-SEP-21
m+p-Xylenes			137.0		%		50-140	20-SEP-21
Methylene chloride			108.2		%		50-140	20-SEP-21
n-Butylbenzene			117.4		%		50-140	20-SEP-21
n-Propylbenzene			111.9		%		50-140	20-SEP-21
o-Xylene			106.7		%		50-140	20-SEP-21
sec-Butylbenzene			122.1		%		50-140	20-SEP-21
Styrene			100.9		%		50-140	20-SEP-21
tert-Butylbenzene			117.9		%		50-140	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-HS-MS-CL	**Water**							
Batch R5588700								
WG3621120-6 MS		**L2638356-1**						
Tetrachloroethylene			112.1		%		50-140	20-SEP-21
Toluene			100.6		%		50-140	20-SEP-21
trans-1,2-Dichloroethene			106.4		%		50-140	20-SEP-21
trans-1,3-Dichloropropene			77.5		%		50-140	20-SEP-21
Trichloroethene			106.8		%		50-140	20-SEP-21
Trichlorofluoromethane			111.9		%		50-140	20-SEP-21
Vinyl chloride			101.9		%		50-140	20-SEP-21

Quality Control Report

Workorder: L2638370 Report Date: 23-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3
Contact: Darby Madalena

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

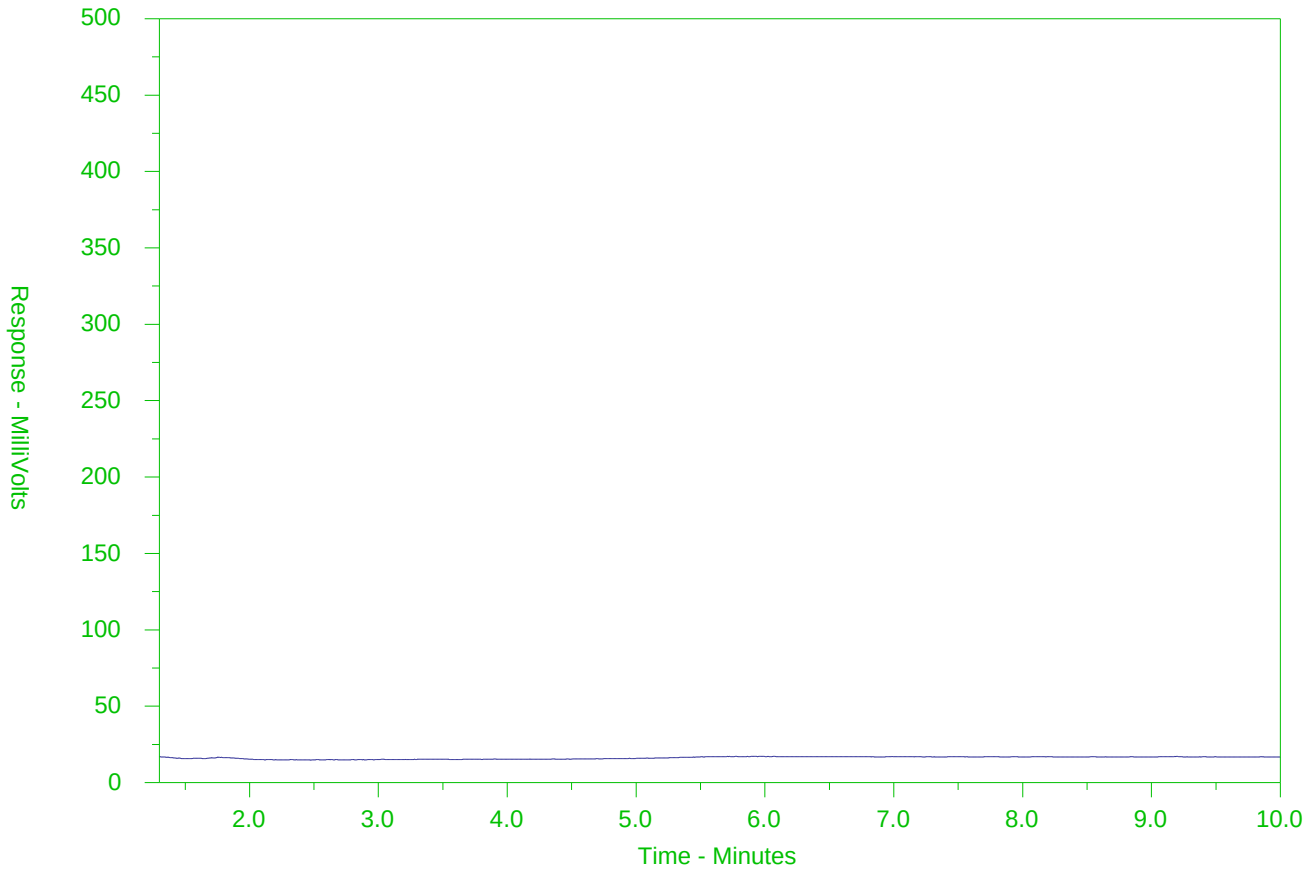
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-1
Client Sample ID: MW-05



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

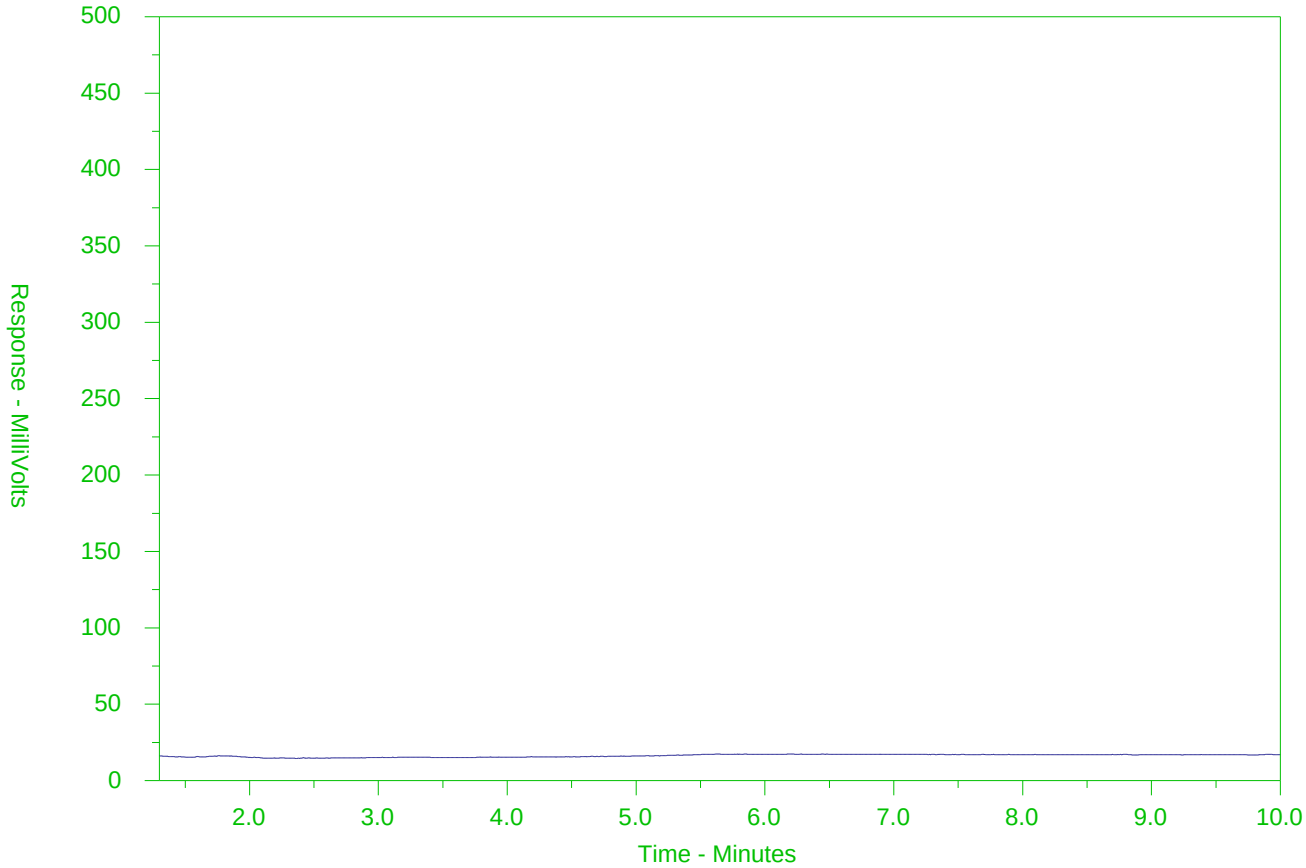
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-2
Client Sample ID: XCG-4(MW)



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

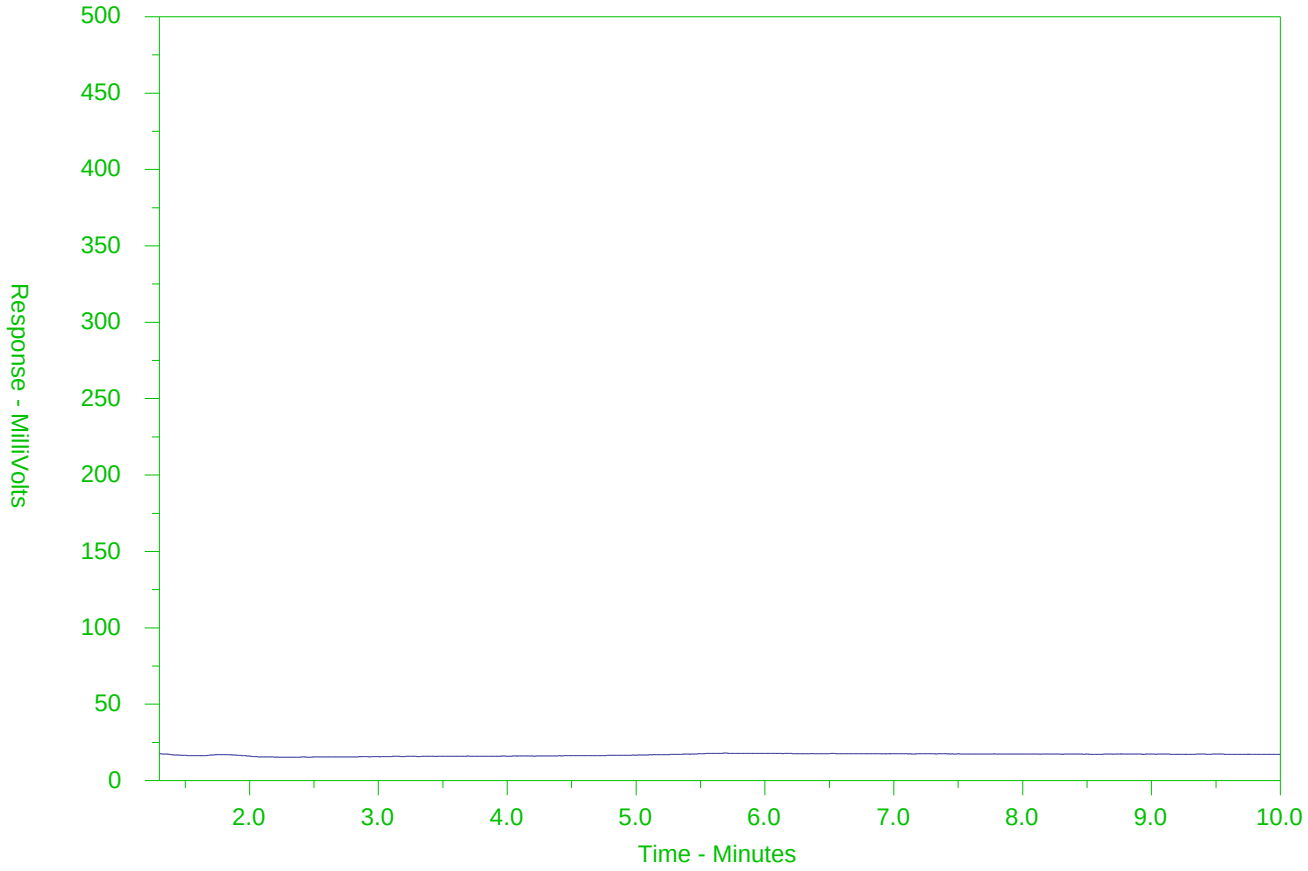
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-3
Client Sample ID: XCG-5(MW)



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

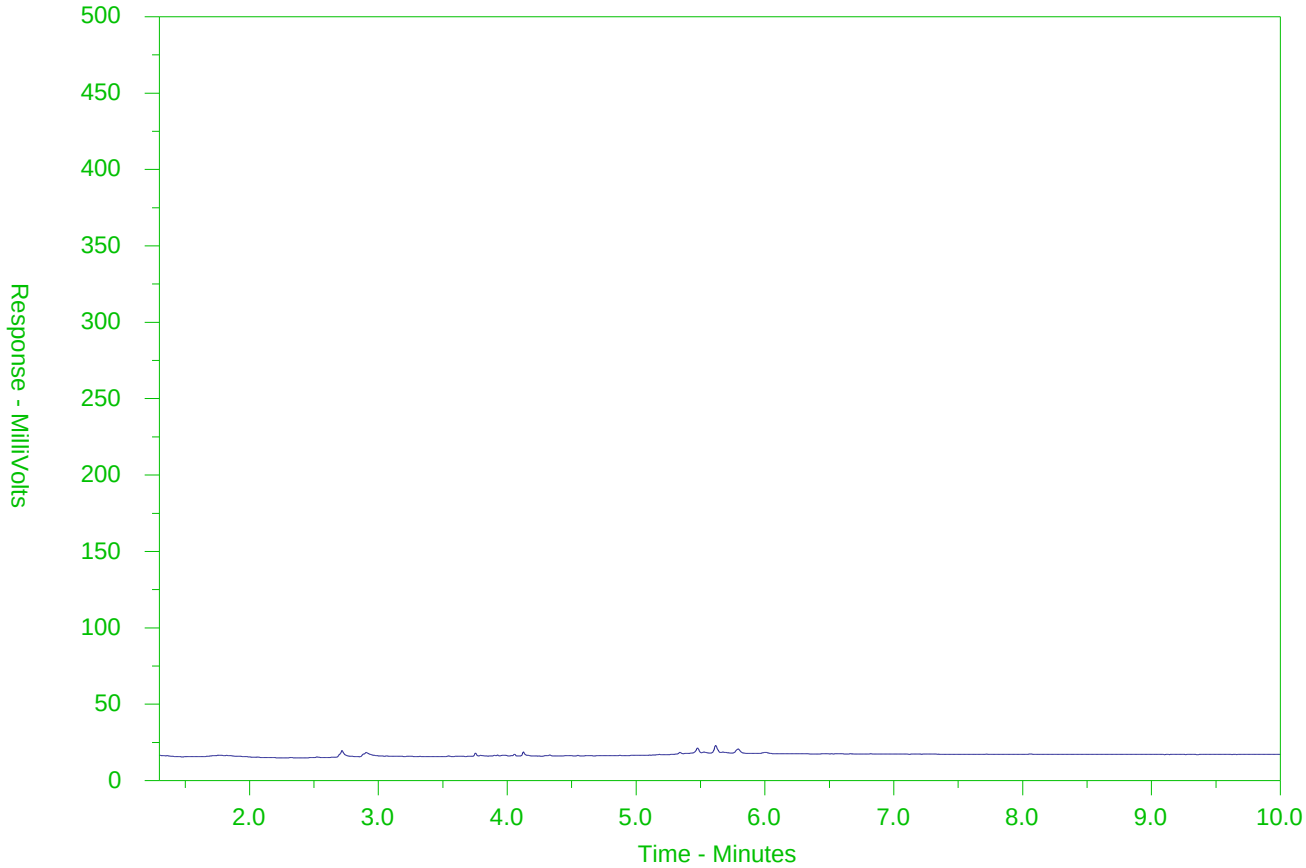
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-4
Client Sample ID: XCG-12(MW)



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

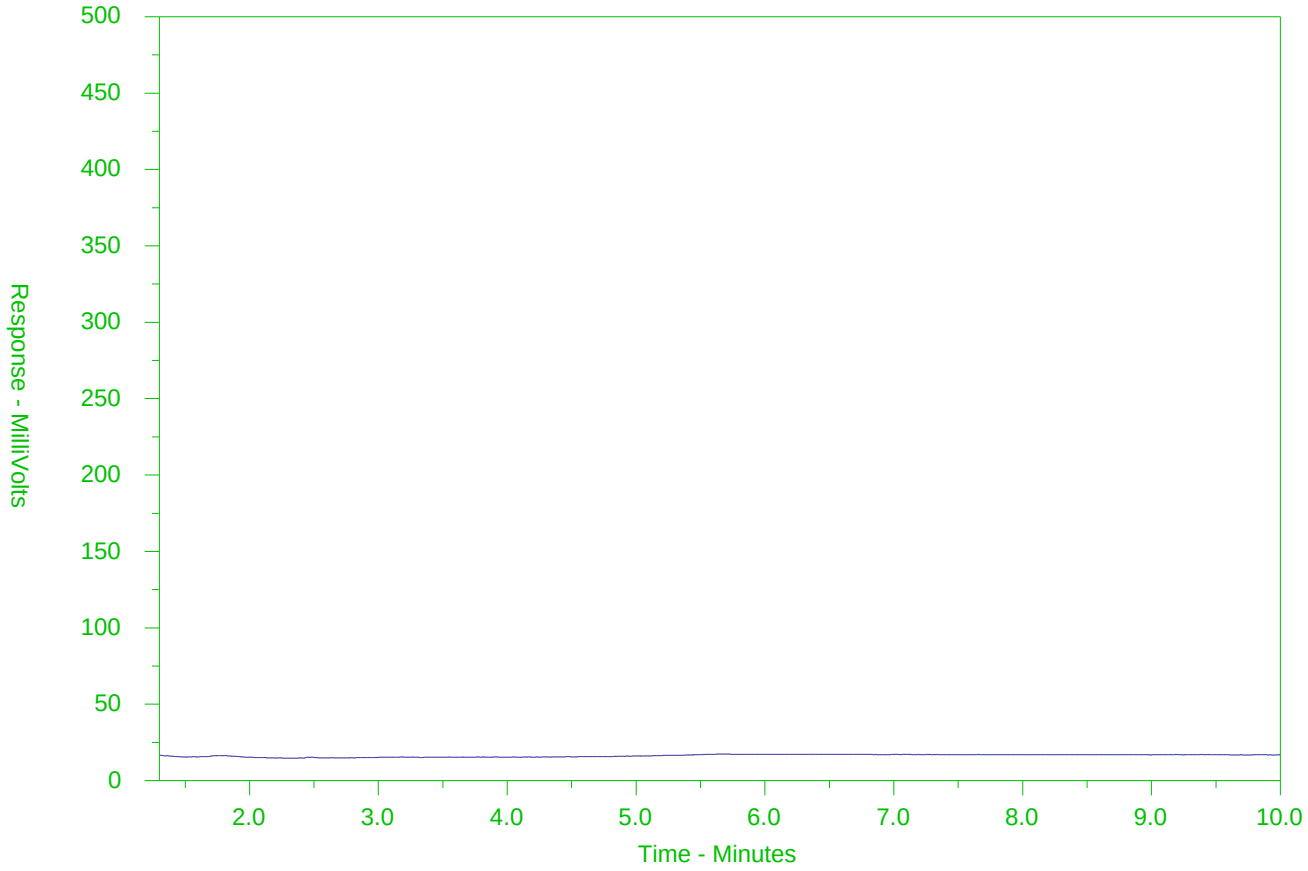
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-5
Client Sample ID: XCG-13(MW)



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

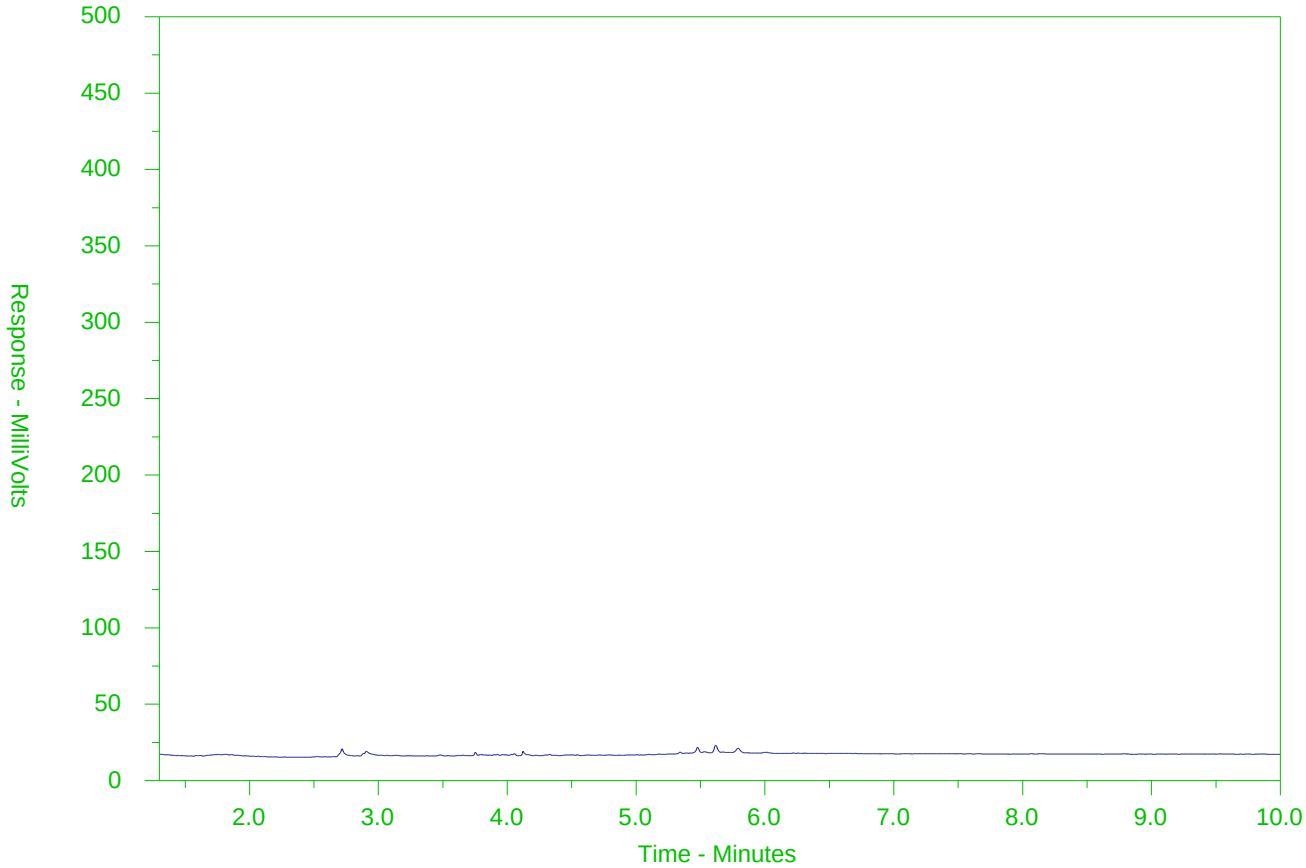
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2638370-6
Client Sample ID: DUPLICATE



← F2 →	← F3 →	← F4 →	
nC10	nC16	nC34	nC50
174°C 346°F	287°C 549°F	481°C 898°F	575°C 1067°F
← Gasoline →		← Motor Oils/ Lube Oils/ Grease →	
← Diesel/ Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the scale at left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR library can be found at www.alsglobal.com.

L2638370-COFC

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES
Environmental Division

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

COC # CORD Monfort

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Company:	Tetra Tech Canada Inc.	☐ Standard ☐ Other	☑ Regular Service (Default)
Contact:	Darby Madalena	☑ PDF ☑ Excel ☐ Fax	☐ Rush Service (2-3 Days)
Address:	110, 140 Quarry Park Blvd SE, Calgary, AB T2C 3G3	Email 1: darby.madalena@tetratech.com	☐ Priority Service (1 Day or ASAP)
		Email 2:	☐ Emergency Service (<1 Day / Wkend) - Contact ALS
Phone:	403-723-6867 Fax: 403-203-3301	ALS Digital Crosstab results	**Analysis Request**
Invoice To:	☑ Same as Report	Indicate Bottles: Filtered / Preserved (F/P) →→	
Company:	SAME AS REPORT	**Client / Project Information:**	
Contact:		Job #: SWM.SWOP04071-02.009	
Address:		PO/AFE: SWM.SWOP04071-02.009	
Sample		Legal Site Description:	
Phone:	Fax:	Quote #: Q71650	
Lab Work Order # (lab use only)		**ALS Contact:** Milica Papic	**Sampler** (Initials): Ryan Miller

Sample #	Sample Identification (This description will appear on the report)	Date dd-mmm-yy	Time hh:mm	Sample Type (Select from drop-down list)	BTEX,F1,F2-CL	VOC-8260-CL	ROU-MET_D-ABT1-CL	NH3-F-CL							Hazardous?	Highly Contaminated?	Number of Containers
1	MW-05	10-9-21	1150	Water	X	X	X	X									8
2	XCG-4 (MW)		915	Water	X	X	X	X									8
3	XCG-5 (MW)		1245	Water	X	X	X	X									8
4	XCG-12 (MW)		1320	Water	X	X	X	X									8
5	XCG-13 (MW)		1030	Water	X	X	X	X									8
6	Duplicate		—	Water	X	X	X	X									8

Guidelines / Regulations

Special Instructions / Hazardous Details

DSS Metals + Hg Filtered + preserved, NH3 preserved

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the adjacent worksheet.

Relinquished By:	Ryan Miller	Date & Time:	Sep 10/21	Received By:		Date & Time:	Sep 9/10	Sample Condition (lab use only)	
Relinquished By:		Date & Time:	16:00	Received By:		Date & Time:		Temperature 16/10	Samples Received in Good Condition? Y / N (if no provided details)

TETRA TECH CANADA INC.
ATTN: Darby Madalena
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Date Received: 10-SEP-21
Report Date: 16-SEP-21 15:38 (MT)
Version: FINAL

Client Phone: 403-203-3355

Certificate of Analysis

Lab Work Order #: L2638199

Project P.O. #: SWM.SWOP04071-02.009
Job Reference: SWM.SWOP04071-02.009
C of C Numbers: 17-831523
Legal Site Desc:

Milica Papic
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2638199-1 XCG-12 (SVP)							
Sampled By: RYAN MILLER on 10-SEP-21 @ 09:45							
Matrix: AIR							
Miscellaneous Parameters							
Methane	<3.0		3.0	ppm(V)		13-SEP-21	R5585148

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
METHANE-ED	Air	Methane	EPA 18 modified GC/FID

This analysis is performed using procedures adapted from EPA 18. Air samples are collected into gas bags or canisters. A volume of air sample is transferred from the bag or canister to a gas chromatograph with a flame ionization detector (FID) for analysis.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

17-831523

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Routine Water Chemistry Report

L2638199

Lab ID	Sample ID				Lab ID	Sample ID			

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L2638199

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L2638199 Report Date: 16-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
METHANE-ED	**Air**							
Batch R5585148								
WG3618492-4 DUP		**L2638199-1**						
Methane		<3.0	<3.0	RPD-NA	ppm(V)	N/A	20	13-SEP-21
WG3618492-2 LCS								
Methane			115.2		%		70-130	13-SEP-21
WG3618492-1 MB								
Methane			<3.0		ppm(V)		3	13-SEP-21

Quality Control Report

Workorder: L2638199 Report Date: 16-SEP-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3
Contact: Darby Madalena

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2638199-COFC

COC Number: 17 - 831523

Page of

Report To	Contact and company name below will appear on the final report
Company:	Tetra Tech Canada Inc
Contact:	Darby Madalena
Phone:	110, 140 Quarry Park Blvd, Calgary, AB T2C 3G3
	Company address below will appear on the final report
Street:	403-723-6867
City/Province:	
Postal Code:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL | | EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL | | MAIL ☐ FAX
Email 1 or Fax darby.madalena@tetratech.com
Email 2
Email 3

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐; 3 day [P3-25%] ☐; 2 day [P2-50%] ☐

EMERGENCY: 1 Business day [E - 100%] ☐; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Same as Report
Contact:	

Invoice Distribution

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2

Project Information

ALS Account # / Quote #:
Job #: SWM.SWAP04071-02.009
PO / AFE: SWM.SWAP04071-02 009
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only):
ALS Contact:
Sampler: Ryan Miller

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Methane	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	XCG-12 (SVP)	10-09-21	9:45	Air	1			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? | | YES | | NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Ryan Miller	Date: Sept 10/21	Time: 16:00	Received by:	Date:	Time: 16:10	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

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

TETRA TECH CANADA INC.
ATTN: Darby Madalena
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Date Received: 09-DEC-21
Report Date: 23-DEC-21 12:42 (MT)
Version: FINAL

Client Phone: 403-203-3355

Certificate of Analysis

Lab Work Order #: L2671041

Project P.O. #: 704-SWM.SWOP04071-02.009
Job Reference: 704-SWM.SWOP04071-02.009
C of C Numbers:
Legal Site Desc:

Milica Papic
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-1 VW-05							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	73.6		1.0	%		10-DEC-21	R5677123
Oxygen	18.5		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	7.67		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	3.5	AI	1.2	ug/m3		17-DEC-21	R5680325
Acetone	1.48	AI	0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	<0.32		0.32	ug/m3		17-DEC-21	R5680325
Benzene	<0.10		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-1 VW-05							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	3.60		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	1.15		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	<0.41		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	54.6		4.0	ug/m3		17-DEC-21	R5680325
cis-1,2-Dichloroethene	13.8		1.0	ppb(V)		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	110		4.9	ug/m3		17-DEC-21	R5680325
Dichlorodifluoromethane	22.2		1.0	ppb(V)		17-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	40.5		7.0	ug/m3		17-DEC-21	R5680325
Freon 114	5.8		1.0	ppb(V)		17-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	<1.7		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	<0.40		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	0.96		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	0.33		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-1 VW-05							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	<0.82		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	<0.70		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	<1.7	DLQ	1.7	ug/m3		17-DEC-21	R5680325
Propylene	<1.0	DLQ	1.0	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	2.2		1.4	ug/m3		17-DEC-21	R5680325
Tetrachloroethylene	0.33		0.20	ppb(V)		17-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	<0.75		0.75	ug/m3		17-DEC-21	R5680325
Toluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	7.78		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	1.96		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	<1.1		1.1	ug/m3		17-DEC-21	R5680325
Trichloroethylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichlorofluoromethane	7.6		1.1	ug/m3		17-DEC-21	R5680325
Trichlorofluoromethane	1.35		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	<0.51		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	99.1		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.45		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	<2.0		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	<15		15	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	<15		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	101.1		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	0.00023		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	-11.2		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX2480				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-1 VW-05							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-2 XCG-4 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	77.5		1.0	%		10-DEC-21	R5677123
Oxygen	21.0		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	1.15		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	10.0		1.2	ug/m3		17-DEC-21	R5680325
Acetone	4.21		0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	<0.32		0.32	ug/m3		17-DEC-21	R5680325
Benzene	<0.10		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-2 XCG-4 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	<0.62		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	0.49		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	0.24		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	1.32		0.79	ug/m3		17-DEC-21	R5680325
cis-1,2-Dichloroethene	0.33		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	50.7		4.9	ug/m3		17-DEC-21	R5680325
Dichlorodifluoromethane	10.3		1.0	ppb(V)		17-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	12.0		1.4	ug/m3		17-DEC-21	R5680325
Freon 114	1.71		0.20	ppb(V)		17-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	<1.7		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	<0.40		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	0.91		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	0.31		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-2 XCG-4 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	<0.82		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	0.75		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	0.21		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	<2.1	DLQ	2.1	ug/m3		17-DEC-21	R5680325
Propylene	<1.2	DLQ	1.2	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	40.5		6.8	ug/m3		17-DEC-21	R5680325
Tetrachloroethylene	6.0		1.0	ppb(V)		17-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	<0.75		0.75	ug/m3		17-DEC-21	R5680325
Toluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	<1.1		1.1	ug/m3		17-DEC-21	R5680325
Trichloroethylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichlorofluoromethane	1.3		1.1	ug/m3		17-DEC-21	R5680325
Trichlorofluoromethane	0.24		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	2.07		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	0.81		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	99.6		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.45		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	<2.0		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	1520		15	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	<15		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	101.9		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	0.00421		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	-12.4		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX1727				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-2 XCG-4 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-3 VW-04							
Sampled By: CLIENT on 23-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	76.2		1.0	%		10-DEC-21	R5677123
Oxygen	20.8		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	1.45		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	1.7		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	0.31		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	1.6		1.2	ug/m3		17-DEC-21	R5680325
Acetone	0.68		0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	<0.32		0.32	ug/m3		17-DEC-21	R5680325
Benzene	<0.10		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-3 VW-04							
Sampled By: CLIENT on 23-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	<0.62		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	6.52		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	1.34		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	<0.41		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
cis-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	76.1		4.9	ug/m3		20-DEC-21	R5680325
Dichlorodifluoromethane	15.4		1.0	ppb(V)		20-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	15.6		1.4	ug/m3		17-DEC-21	R5680325
Freon 114	2.23		0.20	ppb(V)		17-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	<1.7		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	<0.40		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-3 VW-04							
Sampled By: CLIENT on 23-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	<0.82		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	<0.70		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	<0.34		0.34	ug/m3		17-DEC-21	R5680325
Propylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	8950		330	ug/m3		20-DEC-21	R5680325
Tetrachloroethylene	1320		48	ppb(V)		20-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	<0.75		0.75	ug/m3		17-DEC-21	R5680325
Toluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	85.6		5.4	ug/m3		20-DEC-21	R5680325
Trichloroethylene	15.9		1.0	ppb(V)		20-DEC-21	R5680325
Trichlorofluoromethane	19.6		5.6	ug/m3		20-DEC-21	R5680325
Trichlorofluoromethane	3.5		1.0	ppb(V)		20-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	<0.51		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	99.0		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.45		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	<2.0		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	6800		360	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	40		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	102.8		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	<0.00010		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	7.6		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX0862				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-3 VW-04							
Sampled By: CLIENT on 23-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-4 XCG-8 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	75.4		1.0	%		10-DEC-21	R5677123
Oxygen	21.5		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	0.257		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	3.01		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	0.61		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	1.94		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	0.39		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	5.3		1.2	ug/m3		17-DEC-21	R5680325
Acetone	2.23		0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	1.47		0.32	ug/m3		17-DEC-21	R5680325
Benzene	0.46		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-4 XCG-8 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	<0.62		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	0.72		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	0.35		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
cis-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	1.20		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	0.35		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	16.4		0.99	ug/m3		17-DEC-21	R5680325
Dichlorodifluoromethane	3.32		0.20	ppb(V)		17-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	9.40		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	2.17		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	7.5		1.4	ug/m3		17-DEC-21	R5680325
Freon 114	1.07		0.20	ppb(V)		17-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	12.6		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	2.91		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	1.42		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	0.48		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-4 XCG-8 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	3.14		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	0.77		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	2.08		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	0.59		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	2.63	AI	0.34	ug/m3		17-DEC-21	R5680325
Propylene	1.53	AI	0.20	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	50.4		6.8	ug/m3		20-DEC-21	R5680325
Tetrachloroethylene	7.4		1.0	ppb(V)		20-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	<0.75		0.75	ug/m3		17-DEC-21	R5680325
Toluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	<1.1		1.1	ug/m3		17-DEC-21	R5680325
Trichloroethylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichlorofluoromethane	1.2		1.1	ug/m3		17-DEC-21	R5680325
Trichlorofluoromethane	0.22		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	<0.51		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	98.2		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	2.91		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	12.6		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	154		15	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	75		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	100.0		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	0.0224		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	-11.4		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX2366				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-4 XCG-8 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-5 XCG-13 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	72.6		1.0	%		10-DEC-21	R5677123
Oxygen	13.6		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	11.1		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	3.0		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	0.50		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	2.6		1.2	ug/m3		17-DEC-21	R5680325
Acetone	1.08		0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	1.38		0.32	ug/m3		17-DEC-21	R5680325
Benzene	0.43		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-5 XCG-13 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	<0.62		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	1.04		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	0.50		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	3.14		0.79	ug/m3		17-DEC-21	R5680325
cis-1,2-Dichloroethene	0.79		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	9.18		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	2.67		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	1890		120	ug/m3		20-DEC-21	R5680325
Dichlorodifluoromethane	382		25	ppb(V)		20-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	330		7.0	ug/m3		20-DEC-21	R5680325
Freon 114	47.2		1.0	ppb(V)		20-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	<1.7		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	<0.40		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-5 XCG-13 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	<0.82		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	<0.70		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	0.62	AI	0.34	ug/m3		17-DEC-21	R5680325
Propylene	0.36	AI	0.20	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	8.3		1.4	ug/m3		17-DEC-21	R5680325
Tetrachloroethylene	1.23		0.20	ppb(V)		17-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	<0.75		0.75	ug/m3		17-DEC-21	R5680325
Toluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	6.7		1.1	ug/m3		17-DEC-21	R5680325
Trichloroethylene	1.25		0.20	ppb(V)		17-DEC-21	R5680325
Trichlorofluoromethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
Trichlorofluoromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	<0.51		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	97.2		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.45		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	<2.0		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	49		15	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	<15		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	99.2		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	0.00022		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	-12.9		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX0921				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-5 XCG-13 (SVP)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-6 DUPLICATE (21DUPVWMONTFORT)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
High Level Fixed Gases by TCD							
Nitrogen	71.9		1.0	%		10-DEC-21	R5677123
Oxygen	18.1		0.10	%		10-DEC-21	R5677123
Carbon Dioxide	7.70		0.050	%		10-DEC-21	R5677123
Carbon Monoxide	<0.050		0.050	%		10-DEC-21	R5677123
Methane	<0.050		0.050	%		10-DEC-21	R5677123
Canister EPA TO-15							
1,1,1-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,1-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<1.4		1.4	ug/m3		17-DEC-21	R5680325
1,1,2,2-Tetrachloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1,2-Trichloroethane	<1.1		1.1	ug/m3		17-DEC-21	R5680325
1,1,2-Trichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,1-Dichloroethene	<0.79		0.79	ug/m3		17-DEC-21	R5680325
1,1-Dichloroethene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2,4-Trichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,2,4-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dibromoethane	<1.5		1.5	ug/m3		17-DEC-21	R5680325
1,2-Dibromoethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,2-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloroethane	<0.81		0.81	ug/m3		17-DEC-21	R5680325
1,2-Dichloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,2-Dichloropropane	<0.92		0.92	ug/m3		17-DEC-21	R5680325
1,2-Dichloropropane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
1,3,5-Trimethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Butadiene	<0.44		0.44	ug/m3		17-DEC-21	R5680325
1,3-Butadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,3-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,3-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dichlorobenzene	<1.2		1.2	ug/m3		17-DEC-21	R5680325
1,4-Dichlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
1,4-Dioxane	<0.72		0.72	ug/m3		17-DEC-21	R5680325
1,4-Dioxane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
2-Hexanone	<4.1		4.1	ug/m3		17-DEC-21	R5680325
2-Hexanone	<1.0		1.0	ppb(V)		17-DEC-21	R5680325
4-Ethyltoluene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
4-Ethyltoluene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Acetone	3.5		1.2	ug/m3		17-DEC-21	R5680325
Acetone	1.47		0.50	ppb(V)		17-DEC-21	R5680325
Allyl chloride	<0.63		0.63	ug/m3		17-DEC-21	R5680325
Allyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Benzene	0.35		0.32	ug/m3		17-DEC-21	R5680325
Benzene	0.11		0.10	ppb(V)		17-DEC-21	R5680325
Benzyl chloride	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Benzyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromodichloromethane	<1.3		1.3	ug/m3		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-6 DUPLICATE (21DUPVWMONTFORT)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
Bromodichloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromoform	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Bromoform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Bromomethane	<0.78		0.78	ug/m3		17-DEC-21	R5680325
Bromomethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Disulfide	3.68		0.62	ug/m3		17-DEC-21	R5680325
Carbon Disulfide	1.18		0.20	ppb(V)		17-DEC-21	R5680325
Carbon Tetrachloride	<1.3		1.3	ug/m3		17-DEC-21	R5680325
Carbon Tetrachloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chlorobenzene	<0.92		0.92	ug/m3		17-DEC-21	R5680325
Chlorobenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroethane	<0.53		0.53	ug/m3		17-DEC-21	R5680325
Chloroethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloroform	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Chloroform	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Chloromethane	0.54		0.41	ug/m3		17-DEC-21	R5680325
Chloromethane	0.26		0.20	ppb(V)		17-DEC-21	R5680325
cis-1,2-Dichloroethene	57.8		4.0	ug/m3		20-DEC-21	R5680325
cis-1,2-Dichloroethene	14.6		1.0	ppb(V)		20-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
cis-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Cyclohexane	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Cyclohexane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dibromochloromethane	<1.7		1.7	ug/m3		17-DEC-21	R5680325
Dibromochloromethane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Dichlorodifluoromethane	109		4.9	ug/m3		20-DEC-21	R5680325
Dichlorodifluoromethane	22.1		1.0	ppb(V)		20-DEC-21	R5680325
Ethyl acetate	<0.72		0.72	ug/m3		17-DEC-21	R5680325
Ethyl acetate	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Ethylbenzene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Ethylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 113	<1.5		1.5	ug/m3		17-DEC-21	R5680325
Freon 113	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Freon 114	37.5		7.0	ug/m3		20-DEC-21	R5680325
Freon 114	5.4		1.0	ppb(V)		20-DEC-21	R5680325
Hexachlorobutadiene	<2.1		2.1	ug/m3		17-DEC-21	R5680325
Hexachlorobutadiene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isooctane	<0.93		0.93	ug/m3		17-DEC-21	R5680325
Isooctane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Isopropylbenzene	<0.98		0.98	ug/m3		17-DEC-21	R5680325
Isopropylbenzene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
m&p-Xylene	<1.7		1.7	ug/m3		17-DEC-21	R5680325
m&p-Xylene	<0.40		0.40	ppb(V)		17-DEC-21	R5680325
Methyl ethyl ketone	0.77		0.59	ug/m3		17-DEC-21	R5680325
Methyl ethyl ketone	0.26		0.20	ppb(V)		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.82		0.82	ug/m3		17-DEC-21	R5680325
Methyl isobutyl ketone	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Methylene chloride	<0.69		0.69	ug/m3		17-DEC-21	R5680325
Methylene chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
MTBE	<0.72		0.72	ug/m3		17-DEC-21	R5680325
MTBE	<0.20		0.20	ppb(V)		17-DEC-21	R5680325

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-6 DUPLICATE (21DUPVWMONTFORT)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister EPA TO-15							
n-Heptane	<0.82		0.82	ug/m3		17-DEC-21	R5680325
n-Heptane	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
n-Hexane	1.00		0.70	ug/m3		17-DEC-21	R5680325
n-Hexane	0.28		0.20	ppb(V)		17-DEC-21	R5680325
Naphthalene	<1.0		1.0	ug/m3		17-DEC-21	R5680325
Naphthalene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
o-Xylene	<0.87		0.87	ug/m3		17-DEC-21	R5680325
o-Xylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Propylene	<1.7	DLQ	1.7	ug/m3		17-DEC-21	R5680325
Propylene	<1.0	DLQ	1.0	ppb(V)		17-DEC-21	R5680325
Styrene	<0.85		0.85	ug/m3		17-DEC-21	R5680325
Styrene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Tetrachloroethylene	2.2		1.4	ug/m3		17-DEC-21	R5680325
Tetrachloroethylene	0.33		0.20	ppb(V)		17-DEC-21	R5680325
Tetrahydrofuran	<0.59		0.59	ug/m3		17-DEC-21	R5680325
Tetrahydrofuran	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Toluene	0.82		0.75	ug/m3		17-DEC-21	R5680325
Toluene	0.22		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,2-Dichloroethene	7.81		0.79	ug/m3		17-DEC-21	R5680325
trans-1,2-Dichloroethene	1.97		0.20	ppb(V)		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.91		0.91	ug/m3		17-DEC-21	R5680325
trans-1,3-Dichloropropene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichloroethylene	<1.1		1.1	ug/m3		17-DEC-21	R5680325
Trichloroethylene	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Trichlorofluoromethane	7.4		1.1	ug/m3		17-DEC-21	R5680325
Trichlorofluoromethane	1.31		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl acetate	<1.8		1.8	ug/m3		17-DEC-21	R5680325
Vinyl acetate	<0.50		0.50	ppb(V)		17-DEC-21	R5680325
Vinyl bromide	<0.87		0.87	ug/m3		17-DEC-21	R5680325
Vinyl bromide	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Vinyl chloride	<0.51		0.51	ug/m3		17-DEC-21	R5680325
Vinyl chloride	<0.20		0.20	ppb(V)		17-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	98.2		50-150	%		17-DEC-21	R5680325
Sum of Xylene Isomer Concentrations							
Xylenes (Total)	<0.45		0.45	ppb(V)		20-DEC-21	
Xylenes (Total)	<2.0		2.0	ug/m3		20-DEC-21	
Total F1and F2 fractions (not corrected)							
F1 (C6-C10)	19		15	ug/m3		20-DEC-21	R5680325
F2 (C10-C16)	30		15	ug/m3		20-DEC-21	R5680325
Surrogate: 4-Bromofluorobenzene	99.2		50-150	%		20-DEC-21	R5680325
Select list of 7 C1-C5 hydrocarbon gases							
Methane	0.00075		0.00010	%		14-DEC-21	R5680243
Ethane	<0.00020		0.00020	%		14-DEC-21	R5680243
Ethene	<0.00020		0.00020	%		14-DEC-21	R5680243
Propane	<0.00020		0.00020	%		14-DEC-21	R5680243
Propene	<0.00020		0.00020	%		14-DEC-21	R5680243
Butane	<0.00020		0.00020	%		14-DEC-21	R5680243
Pentane	<0.00020		0.00020	%		14-DEC-21	R5680243
Canister Information							
Pressure on Receipt	-11.4		-30	in Hg	13-DEC-21	13-DEC-21	R5677758
Canister ID	SX2233				13-DEC-21	13-DEC-21	R5677758
Regulator ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2671041-6 DUPLICATE (21DUPVWMONTFORT)							
Sampled By: CLIENT on 20-NOV-21							
Matrix: AIR							
Canister Information							
Batch Proof ID	N/A				13-DEC-21	13-DEC-21	R5677758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier Key:

Qualifier	Description
AI	Analytical interferences may be present. Result may be biased high.
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
RRQC	Refer to report remarks for information regarding this QC result.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
C1-C5-FID-WT	Canister	Select list of 7 C1-C5 hydrocarbon gases	EPA Method 3C & ASTM D1946

This analysis is performed using procedures adapted from ASTM D1946/EPA Method 3C. Air samples are collected into cleaned evaculated canisters. A volume of air is removed from the canister & injected into a GC-FID for analysis. Hydrocarbon gas concentrations are calculated against a gas standard. Test results are not blank corrected unless indicated by a qualifier.

Canister samples will be retained for 7 calendar days after final report. If you require longer canister storage time, please contact your account manager.

CAN-DATA-WT	Canister	Canister Information	EPA TO-15

Batch Proof ID, Canister ID, Pressure on Receipt, Regulator ID.

F1-F2-GCMS-WT	Canister	Total F1and F2 fractions (not corrected)	EPATO-15

This analysis is performed using procedures adapted from EPA Method TO-15. Air samples are collected into cleaned evacuated canisters. A volume of air sample is transferred from the canister to a preconcentrator system where the analytes are trapped & focused. The analytes are then thermally desorbed into a GC-MSD for analysis. Test results are not blank corrected unless indicated by a qualifier.

Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.

FIXED GASES-TCD-WT	Canister	High Level Fixed Gases by TCD	EPA Method 3C & ASTM D1946

This analysis is performed using procedures adapted from EPA Method 3C & ASTM D1946. Air samples are collected into cleaned evacuated canisters. A volume of air is removed from the canister and injected by means of a gas-sampling/backflush valve onto a series of packed GC columns and measured using a thermal conductivity detector (TCD).

Oxygen is not separated from Argon.

Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.

TO15-GCMS-WT	Canister	Canister EPA TO-15	EPA TO-15

This analysis is performed using procedures adapted from EPA Method TO-15. Air samples are collected into cleaned evacuated canisters. A volume of air sample is transferred from the canister to a preconcentrator system where the analytes are trapped & focused. The analytes are then thermally desorbed into a GC-MSD for analysis. Test results are not blank corrected unless indicated by a qualifier.

Canister samples will be retained for 7 calendar days after final report. If you require a longer canister storage time, please contact your account manager.

"Due to elevated laboratory background levels of IPA resulting from COVID-19 cleaning protocols, ALS is unable to report IPA results until further notice."

XYLENES-SUM-CALC-WT	Canister	Sum of Xylene Isomer Concentrations	CALCULATION

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Routine Water Chemistry Report

L2671041

Lab ID	Sample ID				Lab ID	Sample ID			

ALS LABORATORY GROUP SOIL SALINITY CONVERSION

L2671041

Lab ID	Sample ID					Lab ID	Sample ID				

"Calculations are as per:
Methods of Analysis for Soils, Plants and Waters
Homer D. Chapman and Parker F. Pratt
University of California, Riverside, Cl.
August, 1961."

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C1-C5-FID-WT	**Canister**							
Batch R5680243								
WG3674445-3 DUP		**L2669117-1**						
Methane		<0.00010	<0.00010	RPD-NA	%	N/A	20	14-DEC-21
Ethane		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
Ethene		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
Propane		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
Propene		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
Butane		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
Pentane		<0.00020	<0.00020	RPD-NA	%	N/A	20	14-DEC-21
WG3674445-2 LCS								
Methane			95.8		%		70-130	14-DEC-21
Ethane			99.5		%		70-130	14-DEC-21
Ethene			100.5		%		70-130	14-DEC-21
Propane			99.9		%		70-130	14-DEC-21
Propene			97.7		%		70-130	14-DEC-21
Butane			102.8		%		70-130	14-DEC-21
Pentane			106.2		%		70-130	14-DEC-21
WG3674445-1 MB								
Methane			<0.00010		%		0.0001	14-DEC-21
Ethane			<0.00020		%		0.0002	14-DEC-21
Ethene			<0.00020		%		0.0002	14-DEC-21
Propane			<0.00020		%		0.0002	14-DEC-21
Propene			<0.00020		%		0.0002	14-DEC-21
Butane			<0.00020		%		0.0002	14-DEC-21
Pentane			<0.00020		%		0.0002	14-DEC-21
CAN-DATA-WT	**Canister**							
Batch R5677758								
WG3673887-1 MB								
Pressure on Receipt			-29.8		in Hg			13-DEC-21
F1-F2-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-3 DUP		**L2671030-6**						
F1 (C6-C10)		40	<24	RPD-NA	ug/m3	N/A	50	20-DEC-21
F2 (C10-C16)		34	<24	RPD-NA	ug/m3	N/A	50	20-DEC-21
WG3674290-2 LCS								

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-F2-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-2 LCS								
F1 (C6-C10)			90.4		%		50-150	20-DEC-21
WG3674290-1 MB								
F1 (C6-C10)			<15		ug/m3		15	20-DEC-21
F2 (C10-C16)			<15		ug/m3		15	20-DEC-21
Surrogate: 4-Bromofluorobenzene			103.1		%		50-150	20-DEC-21
FIXED GASES-TCD-WT	**Canister**							
Batch R5677123								
WG3672392-3 DUP		**L2669098-1**						
Nitrogen		1.1	1.1		%	2.8	30	10-DEC-21
Oxygen		0.21	0.21		%	3.4	30	10-DEC-21
Carbon Dioxide		33.7	34.5		%	2.3	30	10-DEC-21
Carbon Monoxide		<0.050	<0.050	RPD-NA	%	N/A	30	10-DEC-21
Methane		62.5	62.5		%	0.1	30	10-DEC-21
WG3672392-2 LCS								
Nitrogen			102.8		%		70-130	10-DEC-21
Oxygen			103.0		%		70-130	10-DEC-21
Carbon Dioxide			101.6		%		70-130	10-DEC-21
Carbon Monoxide			97.5		%		70-130	10-DEC-21
Methane			102.4		%		70-130	10-DEC-21
WG3672392-1 MB								
Nitrogen			<1.0		%		1	10-DEC-21
Oxygen			<0.10		%		0.1	10-DEC-21
Carbon Dioxide			<0.050		%		0.05	10-DEC-21
Carbon Monoxide			<0.050		%		0.05	10-DEC-21
Methane			<0.050		%		0.05	10-DEC-21
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-3 DUP		**L2671030-6**						
1,1,1-Trichloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,1,2,2-Tetrachloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,1,2-Trichloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,1-Dichloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,1-Dichloroethene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,2,4-Trichlorobenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-3 DUP		**L2671030-6**						
1,2,4-Trimethylbenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,2-Dibromoethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,2-Dichlorobenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,2-Dichloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,2-Dichloropropane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,3,5-Trimethylbenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,3-Butadiene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,3-Dichlorobenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,4-Dichlorobenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
1,4-Dioxane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
2-Hexanone		<1.6	<1.6	RPD-NA	ppb(V)	N/A	30	17-DEC-21
4-Ethyltoluene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Acetone		9.9	9.7		ppb(V)	1.6	30	17-DEC-21
Allyl chloride		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Benzene		<0.16	<0.16	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Benzyl chloride		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Bromodichloromethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Bromoform		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Bromomethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Carbon Disulfide		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Carbon Tetrachloride		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Chlorobenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Chloroethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Chloroform		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Chloromethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
cis-1,2-Dichloroethene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
cis-1,3-Dichloropropene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Cyclohexane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Dibromochloromethane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Dichlorodifluoromethane		1.23	0.95		ppb(V)	26	30	17-DEC-21
Ethyl acetate		0.89	0.88		ppb(V)	0.2	30	17-DEC-21
Ethylbenzene		0.51	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Freon 113		<0.32	<0.32		ppb(V)			17-DEC-21

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-3 DUP		**L2671030-6**						
Freon 113		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Freon 114		0.60	0.41	J	ppb(V)	0.19	0.64	17-DEC-21
Hexachlorobutadiene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Isooctane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Isopropylbenzene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	50	17-DEC-21
m&p-Xylene		0.95	<0.64	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Methyl ethyl ketone		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Methyl isobutyl ketone		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Methylene chloride		1.39	1.36		ppb(V)	2.5	30	17-DEC-21
MTBE		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
n-Heptane		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
n-Hexane		1.11	1.07		ppb(V)	3.1	30	17-DEC-21
Naphthalene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
o-Xylene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Propylene		<0.50	<0.50	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Styrene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Tetrachloroethylene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Tetrahydrofuran		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Toluene		5.85	5.81		ppb(V)	0.7	30	17-DEC-21
trans-1,2-Dichloroethene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
trans-1,3-Dichloropropene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Trichloroethylene		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Trichlorofluoromethane		0.38	0.41		ppb(V)	7.8	30	17-DEC-21
Vinyl acetate		<0.80	<0.80	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Vinyl bromide		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
Vinyl chloride		<0.32	<0.32	RPD-NA	ppb(V)	N/A	30	17-DEC-21
WG3674290-2 LCS								
1,1,1-Trichloroethane			102.9		%		70-130	16-DEC-21
1,1,2,2-Tetrachloroethane			104.7		%		70-130	16-DEC-21
1,1,2-Trichloroethane			98.1		%		70-130	16-DEC-21
1,1-Dichloroethane			99.0		%		70-130	16-DEC-21
1,1-Dichloroethene			99.0		%		70-130	16-DEC-21
1,2,4-Trichlorobenzene			120.0		%		70-130	16-DEC-21

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-2 LCS								
1,2,4-Trimethylbenzene			120.8		%		70-130	16-DEC-21
1,2-Dibromoethane			98.1		%		70-130	16-DEC-21
1,2-Dichlorobenzene			120.2		%		70-130	16-DEC-21
1,2-Dichloroethane			99.0		%		70-130	16-DEC-21
1,2-Dichloropropane			95.2		%		70-130	16-DEC-21
1,3,5-Trimethylbenzene			118.9		%		70-130	16-DEC-21
1,3-Butadiene			100.9		%		70-130	16-DEC-21
1,3-Dichlorobenzene			119.0		%		70-130	16-DEC-21
1,4-Dichlorobenzene			114.4		%		70-130	16-DEC-21
1,4-Dioxane			96.2		%		70-130	16-DEC-21
2-Hexanone			96.3		%		70-130	16-DEC-21
4-Ethyltoluene			114.2		%		70-130	16-DEC-21
Acetone			74.5		%		70-130	16-DEC-21
Allyl chloride			98.0		%		70-130	16-DEC-21
Benzene			98.1		%		70-130	16-DEC-21
Benzyl chloride			110.6		%		70-130	16-DEC-21
Bromodichloromethane			97.2		%		70-130	16-DEC-21
Bromoform			105.7		%		70-130	16-DEC-21
Bromomethane			93.1		%		70-130	16-DEC-21
Carbon Disulfide			101.9		%		70-130	16-DEC-21
Carbon Tetrachloride			101.9		%		70-130	16-DEC-21
Chlorobenzene			104.7		%		70-130	16-DEC-21
Chloroethane			93.1		%		70-130	16-DEC-21
Chloroform			101.0		%		70-130	16-DEC-21
Chloromethane			97.1		%		70-130	16-DEC-21
cis-1,2-Dichloroethene			99.1		%		70-130	16-DEC-21
cis-1,3-Dichloropropene			96.2		%		70-130	16-DEC-21
Cyclohexane			97.2		%		70-130	16-DEC-21
Dibromochloromethane			99.1		%		70-130	16-DEC-21
Dichlorodifluoromethane			101.0		%		70-130	16-DEC-21
Ethyl acetate			94.3		%		70-130	16-DEC-21
Ethylbenzene			104.6		%		70-130	16-DEC-21
Freon 113			102.0		%		70-130	16-DEC-21

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-2 LCS								
Freon 114			95.8		%		70-130	16-DEC-21
Hexachlorobutadiene			129.5		%		70-130	16-DEC-21
Isooctane			97.1		%		70-130	16-DEC-21
Isopropylbenzene			109.7		%		50-150	16-DEC-21
m&p-Xylene			107.5		%		70-130	16-DEC-21
Methyl ethyl ketone			96.3		%		70-130	16-DEC-21
Methyl isobutyl ketone			96.2		%		70-130	16-DEC-21
Methylene chloride			99.0		%		70-130	16-DEC-21
MTBE			102.8		%		70-130	16-DEC-21
n-Heptane			95.3		%		70-130	16-DEC-21
n-Hexane			100.0		%		70-130	16-DEC-21
Naphthalene			108.6		%		70-130	16-DEC-21
o-Xylene			109.3		%		70-130	16-DEC-21
Propylene			94.4		%		70-130	16-DEC-21
Styrene			105.8		%		70-130	16-DEC-21
Tetrachloroethylene			102.9		%		70-130	16-DEC-21
Tetrahydrofuran			93.3		%		70-130	16-DEC-21
Toluene			98.1		%		70-130	16-DEC-21
trans-1,2-Dichloroethene			100.0		%		70-130	16-DEC-21
trans-1,3-Dichloropropene			98.1		%		70-130	16-DEC-21
Trichloroethylene			100.9		%		70-130	16-DEC-21
Trichlorofluoromethane			101.9		%		70-130	16-DEC-21
Vinyl acetate			96.3		%		70-130	16-DEC-21
Vinyl bromide			100.0		%		70-130	16-DEC-21
Vinyl chloride			95.0		%		70-130	16-DEC-21
WG3674290-1 MB								
1,1,1-Trichloroethane			<0.20		ppb(V)		0.2	17-DEC-21
1,1,2,2-Tetrachloroethane			<0.20		ppb(V)		0.2	17-DEC-21
1,1,2-Trichloroethane			<0.20		ppb(V)		0.2	17-DEC-21
1,1-Dichloroethane			<0.20		ppb(V)		0.2	17-DEC-21
1,1-Dichloroethene			<0.20		ppb(V)		0.2	17-DEC-21
1,2,4-Trichlorobenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,2,4-Trimethylbenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,2-Dibromoethane			<0.20		ppb(V)		0.2	17-DEC-21

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch R5680325								
WG3674290-1 MB								
1,2-Dichlorobenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,2-Dichloroethane			<0.20		ppb(V)		0.2	17-DEC-21
1,2-Dichloropropane			<0.20		ppb(V)		0.2	17-DEC-21
1,3,5-Trimethylbenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,3-Butadiene			<0.20		ppb(V)		0.2	17-DEC-21
1,3-Dichlorobenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,4-Dichlorobenzene			<0.20		ppb(V)		0.2	17-DEC-21
1,4-Dioxane			<0.20		ppb(V)		0.2	17-DEC-21
2-Hexanone			<1.0		ppb(V)		1	17-DEC-21
4-Ethyltoluene			<0.20		ppb(V)		0.2	17-DEC-21
Acetone			2.62	RRQC	ppb(V)		0.5	17-DEC-21
Allyl chloride			<0.20		ppb(V)		0.2	17-DEC-21
Benzene			<0.10		ppb(V)		0.1	17-DEC-21
Benzyl chloride			<0.20		ppb(V)		0.2	17-DEC-21
Bromodichloromethane			<0.20		ppb(V)		0.2	17-DEC-21
Bromoform			<0.20		ppb(V)		0.2	17-DEC-21
Bromomethane			<0.20		ppb(V)		0.2	17-DEC-21
Carbon Disulfide			<0.20		ppb(V)		0.2	17-DEC-21
Carbon Tetrachloride			<0.20		ppb(V)		0.2	17-DEC-21
Chlorobenzene			<0.20		ppb(V)		0.2	17-DEC-21
Chloroethane			<0.20		ppb(V)		0.2	17-DEC-21
Chloroform			<0.20		ppb(V)		0.2	17-DEC-21
Chloromethane			<0.20		ppb(V)		0.2	17-DEC-21
cis-1,2-Dichloroethene			<0.20		ppb(V)		0.2	17-DEC-21
cis-1,3-Dichloropropene			<0.20		ppb(V)		0.2	17-DEC-21
Cyclohexane			<0.20		ppb(V)		0.2	17-DEC-21
Dibromochloromethane			<0.20		ppb(V)		0.2	17-DEC-21
Dichlorodifluoromethane			<0.20		ppb(V)		0.2	17-DEC-21
Ethyl acetate			<0.20		ppb(V)		0.2	17-DEC-21
Ethylbenzene			<0.20		ppb(V)		0.2	17-DEC-21
Freon 113			<0.20		ppb(V)		0.2	17-DEC-21
Freon 114			<0.20		ppb(V)		0.2	17-DEC-21
Hexachlorobutadiene			<0.20		ppb(V)		0.2	17-DEC-21

COMMENTS: RRQC- Acetone contamination isolated to H2O added to method blank, samples are unaffected.

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3

Contact: Darby Madalena

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TO15-GCMS-WT	**Canister**							
Batch	**R5680325**							
WG3674290-1	**MB**							
Isooctane			<0.20		ppb(V)		0.2	17-DEC-21
Isopropylbenzene			<0.20		ppb(V)		0.2	17-DEC-21
m&p-Xylene			<0.40		ppb(V)		0.4	17-DEC-21
Methyl ethyl ketone			<0.20		ppb(V)		0.2	17-DEC-21
Methyl isobutyl ketone			<0.20		ppb(V)		0.2	17-DEC-21
Methylene chloride			<0.20		ppb(V)		0.2	17-DEC-21
MTBE			<0.20		ppb(V)		0.2	17-DEC-21
n-Heptane			<0.20		ppb(V)		0.2	17-DEC-21
n-Hexane			<0.20		ppb(V)		0.2	17-DEC-21
Naphthalene			<0.20		ppb(V)		0.2	17-DEC-21
o-Xylene			<0.20		ppb(V)		0.2	17-DEC-21
Propylene			<0.20		ppb(V)		0.2	17-DEC-21
Styrene			<0.20		ppb(V)		0.2	17-DEC-21
Tetrachloroethylene			<0.20		ppb(V)		0.2	17-DEC-21
Tetrahydrofuran			<0.20		ppb(V)		0.2	17-DEC-21
Toluene			<0.20		ppb(V)		0.2	17-DEC-21
trans-1,2-Dichloroethene			<0.20		ppb(V)		0.2	17-DEC-21
trans-1,3-Dichloropropene			<0.20		ppb(V)		0.2	17-DEC-21
Trichloroethylene			<0.20		ppb(V)		0.2	17-DEC-21
Trichlorofluoromethane			<0.20		ppb(V)		0.2	17-DEC-21
Vinyl acetate			<0.50		ppb(V)		0.5	17-DEC-21
Vinyl bromide			<0.20		ppb(V)		0.2	17-DEC-21
Vinyl chloride			<0.20		ppb(V)		0.2	17-DEC-21
Surrogate: 4-Bromofluorobenzene			99.8		%		50-150	17-DEC-21

COMMENTS: RRQC- Acetone contamination isolated to H2O added to method blank, samples are unaffected.

Quality Control Report

Workorder: L2671041 Report Date: 23-DEC-21

Client: TETRA TECH CANADA INC.
110, 140 Quarry Park Blvd SE
Calgary AB T2C 3G3
Contact: Darby Madalena

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

L2671041 AP

CAM FCD-01302 /3

6740 Campobello Rd
Mississauga Ontario ,L5N 2L8
www.bvlabs.com

Toll Free: 1-800-668-0639
Phone: (905) 817-5700
Fax: (905) 817-5777

Chain of Custody Form - Summa™ Canister

INVOICE INFORMATION

Company Name: Tetra Tech Canada
Contact Name: Accounts Payable
Address: 110, 140 Quarry Park Blvd SE
Calgary, Alberta T2C 3G3
E-mail: eba.accountspayable@tetratech.com
Ph: 403-203-3355
Sampled by:

REPORT INFORMATION

Company Name: Tetra Tech Canada
Project Manager: Darby Madalena
Address:
E-mail: darby.madalena@tetratech.com
Ph: 403-723-6867

ANALYSIS REQUESTED

Field Sample ID	Canister Serial #	Flow Regulator Serial #	Collection Date	START VACUUM (inches of Hg)	END VACUUM (inches of Hg)	SOIL VAPOUR	AMBIENT/INDOOR AIR	AMBIENT/COMMERCIAL/INDUSTRIAL	SUB-SLAB GAS	FULL LIST OF VOCs (reference TO15A)	BTEX/Aromatic/Aliphatic Hydrocarbon Fractions	BTEX/F1 (C6-C10) and F2 (C10-C16)	Selected VOC's - please specify	Other	Matrix Gases (O2, CO, CO2, CH4, N)	Volatile Gases (Light HHC)		CANISTERS NOT USED
VW-05	10919	FX1118	11/20/21	29	5	X				X					X	X		
XCG-4 (SVP)	3020	FX1275	11/20/21	25	8	X				X					X	X		
~~XCG-5 (SVP)~~ VW-04	1236	FX0266	11/23/21			X				X					X	X		
XCG-6 (SVP)	9895	FX0552	11/20/21	27	7.5	X				X					X	X		
XCG-13 (SVP)	1302	FX1485	↓	27.5	9.5	X				X					X	X		
Duplicate (21 DUP VW Monfort)	9684	FX1481	↓	26	5	X				X					X	X		

Q1129-008

9:30 A

TAT Requirement

- STD 10 Business day ☑
- Rush 5 Business day * ☐
- Rush 2 Business day * ☐
- Rush Other * ☐

* need approval from Bureau Veritas

PROJECT INFORMATION

Project #: 704-SWM.SWOP04071-02.009
Name: Monfort
PO #: 704-SWM.SWOP04071-02.009
Bureau Veritas Quote #:
Bureau Veritas Contact: Cristina Bacchus
Task Order/Line Item

REPORTING REQUIREMENTS

EDD ☐
Regulations ON 153 ☐
ON 419 ☐
BC CSR ☐
Other

Notes

1) please indicate on soil vapour or ambient air
2) please list all canisters on the chain of custody even if unused

PROJECT SPECIFIC COMMENTS

L2671041-COFC

Client Signature:
Date/Time: 11/24/21 0910

Received by: Tanya Ramisha Simeon
Date/Time: 2021/11/29 09:30

PLEASE RETURN AL

AP 9-Dec-21 14:00

Job Number	Q1129-008	
Samples	#bottles	Analysis
SX2480 VW-05		
SX1727 XCG-4 (SVP)		
SX0862 VW-04		
SX2366 XCG-6(SVP)		
SX0921 XCG-13(SVP)		
SX2233 DUPLICATE		
Media job# C1V7108		

L2671041-COFC

APPENDIX E

HISTORICAL ANALYTICAL DATA

Table 5 Summary of Field Parameters in Groundwater

Location	Date	Temperature (°C)	pH	Conductivity (µS/cm)	Dissolved Oxygen (mg/L)	Redox (mV)
2016 Alberta Tier 1 Guidelines[1] (COARSE)		--	6.5-8.5	--	--	--
March Sampling Event						
MW-01	12-Mar-17	7.45	6.56	828	9.05	184.2
MW-02	13-Mar-17	4.16	7.32	1247	2.95	-31.0
MW-03	13-Mar-17	4.31	6.90	1766	0.86	-23.6
MW-06	14-Mar-17	5.05	**6.06**	2847	4.54	16.3
MW-07	14-Mar-17	6.33	**6.11**	2370	0.99	-15.6
XCG-1 (MW)	11-Mar-17	6.80	7.17	676	6.82	72.2
XCG-2 (MW)	11-Mar-17	6.04	7.25	822	5.10	118.6
XCG-4 (MW)	13-Mar-17	1.59	8.38	1110	3.21	-137.2
XCG-5 (MW)	13-Mar-17	4.59	**10.29**	747	8.36	-186.6
XCG-6 (MW)	13-Mar-17	4.36	**6.20**	1842	3.76	210.7
XCG-12 (MW)	14-Mar-17	3.25	**6.47**	1017	4.54	16.3
XCG-13 (MW)	14-Mar-17	3.82	**6.19**	2025	1.13	11.3
XCG-14 (MW)	11-Mar-17	6.16	7.26	1022	4.53	58.8

Notes:

1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).

-- No Value

Bold Exceeds the Alberta Tier 1 Guidelines

Table 6 Summary of Analytical Results for VOCs in Groundwater

Sample ID		2016 Alberta Tier 1 Guidelines[1] (COARSE)	MW-01	MW-02	MW-03	MW-06	MW-07	XCG-1 (MW)	XCG-2 (MW)		XCG-4 (MW)	XCG 5 (MW)	XCG 6 (MW)	XCG-12 (MW)	XCG-13 (MW)	XCG-14 (MW)	Field Blank
Laboratory ID	**RDL**	**Groundwater**	QR8541	QS0279	QS0278	QS2251	QS2250	QR7384	QR8538	QR8539	QS2248	QS0277	QS0276	QR8542	QS2249	QR8540	QR8543
Units	**µg/L**	**µg/L**	**12-Mar-17**	**13-Mar-17**	**13-Mar-17**	**14-Mar-17**	**14-Mar-17**	**10-Mar-17**	**11-Mar-17**	**11-Mar-17**	**14-Mar-17**	**13-Mar-17**	**13-Mar-17**	**12-Mar-17**	**14-Mar-17**	**11-Mar-17**	**12-Mar-17**
Total Trihalomethanes	1	100	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
Bromodichloromethane	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromoform	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	2.0	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Carbon tetrachloride	0.50	0.57	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorobenzene	0.50	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chlorodibromomethane	1.00	190	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroethane	1.00	--	<1.0	<1.0	<1.0	<1.0	1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	0.50	1.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	2.00	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-dibromoethane	0.20	--	<0.20	<0.20	<0.20	0.30	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-dichlorobenzene	0.50	0.7	<0.50	<0.50	<0.50	0.52	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-dichlorobenzene	0.5	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4-dichlorobenzene	0.50	1	<0.50	<0.50	<0.50	**1.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-dichloroethane	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-dichloroethane	0.50	5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-dichloroethene	0.50	14	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene	0.50	--	<0.50	<0.50	20	18	120	<0.50	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	130	<0.50	<0.50
trans-1,2-dichloroethene	0.50	--	<0.50	<0.50	<0.50	<0.50	2.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.9	<0.50	<0.50
Dichloromethane	2.00	50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
1,2-dichloropropane	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,3-dichloropropene	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,3-dichloropropene	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl methacrylate	0.5	470	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methyl-tert-butylether (MTBE)	0.5	15	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Styrene	1	72	<0.50	<0.50	<0.50	0.75	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1,2-tetrachloroethane	1.0	--	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1,2,2-tetrachloroethane	2.00	--	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Tetrachloroethene	0.50	10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-trichlorobenzene	1.00	8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,2,4-trichlorobenzene	1.00	15	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,3,5-trichlorobenzene	0.50	14	<0.50	<0.50	<0.50	0.73	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-trichloroethane	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-trichloroethane	0.50	--	<0.50	<0.50	<0.50	0.56	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	0.50	5	<0.50	<0.50	<0.50	<0.50	**7.4**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	<0.50
Trichlorofluoromethane	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,4-trimethylbenzene	0.50	--	<0.50	<0.50	<0.50	14	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,3,5-trimethylbenzene	0.50	--	<0.50	<0.50	<0.50	3.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl chloride	0.50	1.1	<0.50	<0.50	**16**	**8.4**	**39**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**21**	<0.50	<0.50

Notes:

RDL	Laboratory Reportable Detection Limit
1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).	
--	no value
<	Less than the RDL
Bold	Exceeds the Alberta Tier 1 Guidelines

Table 7 Summary of Analytical Results for Routine Parameters and Nutrients in Groundwater

Sample ID			2016 Alberta Tier 1 Guidelines[1] (COARSE)	MW-01	MW-02	MW-03	MW-06	MW-07	XCG-1 (MW)	XCG-2 (MW)		XCG-4 (MW)	XCG-5 (MW)	XCG-6 (MW)	XCG-12 (MW)	XCG-13 (MW)	XCG-14 (MW)	Field Blank
Laboratory ID		**RDL**	**Groundwater**	QR8541	QS0279	QS0278	QS2251	QS2250	QR7384	QR8538	QR8539	QS2248	QS0277	QS0276	QR8542	QS2249	QR8540	QR8543
	Units			**12-Mar-17**	**13-Mar-17**	**13-Mar-17**	**14-Mar-17**	**14-Mar-17**	**10-Mar-17**	**11-Mar-17**	**11-Mar-17**	**14-Mar-17**	**13-Mar-17**	**13-Mar-17**	**12-Mar-17**	**14-Mar-17**	**11-Mar-17**	**12-Mar-17**
Calculated Parameters																		
Anion Sum	meq/L	N/A	--	9.3	13	20	32	25	7.1	8.8	8.8	12	8.1	18	12	24	12	0.0000
Cation Sum	meq/L	N/A	--	8.9	13	20	30	26	7.1	8.8	8.9	12	8.0	18	12	23	12	0.0030
Hardness (CaCO3)	mg/L	0.50	--	420	520	920	970	1100	340	320	320	480	390	870	550	1000	560	<0.50
Ion Balance (% Difference)	N/A	0.010	--	2.0	1.3	0.29	3.5	0.66	0.43	0.13	0.50	0.87	0.31	0.89	1.5	2.3	0.77	NC
Dissolved Nitrate (NO3)	mg/L	0.044	--	0.21	6.2	1.7	0.14	0.20	0.10	0.063	0.077	<0.044	2.7	250	0.17	<0.044	0.056	<0.044
Nitrate plus Nitrite (N)	mg/L	0.010	--	0.047	1.4	0.38	0.031	0.044	0.024	0.014	0.017	<0.010	0.61	56	0.037	<0.010	0.013	<0.010
Dissolved Nitrite (NO2)	mg/L	0.033	--	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	0.20	<0.033	<0.033	<0.033	<0.033
Calculated Total Dissolved Solids	mg/L	10	500	450	**660**	**990**	**1500**	**1300**	350	460	460	**580**	380	**1000**	**580**	**1100**	**570**	<10
Miscellaneous Inorganics																		
Conductivity	uS/cm	1.0	--	830	1200	1800	2800	2400	660	820	830	1000	700	1700	1000	2100	1000	1.1
pH	pH	N/A	6.5-8.5	7.37	7.57	7.31	7.10	7.12	7.73	7.30	7.29	7.74	7.76	7.32	7.59	7.15	7.34	**5.57**
Anions																		
Alkalinity (PP as CaCO3)	mg/L	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Alkalinity (Total as CaCO3)	mg/L	0.50	--	410	360	960	1500	890	310	340	340	550	390	600	530	920	490	<0.50
Bicarbonate (HCO3)	mg/L	0.50	--	500	430	1200	1800	1100	380	420	420	670	470	730	640	1100	590	<0.50
Carbonate (CO3)	mg/L	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Hydroxide (OH)	mg/L	0.50	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Sulphate (SO4)	mg/L	1.0	500 or 128 to 429 (a)	37	53	36	<1.0	7.2	29	57	58	9.3	10	82	42	6.8	56	<1.0
Dissolved Chloride (Cl)	mg/L	1.0	120	12	**160**	13	83	**260**	10	27	27	17	2.0	11	22	**200**	21	<1.0
Nutrients																		
Dissolved Nitrite (N)	mg/L	0.010-0.033	1.0 or 0.06 to 0.6 (b)	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.060	<0.033	<0.010	<0.010	<0.010
Dissolved Nitrate (N)	mg/L	0.010	3	0.047	1.4	0.38	0.031	0.044	0.024	0.014	0.017	<0.010	0.61	**56**	0.58	<0.010	0.013	<0.010
Total Ammonia (N)	mg/L	0.050	0.018 to 190 (c)	0.19	<0.050	0.13	**69**	0.87	0.38	0.23	0.23	0.17	<0.050	0.093	0.54	0.18	0.30	<0.050
Total Nitrogen (N)	mg/L	0.055	--	1.3	1.8	1.0	96	1.9	2.5	0.45	0.55	0.64	0.82	57	3.6	0.93	1.4	<0.055
Total Phosphorus (P)	mg/L	0.015-0.0030	--	0.70	0.0061	0.0097	1.1	0.030	2.5	0.19	0.10	0.11	0.0085	0.0046	1.2	0.020	2.6	<0.0030
Total Kjeldahl Nitrogen	mg/L	0.050-0.25	--	1.2	0.34	0.63	96	1.9	2.5	0.44	0.53	0.64	0.21	1.0	3.4	0.93	1.4	<0.050
Demand Parameters																		
Biochemical Oxygen Demand	mg/L	2-10	--	<2.0	<2.0	6.9	22	7.8	2.8	<2.0	<2.0	<2.0	<2.0	<2.0	8.3	3.1	<2.0	<2.0
Total Chemical Oxygen Demand	mg/L	5	--	<5.0	15	65	330	64	71	37	36	41	<5.0	20	110	41	85	<5.0
Misc. Inorganics																		
Total Organic Carbon (C)	mg/L	0.5-5.0	--	4.3	8.8	8.1	72.0	19	<2.5	3.3	4.2	4.3	3.7	12.0	16	15	<5.0	<0.50
Organic Acids																		
Formic Acid	mg/L	<0.5	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Acetic Acid	mg/L	<0.5	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Propionic Acid	mg/L	<0.5	--	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Butyric Acid	mg/L	<10	--	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Misc. Organics																		
Adsorbable Organic Halogen	mg/L	0.01	--	0.02	0.07	<0.01	0.14	0.06	0.02	0.03	0.02	0.03	0.01	0.03	0.02	0.6	0.02	0.02

Notes:

RDL Laboratory Reportable Detection Limit

1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).

-- no value

< Less than the RDL

(a) Varies with hardness. See table 1.7 of the Environmental Quality Guidelines for Alberta Surface Waters (2014) if hardness is less than 250 mg/L.

(b) Varies with chloride. See table 1.4 of the Environmental Quality Guidelines for Alberta Surface Waters (2014) if chloride is less than 10 mg/L.

(c) Temperature and pH dependent. See table 1.2 of the Environmental Quality Guidelines for Alberta Surface Waters (2014).

Bold Exceeds the Alberta Tier 1 Guidelines

Table 8 Summary of Analytical Results for Dissolved Metals in Groundwater

Sample ID			2016 Alberta Tier 1 Guidelines[1] (COARSE)	MW-01	MW-02	MW-03	MW-06	MW-07	XCG-1 (MW)	XCG-2 (MW)		XCG-4 (MW)	XCG-5 (MW)	XCG-6 (MW)	XCG-12 (MW)	XCG-13 (MW)	XCG-14 (MW)	Field Blank
Laboratory ID		**RDL**	**Groundwater**	**QR8541**	**QS0279**	**QS0278**	**QS2251**	**QS2250**	**QR7384**	**QR8538**	**QR8539**	**QS2248**	**QS0277**	**QS0276**	**QR8542**	**QS2249**	**QR8540**	**QR8543**
	Units			**12-Mar-17**	**13-Mar-17**	**13-Mar-17**	**14-Mar-17**	**14-Mar-17**	**10-Mar-17**	**11-Mar-17**	**11-Mar-17**	**14-Mar-17**	**13-Mar-17**	**13-Mar-17**	**12-Mar-17**	**14-Mar-17**	**11-Mar-17**	**12-Mar-17**
Dissolved Cadmium (Cd)	ug/L	0.02	5 or 0.11 to 7.7 (a)	0.29	0.044	0.044	<0.020	0.022	0.053	0.15	0.13	0.29	0.042	0.060	0.023	0.088	0.064	<0.020
Dissolved Aluminum (Al)	mg/L	0.003	0.1 or 0.023 to 0.074 (b)	0.0039	<0.0030	<0.0030	0.0057	<0.0030	0.0056	0.0031	0.0038	0.0044	<0.0030	<0.0030	0.0054	0.0042	0.0031	<0.0030
Dissolved Antimony (Sb)	mg/L	0.0006	0.006	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060	0.00065	<0.00060	<0.00060	0.00075	<0.00060	<0.00060	<0.00060	<0.00060	<0.00060
Dissolved Arsenic (As)	mg/L	0.0002	0.005	0.00029	<0.00020	0.00041	0.0092	0.0073	0.0011	0.0013	0.0013	0.00044	0.00033	0.00046	**0.019**	0.0014	0.0011	<0.00020
Dissolved Barium (Ba)	mg/L	0.01	1	0.71	0.64	0.89	0.99	**1.1**	0.51	0.090	0.093	0.22	0.22	0.46	**1.2**	0.94	0.52	<0.010
Dissolved Beryllium (Be)	mg/L	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Boron (B)	mg/L	0.02	1.5	0.042	0.025	0.17	0.23	0.066	0.038	0.090	0.090	0.038	0.024	0.049	0.054	0.050	0.046	<0.020
Dissolved Calcium (Ca)	mg/L	0.3	--	110	130	220	230	230	77	84	83	130	86	250	130	190	120	<0.30
Dissolved Chromium (Cr)	mg/L	0.001	--	<0.0010	<0.0010	<0.0010	0.0019	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Cobalt (Co)	mg/L	0.0003	--	<0.00030	0.0011	0.0016	0.014	0.012	0.00097	0.0024	0.0023	0.00099	<0.00030	0.00050	0.00080	0.0068	0.00043	<0.00030
Dissolved Copper (Cu)	mg/L	0.0002	0.007	0.00085	0.0010	0.0013	<0.00020	<0.00020	0.0032	0.0011	0.0010	0.0019	0.00071	0.0022	0.00047	0.00089	0.00071	<0.00020
Dissolved Iron (Fe)	mg/L	0.06	0.3	<0.060	0.065	0.13	**29**	**12**	<0.060	<0.060	<0.060	<0.060	<0.060	0.086	<0.060	0.066	<0.060	<0.060
Dissolved Lead (Pb)	mg/L	0.0002	0.001 to 0.007 (a)	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Lithium (Li)	mg/L	0.02	--	0.027	0.022	0.064	<0.020	0.038	0.020	0.037	0.038	<0.020	<0.020	<0.020	0.031	0.051	0.047	<0.020
Dissolved Magnesium (Mg)	mg/L	0.2	--	37	51	88	97	130	35	28	27	38	42	62	56	140	61	<0.20
Dissolved Manganese (Mn)	mg/L	0.004	0.05	**0.089**	<0.0040	**0.49**	**0.49**	**1.8**	**0.28**	**0.50**	**0.49**	**0.29**	<0.0040	**0.15**	**0.61**	**0.71**	**0.26**	<0.0040
Dissolved Molybdenum (Mo)	mg/L	0.0002	--	0.0027	0.00040	0.00069	0.00074	0.0024	0.0040	0.0043	0.0046	0.00081	0.00088	0.00044	0.0034	0.00055	0.0020	<0.00020
Dissolved Nickel (Ni)	mg/L	0.0005	0.037 to 1.52 (a)	0.00092	0.0029	0.0072	0.012	0.016	0.0032	0.0073	0.0069	0.0081	0.0012	0.0049	0.0021	0.015	0.0013	<0.00050
Dissolved Phosphorus (P)	mg/L	0.1	--	0.11	<0.10	<0.10	<0.10	<0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Potassium (K)	mg/L	0.3	--	3.9	2.5	6.3	33	3.7	3.3	3.7	3.7	25	2.0	6.5	7.7	3.2	2.5	<0.30
Dissolved Selenium (Se)	mg/L	0.0002	0.001	0.00023	<0.00020	<0.00020	0.00050	0.00026	0.00030	0.00061	0.00058	<0.00020	0.00021	0.00034	<0.00020	0.00027	<0.00020	<0.00020
Dissolved Silicon (Si)	mg/L	0.1	--	6.1	7.7	7.8	15	11	6.2	6.5	6.6	7.6	11	8.1	7.6	9.4	6.8	<0.10
Dissolved Silver (Ag)	mg/L	0.0001	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Dissolved Sodium (Na)	mg/L	0.5	200	9.8	48	39	88	73	6.8	51	54	29	4.8	17	11	54	10	<0.50
Dissolved Strontium (Sr)	mg/L	0.02	--	0.71	0.41	1.3	1.2	1.7	0.55	0.81	0.82	0.38	0.28	0.65	0.72	1.9	1.1	<0.020
Dissolved Sulphur (S)	mg/L	0.2	--	10	15	9.0	2.3	3.4	8.3	16	17	3.1	2.8	21	12	2.7	15	<0.20
Dissolved Thallium (Tl)	mg/L	0.0002	--	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Tin (Sn)	mg/L	0.001	--	<0.0010	<0.0010	<0.0010	0.0018	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010
Dissolved Titanium (Ti)	mg/L	0.001	--	<0.0010	<0.0010	<0.0010	0.0022	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Uranium (U)	mg/L	0.0001	0.015	0.0098	0.0026	0.0095	0.00060	0.010	0.0037	0.013	0.014	0.0028	0.0016	0.0025	0.0013	0.011	0.015	<0.00010
Dissolved Vanadium (V)	mg/L	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dissolved Zinc (Zn)	mg/L	0.003	0.03	0.0036	<0.0030	<0.0030	0.013	<0.0030	0.0032	<0.0030	<0.0030	0.0073	<0.0030	<0.0030	<0.0030	0.0034	<0.0030	<0.0030

Notes:

RDL — Laboratory Reportable Detection Limit

1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).

-- — no value

< — Less than the RDL

Bold — Exceeds the Alberta Tier 1 Guidelines

(a) Varies with hardness. See table 1.3 of the Environmental Quality Guidelines for Alberta Surface Waters (2014).

(b) Varies with pH, see table 1.1 of the Environmental Quality Guidelines for Alberta Surface Waters (2014).

Table 9 Summary of Analytical Results for Total Metals in Groundwater

Sample ID			2016 Alberta Tier 1 Guidelines[1] (COARSE)	MW-01	MW-02	MW-03	MW-06	MW-07	XCG-1 (MW)	XCG-2 (MW)		XCG-4 (MW)	XCG-5 (MW)	XCG-6 (MW)	XCG-12 (MW)	XCG-13 (MW)	XCG-14 (MW)	Field Blank
Laboratory ID		RDL	Groundwater	QR8541	QS0279	QS0278	QS2251	QS2250	QR7384	QR8538	QR8539	QS2248	QS0277	QS0276	QR8542	QS2249	QR8540	QR8543
	Units			12-Mar-17	13-Mar-17	13-Mar-17	14-Mar-17	14-Mar-17	10-Mar-17	11-Mar-17	11-Mar-17	14-Mar-17	13-Mar-17	13-Mar-17	12-Mar-17	14-Mar-17	11-Mar-17	12-Mar-17
Total Cadmium (Cd)	ug/L	0.020	--	1.9	0.34	0.089	0.77	0.25	4.2	1.1	0.76	12	0.12	0.19	1.8	0.17	1.7	<0.020
Total Aluminum (Al)	mg/L	0.0030	--	6.6	0.18	0.53	11	0.39	27	2.8	2.5	3.3	0.087	0.067	12	0.18	16	<0.0030
Total Antimony (Sb)	mg/L	0.00060	--	0.00063	<0.00060	<0.00060	0.00096	<0.00060	0.00090	0.00093	0.00075	<0.00060	0.00082	<0.00060	0.00077	<0.00060	0.00085	<0.00060
Total Arsenic (As)	mg/L	0.00020	--	0.0086	0.00036	0.00094	0.023	0.015	0.056	0.0043	0.0037	0.0030	0.00057	0.00047	0.062	0.0018	0.021	<0.00020
Total Barium (Ba)	mg/L	0.010	--	0.85	0.68 (1)	0.91	1.5	1.2	1.5	0.14	0.13	0.27	0.23	0.47	1.4	0.91	1.2	<0.010
Total Beryllium (Be)	mg/L	0.0010	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	<0.0010	0.0016	<0.0010
Total Boron (B)	mg/L	0.020	--	0.042	0.030	0.20	0.25	0.064	0.047	0.11	0.098	0.039	0.029	0.057	0.055	0.050	0.065	<0.020
Total Calcium (Ca)	mg/L	0.30	--	130	130	240	280	240	250	93	83	140	88	260	170	190	240	<0.30
Total Chromium (Cr)	mg/L	0.0010	--	0.011	<0.0010	0.0018	0.019	<0.0010	0.048	0.0036	0.0026	0.0060	<0.0010	<0.0010	0.021	<0.0010	0.029	<0.0010
Total Cobalt (Co)	mg/L	0.00030	--	0.0081	0.0015	0.0019	0.024	0.014	0.035	0.0047	0.0044	0.0035	<0.00030	0.00060	0.015	0.0070	0.022	<0.00030
Total Copper (Cu)	mg/L	0.00020	--	0.019	0.0018	0.0025	0.032	0.0017	0.091	0.0063	0.0057	0.0095	0.0012	0.0023	0.034	0.0012	0.056	<0.00020
Total Iron (Fe)	mg/L	0.060	--	14	0.46 (1)	1.2	69	19	75	4.6	3.7	5.6	0.30	0.26	28	0.52	41	<0.060
Total Lead (Pb)	mg/L	0.00020	--	0.0084	0.00023	0.00082	0.021	0.00084	0.036	0.0045	0.0038	0.010	<0.00020	<0.00020	0.016	0.00024	0.024	<0.00020
Total Lithium (Li)	mg/L	0.020	--	0.032	0.025	0.072	0.026	0.036	0.061	0.041	0.037	<0.020	<0.020	<0.020	0.038	0.047	0.068	<0.020
Total Magnesium (Mg)	mg/L	0.20	--	46	54	97	120	130	83	31	27	41	43	66	60	140	92	<0.20
Total Manganese (Mn)	mg/L	0.0040	--	0.87	0.0061	0.55	0.79	1.8	1.6	0.60	0.54	0.37	0.0054	0.19	0.97	0.71	1.0	<0.0040
Total Molybdenum (Mo)	mg/L	0.00020	--	0.0036	0.00049	0.00087	0.0018	0.0025	0.0058	0.0049	0.0046	0.0014	0.00088	0.00053	0.0041	0.00061	0.0031	<0.00020
Total Nickel (Ni)	mg/L	0.00050	--	0.022	0.0046	0.0088	0.039	0.018	0.089	0.014	0.013	0.019	0.0015	0.0054	0.044	0.015	0.059	<0.00050
Total Phosphorus (P)	mg/L	0.10	--	0.48	<0.10 (1)	<0.10	1.1	<0.10	2.1	0.19	0.15	0.10	<0.10	<0.10	0.75	<0.10	1.2	<0.10
Total Potassium (K)	mg/L	0.30	--	5.1	2.7 (1)	7.3	38	3.7	8.0	4.5	4.0	26	2.1	7.1	8.3	3.3	6.0	<0.30
Total Selenium (Se)	mg/L	0.00020	--	0.00060	<0.00020	0.00021	0.00076	0.00021	0.0024	0.00089	0.00081	0.00029	0.00023	0.00037	0.00064	0.00025	0.0029	<0.00020
Total Silicon (Si)	mg/L	0.10	--	20	8.8 (1)	11	36	12	50	16	14	17	12	9.2	30	10	43	<0.10
Total Silver (Ag)	mg/L	0.00010	--	0.00013	<0.00010	<0.00010	0.00023	<0.00010	0.00064	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	0.00033	<0.00010	0.00029	<0.00010
Total Sodium (Na)	mg/L	0.50	--	8.0	51	42	95	76	7.3	56	51	35	4.6	19	9.7	56	10	<0.50
Total Strontium (Sr)	mg/L	0.020	--	0.66	0.44 (1)	1.3	1.3	1.6	0.80	0.86	0.77	0.38	0.28	0.65	0.67	1.7	1.2	<0.020
Total Sulphur (S)	mg/L	0.20	--	9.3	17	11	3.0	3.8	9.1	17	16	4.5	3.0	27	11	2.8	17	<0.20
Total Thallium (Tl)	mg/L	0.00020	--	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00072	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	0.00031	<0.00020	0.00040	<0.00020
Total Tin (Sn)	mg/L	0.0010	--	0.0017	<0.0010	<0.0010	0.0065	<0.0010	0.0084	0.0045	0.0037	0.0020	0.0010	<0.0010	0.0095	<0.0010	0.0019	<0.0010
Total Titanium (Ti)	mg/L	0.0010	--	0.11	0.0069	0.016	0.19	0.014	0.26	0.037	0.032	0.13	0.0022	0.0046	0.17	0.0050	0.21	<0.0010
Total Uranium (U)	mg/L	0.00010	--	0.010	0.0031	0.0091	0.0016	0.0099	0.0066	0.015	0.014	0.0035	0.0016	0.0025	0.0023	0.011	0.015	<0.00010
Total Vanadium (V)	mg/L	0.0010	--	0.019	<0.0010	0.0022	0.031	0.0017	0.075	0.0058	0.0053	0.010	<0.0010	<0.0010	0.036	<0.0010	0.050	<0.0010
Total Zinc (Zn)	mg/L	0.0030	--	0.090	0.011	0.0074	0.099	0.0071	0.27	0.032	0.030	0.044	0.0053	<0.0030	0.15	0.0053	0.19	<0.0030

Notes:

RDL	Laboratory Reportable Detection Limit
1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).	
--	no value
<	Less than the RDL
Bold	Exceeds the Alberta Tier 1 Guidelines

Table 10 Summary of Analytical Results for PHCs in Groundwater

Sample ID			2016 Alberta Tier 1 Guidelines[1] (COARSE)	MW-01	MW-02	MW-03	MW-06	MW-07	XCG-1 (MW)	XCG-2 (MW)	XCG-4 (MW)	XCG 5 (MW)	XCG 6 (MW)	XCG-12 (MW)	XCG-13 (MW)	XCG-14 (MW)	Field Blank
Laboratory ID		RDL	Groundwater	QR8541	QS0279	QS0278	QS2251	QS2250	QR7384	QR8538	QS2248	QS0277	QS0276	QR8542	QS2249	QR8540	QR8543
	Units			12-Mar-17	13-Mar-17	13-Mar-17	14-Mar-17	14-Mar-17	10-Mar-17	11-Mar-17	14-Mar-17	13-Mar-17	13-Mar-17	12-Mar-17	14-Mar-17	11-Mar-17	12-Mar-17
Benzene	µg/L	0.40	5	<0.40	<0.40	<0.40	**4.8**	1.7	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.86	<0.40	<0.40
Toluene	µg/L	0.40	21	<0.40	<0.40	<0.40	3.5	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	µg/L	0.40	1.6	<0.40	<0.40	<0.40	**58**	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
m & p-Xylene	µg/L	0.80	--	<0.80	<0.80	<0.80	30	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
o-Xylene	µg/L	0.40	--	<0.40	<0.40	<0.40	15	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Xylenes (Total)	µg/L	0.80	20	<0.80	<0.80	<0.80	**45**	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80
F1 (C6-C10) - BTEX	µg/L	100	810	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F1 (C6-C10)	µg/L	100	810	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
F2 (C10-C16 Hydrocarbons)	mg/L	0.10	1100	<0.10	<0.10	<0.10	0.52	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10

Notes:

RDL Laboratory Reportable Detection Limit

1. Alberta Tier 1 groundwater remediation guidelines for residential/parkland land use, coarse grained soil (February 2016).

-- no value

< Less than the RDL

Bold Exceeds the Alberta Tier 1 Guidelines

Table 11 Summary of Analytical Results for Fixed Gases and Petroleum Hydrocarbons in Soil Vapour

Sample ID	Units	Reportable Detection Limit	Deminimus Screening - Soil Vapour Screening Criteria	Soil Vapour Probes														
				VW-01	VW-03	VW-05		XCG-1(SVP)	XCG-2(SVP)	XCG-4(SVP)		XCG-5(SVP)	XCG-6(SVP)	XCG-9(SVP)	XCG-10(SVP)	XCG-12(SVP)	XCG-13(SVP)	Trip Blank
Laboratory				Maxxam	Maxxam	Maxxam		Maxxam	Maxxam	Maxxam		Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Canister number				332	1280	1800	3017	1470	243	1281	212	1380	238	333	354	262	354	215
Laboratory ID				EBG095	EBG097	EBG090	EBG091	EBG092	EBG089	EBG086	EMV462	EBG085	EBG088	EBG096	EBG094	EBG087	EBG093	EBG098
Date Sampled				12-Mar-17	12-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	14-Mar-17	1-Jun-17	14-Mar-17	13-Mar-17	11-Mar-17	12-Mar-17	14-Mar-17	12-Mar-17	N/A
Summa Canister Pressure on Receipt (psig)	(psig)	NV		(-2.9)	(-3.1)	(-1.9)	(-2.0)	(-1.7)	(-3.6)	(-3.4)	(-2.5)	(-3.4)	(-3.0)	(-2.7)	(-1.1)	(-3.0)	(-1.7)	(-14.3)
Oxygen	(% v/v)	0.2-0.3	NV	23.0	12.5	8.6	9.6	20.4	20.3	2.0	5.5	20.3	1.9	21.3	15.8	18.7	4.3	--
Nitrogen	(% v/v)	0.2-0.3	NV	77.0	80.7	79.0	78.9	78.1	78.4	82.8	--	77.4	81.5	78.2	81.7	79.0	84.8	--
Carbon Monoxide	(% v/v)	0.2-0.3	NV	<0.2	<0.2	<0.2	<0.2	<0.2	<0.3	<0.2	--	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	--
Methane	(% v/v)	0.2-0.3	0.1 to 0.5 % v/v	<0.2	<0.2	**0.3**	**0.3**	<0.2	<0.3	**5.7**	< 0.2	<0.3	**1.2**	<0.2	<0.2	<0.2	**1.1**	--
Methane	ppm	3.4-5.4	1000 ppm to 5000 ppm	<4.3	<3.8	NR	NR	<3.9	5.9	NR	--	<5.2	NR	<4.2	<3.4	32	NR	--
Carbon Dioxide	(% v/v)	0.2-0.3	NV	<0.2	6.8	12.1	11.3	1.5	1.3	9.5	9.6	2.3	15.4	0.6	2.5	2.3	9.8	--
Ethane	ppm	0.17-0.27	1,000	<0.21	<0.19	2.3	2.1	<0.2	<0.27	0.24	--	<0.26	<0.22	<0.21	<0.17	<0.23	<0.19	--
Ethylene	ppm	0.17-0.27	200	<0.21	<0.19	6.8	6.3	<0.2	<0.27	6.2	--	<0.26	0.57	<0.21	<0.17	<0.23	0.25	--
Propane	ppm	0.17-0.27	1,000	<0.21	<0.19	<0.21	<0.2	<0.2	<0.27	<0.23	--	<0.26	<0.22	<0.21	<0.17	<0.23	<0.19	--
Propene	ppm	0.17-0.27	35	<0.21	<0.19	<0.21	<0.2	<0.2	<0.27	<0.23	--	<0.26	<0.22	<0.21	<0.17	<0.23	<0.19	--
F1-BTEX, C6-C10 (as Toluene)	µg/m3	5.0	59,532	7.9	31.8	486	530	36.1	<5.0	39.7	--	18.4	668	6.0	43.0	8.8	5830	<5.0
F2, C10-C16 (as Decane)	µg/m3	5.0	27,778	12.7	<5.0	62.8	68.9	<5.0	<5.0	<5.0	--	6.2	<5.0	<5.0	<5.0	<5.0	972	<5.0

Notes:

Bold Shaded	Concentration exceeds calculated soil vapour screening criteria
-	Criteria not derived (concentration below detection limits)
NR	Lab did not report ppm units (based on elevated %v/v detection)
--	No Data
<	Below Laboratory MDL

Table 12 Summary of Analytical Results for VOCs in Soil Vapour

Sample ID	Units	Reportable Detection Limit	Deminimus Screening -Soil Vapour Screening Criteria	Soil Vapour Probes														
				VW-01	VW-03	VW-05		XCG-1(SVP)	XCG-2(SVP)	XCG-4(SVP)		XCG-5(SVP)	XCG-6(SVP)	XCG-9(SVP)	XCG-10(SVP)	XCG-12(SVP)	XCG-13(SVP)	Trip Blank
Laboratory				Maxxam	Maxxam	Maxxam		Maxxam	Maxxam	Maxxam		Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Canister number				332	1280	1800	3017	1470	243	1281	212	1380	238	333	354	262	354	215
Laboratory ID				EBG095	EBG097	EBG090	EBG091	EBG092	EBG089	EBG086	EMV462	EBG085	EBG088	EBG096	EBG094	EBG087	EBG093	EBG098
Date Sampled				12-Mar-17	12-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	14-Mar-17	1-Jun-17	14-Mar-17	13-Mar-17	11-Mar-17	12-Mar-17	14-Mar-17	12-Mar-17	N/A
Dichlorodifluoromethane (FREON 12)	µg/m³	0.989 - 9.89	17,800	2.50	571	867	855	8.46	2.68	41.3	--	280	88.9	2.46	3.67	89.5	2950	<0.989
1,2-Dichlorotetrafluoroethane	µg/m³	1.19 - 4.75	7,000,000	<1.19	1790	516	512	<1.19	<1.19	44.4	--	<1.19	341	<1.19	4.91	<1.19	565	<1.19
Chloromethane	µg/m³	0.62	1,800	4.39	<0.620	<0.620	<0.620	<0.620	<0.620	<0.620	--	<0.620	<0.620	<0.620	<0.30	<0.620	<0.620	<0.620
Vinyl Chloride	µg/m³	0.256 - 1.28	114.00	<0.256	<0.256	**1180**	**1250**	<0.256	<0.256	21.8	--	<0.256	**154**	<0.256	<0.10	<0.256	**114**	<0.256
Chloroethane	µg/m³	0.792	200,000.0	<0.792	<0.792	23.2	23.1	<0.792	<0.792	<0.792	--	<0.792	0.978	<0.792	<0.30	<0.792	4.36	<0.792
1,3-Butadiene	µg/m³	1.11	-	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	<1.11	--	<1.11	<1.11	<1.11	<0.50	<1.11	<1.11	<1.11
Trichlorofluoromethane (FREON 11)	µg/m³	0.12	20,000	1.21	<1.12	5.92	5.85	<1.12	<1.12	<1.12	--	1.31	<1.12	<1.12	<0.20	<1.12	<1.12	<1.12
Ethanol (ethyl alcohol)	µg/m³	1.88	1,900,000	21.1	<1.88	81.9	81.7	<1.88	<1.88	180	--	2.74	<1.88	<1.88	<1.0	<1.88	<1.88	<1.88
Trichlorotrifluoroethane	µg/m³	1.15	-	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	<1.15	--	<1.15	<1.15	<1.15	<0.15	<1.15	<1.15	<1.15
2-propanol	µg/m³	2.46	491,000	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	--	<2.46	<2.46	<2.46	<1.0	<2.46	<2.46	<2.46
2-Propanone	µg/m³	1.90 - 47.5	618,000	11.1	<1.90	4.33	4.45	<1.90	<1.90	<21.1	--	3.29	5.48	<1.90	<0.80	<1.90	<47.5	<1.90
Methyl Ethyl Ketone (2-Butanone)	µg/m³	2.95 - 6.19	100,000	<2.95	<2.95	<2.95	<2.95	<2.95	<2.95	<2.95	--	<2.95	<6.19	<2.95	<1.0	<2.95	<3.24	<2.95
Methyl Isobutyl Ketone	µg/m³	4.1	-	<4.10	<4.10	<4.10	<4.10	<4.10	<4.10	<4.10	--	<4.10	<4.10	<4.10	<1.0	<4.10	<4.10	<4.10
Methyl Butyl Ketone (2-Hexanone)	µg/m³	4.1	-	<4.10	<4.10	<4.10	<4.10	<4.10	<4.10	<4.10	--	<4.10	<4.10	<4.10	<1.0	<4.10	<4.10	<4.10
Methyl t-butyl ether (MTBE)	µg/m³	0.721	-	<0.721	<0.721	<0.721	<0.721	<0.721	<0.721	<0.721	--	<0.721	<0.721	<0.721	<0.20	<0.721	<0.721	<0.721
Ethyl Acetate	µg/m³	3.6	-	<3.60	<3.60	<3.60	<3.60	<3.60	<3.60	<3.60	--	<3.60	<3.60	<3.60	<1.0	<3.60	<3.60	<3.60
1,1-Dichloroethylene	µg/m³	0.396	4,000	<0.396	<0.396	<0.396	<0.396	<0.396	<0.396	<0.396	--	<0.396	<0.396	<0.396	<0.10	<0.396	5.72	<0.396
cis-1,2-Dichloroethylene	µg/m³	0.396	179	<0.396	1.39	91.0	90.6	<0.396	<0.396	<0.396	--	<0.396	6.99	<0.396	0.59	<0.396	**223**	<0.396
trans-1,2-Dichloroethylene	µg/m³	0.396	179	<0.396	<0.396	5.07	5.05	<0.396	<0.396	<0.396	--	<0.396	1.60	<0.396	<0.10	<0.396	5.49	<0.396
Methylene Chloride(Dichloromethane)	µg/m³	2.78	-	<2.78	<2.78	<2.78	<2.78	<2.78	<2.78	<2.78	--	<2.78	<2.78	<2.78	<0.80	<2.78	<2.78	<2.78
Chloroform	µg/m³	0.488	560	1.40	21.2	<0.488	<0.488	0.734	3.24	0.523	--	<0.488	<0.488	10.5	3.03	0.793	1.32	<0.488
Carbon Tetrachloride	µg/m³	0.629	-	<0.629	<0.629	<0.629	<0.629	<0.629	<0.629	<0.629	--	<0.629	<0.629	<0.629	<0.10	<0.629	<0.629	<0.629
1,1-Dichloroethane	µg/m³	0.405 - 1.21	3,300	<0.405	0.522	<1.21	<1.21	<0.405	<0.405	<0.405	--	<0.405	<0.405	<0.405	<0.10	<0.405	1.74	<0.405
1,2-Dichloroethane	µg/m³	0.405	-	<0.405	<0.405	<0.405	<0.405	<0.405	<0.405	<0.405	--	<0.405	<0.405	<0.405	<0.10	<0.405	<0.405	<0.405
Ethylene Dibromide	µg/m³	0.768	-	<0.768	<0.768	<0.768	<0.768	<0.768	<0.768	<0.768	--	<0.768	<0.768	<0.768	<0.10	<0.768	<0.768	<0.768
1,1,1-Trichloroethane	µg/m³	0.546	20,000	<0.546	<0.546	0.930	0.937	<0.546	<0.546	<0.546	--	<0.546	<0.546	<0.546	<0.10	<0.546	<0.546	<0.546
1,1,2-Trichloroethane	µg/m³	0.546	-	<0.546	<0.546	<0.546	<0.546	<0.546	<0.546	<0.546	--	<0.546	<0.546	<0.546	<0.10	<0.546	<0.546	<0.546
1,1,2,2-Tetrachloroethane	µg/m³	0.687	-	<0.687	<0.687	<0.687	<0.687	<0.687	<0.687	<0.687	--	<0.687	<0.687	<0.687	<0.10	<0.687	<0.687	<0.687
cis-1,3-Dichloropropene	µg/m³	0.454	-	<0.454	<0.454	<0.454	<0.454	<0.454	<0.454	<0.454	--	<0.454	<0.454	<0.454	<0.10	<0.454	<0.454	<0.454
trans-1,3-Dichloropropene	µg/m³	0.454	-	<0.454	<0.454	<0.454	<0.454	<0.454	<0.454	<0.454	--	<0.454	<0.454	<0.454	<0.10	<0.454	<0.454	<0.454
1,2-Dichloropropane	µg/m³	0.462	-	<0.462	<0.462	<0.462	<0.462	<0.462	<0.462	<0.462	--	<0.462	<0.462	<0.462	<0.10	<0.462	<0.462	<0.462
Bromomethane	µg/m³	0.388	-	<0.388	<0.388	<0.388	<0.388	<0.388	<0.388	<0.388	--	<0.388	<0.388	<0.388	<0.10	<0.388	<0.388	<0.388
Bromoform	µg/m³	2.07	-	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	<2.07	--	<2.07	<2.07	<2.07	<0.20	<2.07	<2.07	<2.07
Bromodichloromethane	µg/m³	1.34	-	<1.34	<1.34	<1.34	<1.34	<1.34	<1.34	<1.34	--	<1.34	<1.34	<1.34	<0.20	<1.34	<1.34	<1.34
Dibromochloromethane	µg/m³	1.7	-	<1.70	<1.70	<1.70	<1.70	<1.70	<1.70	<1.70	--	<1.70	<1.70	<1.70	<0.20	<1.70	<1.70	<1.70
Trichloroethylene	µg/m³	0.537	800	<0.537	1.02	1.24	1.59	<0.537	<0.537	<0.537	--	<0.537	0.566	<0.537	1.01	<0.537	11.7	<0.537
Tetrachloroethylene	µg/m³	0.678	800	<0.678	3.55	4.49	4.43	1.84	2.08	8.87	--	<0.678	0.991	0.792	1.86	<0.678	1.40	<0.678
Benzene	µg/m³	0.319	303	0.529	0.366	1.35	1.31	<0.319	<0.319	<0.319	--	<0.319	0.950	<0.319	<0.10	<0.319	0.923	<0.319
Toluene	µg/m³	0.376	190,000	1.62	0.529	6.61	2.46	1.07	0.879	1.10	--	1.43	1.85	0.943	0.20	1.08	2.18	<0.376
Ethylbenzene	µg/m³	0.434	50,000	<0.434	<0.434	<0.434	<0.434	<0.434	<0.434	<0.434	--	<0.434	<0.434	<0.434	<0.10	<0.434	<0.434	<0.434
p+m-Xylene	µg/m³	0.868 - 1.30	9,000	<0.868	<0.868	1.11	1.08	<0.868	<0.868	<0.868	--	<0.868	<0.868	<0.868	<0.20	<0.868	<1.30	<0.868
o-Xylene	µg/m³	0.434	9,000	<0.434	<0.434	<0.434	<0.434	<0.434	<0.434	<0.434	--	<0.434	<0.434	<0.434	<0.10	<0.434	0.608	<0.434
Styrene	µg/m³	0.426	4,600	<0.426	<0.426	<0.426	<0.426	<0.426	<0.426	2.41	--	<0.426	<0.426	<0.426	<0.10	<0.426	<0.426	<0.426
4-ethyltoluene	µg/m³	2.46	-	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	--	<2.46	<2.46	<2.46	<0.50	<2.46	<2.46	<2.46
1,3,5-Trimethylbenzene	µg/m³	2.46	400	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	--	<2.46	<2.46	<2.46	<0.50	<2.46	<2.46	<2.46
1,2,4-Trimethylbenzene	µg/m³	2.46	400	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	<2.46	--	<2.46	<2.46	<2.46	<0.50	<2.46	<2.46	<2.46
Chlorobenzene	µg/m³	0.46	-	<0.460	<0.460	<0.460	<0.460	<0.460	<0.460	<0.460	--	<0.460	<0.460	<0.460	<0.10	<0.460	<0.460	<0.460
Benzyl chloride	µg/m³	2.59	-	<2.59	<2.59	<2.59	<2.59	<2.59	<2.59	<2.59	--	<2.59	<2.59	<2.59	<0.50	<2.59	<2.59	<2.59
1,3-Dichlorobenzene	µg/m³	2.4	-	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40	<2.40	--	<2.40	<2.40	<2.40	<0.40	<2.40	<2.40	<2.40
1,4-Dichlorobenzene	µg/m³	0.601	1,900	<0.601	<0.601	<0.601	<0.601	<0.601	<0.601	<0.601	--	<0.601	<0.601	<0.601	<0.10	<0.601	<0.601	<0.601
1,2-Dichlorobenzene	µg/m³	0.601	-	<0.601	<0.601	<0.601	<0.601	<0.601	<0.601	<0.601	--	<0.601	<0.601	<0.601	<0.10	<0.601	<0.601	<0.601
1,2,4-Trichlorobenzene	µg/m³	3.71	-	<3.71	<3.71	<3.71	<3.71	<3.71	<3.71	<3.71	--	<3.71	<3.71	<3.71	<0.50	<3.71	<3.71	<3.71
Hexachlorobutadiene	µg/m³	5.33	-	<5.33	<5.33	<5.33	<5.33	<5.33	<5.33	<5.33	--	<5.33	<5.33	<5.33	<0.50	<5.33	<5.33	<5.33
Hexane	µg/m³	1.06	14,000	<1.06	<1.06	3.33	3.17	2.93	<1.06	1.71	--	<1.06	7.14	<1.06	<0.30	<1.06	6.03	<1.06
Heptane	µg/m³	1.23	8,000	<1.23	<1.23	1.89	1.34	1.48	1.50	1.33	--	<1.23	1.92	<1.23	<0.30	<1.23	<1.23	<1.23
Cyclohexane	µg/m³	0.688	120,000	<0.688	<0.688	31.5	30.9	<0.688	<0.688	<0.688	--	<0.688	27.4	<0.688	<0.20	<0.688	92.6	<0.688
Tetrahydrofuran	µg/m³	1.18	40,000	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18	--	<1.18	<1.18	<1.18	<0.40	<1.18	<1.18	<1.18
1,4-Dioxane	µg/m³	3.6	-	<3.60	<3.60	<3.60	<3.60	<3.60	<3.60	<3.60	--	<3.60	<3.60	<3.60	<1.0	<3.60	<3.60	<3.60
Naphthalene	µg/m³	2.62	-	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62	<2.62	--	<2.62	<2.62	<2.62	<0.50	<2.62	<2.62	<2.62
Total Xylenes	µg/m³	1.3 - 1.74	9,000	<1.30	<1.30	<1.30	<1.30	<1.30	<1.30	<1.30	--	<1.30	<1.30	<1.30	<0.30	<1.30	<1.74	<1.30
1,1,1,2-Tetrachloroethane	µg/m³	0.687	-	<0.687	<0.687	<0.687	<0.687	<0.687	<0.687	<0.687	--	<0.687	<0.687	<0.687	<0.10	<0.687	<0.687	<0.687
Vinyl Bromide	µg/m³	0.875	-	<0.875	<0.875	<0.875	<0.875	<0.875	<0.875	<0.875	--	<0.875	<0.875	<0.875	<0.20	<0.875	<0.875	<0.875
Propene	µg/m³	0.861- 31.0	60,000	<3.10	<1.72	73.2	72.7	<2.93	<0.861	89.2	--	<0.861	38.9	<3.10	<1.0	<1.55	<31.0	<0.861
2,2,4-Trimethylpentane	µg/m³	0.934	64,173	<0.934	<0.934	3.03	2.95	<0.934	<0.934	<0.934	--	<0.934	4.56	<0.934	<0.20	<0.934	8.17	<0.934
Carbon Disulfide	µg/m³	1.56	2,000	<1.56	<1.56	<1.56	<1.56	6.11	3.69	<1.56	--	3.48	<1.56	7.53	4.11	25.7	<1.56	<1.56
Vinyl Acetate	µg/m³	0.704 - 4.23	-	<0.704	<0.704	<2.82	<2.46	<0.704	<0.704	<0.704	--	<0.704	<2.11	<0.704	<0.20	<0.704	<4.23	<0.704

Notes:

BOLD Shaded	**Concentration exceeds calculated soil vapour screening criteria**
-	Criteria not derived (concentration below detection limits)
--	No Data
<	Below Laboratory MDL

Table 13 Summary of Analytical Results for Siloxanes in Soil Vapour

Sample ID	Units	Reportable Detection Limit	Deminimus Screening -Soil Vapour Screening Criteria	Soil Vapour Probes									
				VW-01	VW-03	VW-05		XCG-1(SVP)	XCG-2(SVP)	XCG-4(SVP)	XCG-6(SVP)	XCG-10(SVP)	XCG-13(SVP)
Laboratory				ALS	ALS	ALS		ALS	ALS	ALS	ALS	ALS	ALS
Tube ID				G0150695SVI	G0150687SVI	G0150642SVI	G0150640SVI	G0150699SVI	G0150637SVI	G0150637SVI	G0150069SVI	G0150698SVI	G0150688SVI
Laboratory ID				L1901643-2	L1901643-1	L1901643-3	L1901643-4	L1901643-5	L1901643-8	L1901643-8	L1901643-7	L1901643-9	L1901643-6
Date Sampled				12-Mar-17	12-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	11-Mar-17	14-Mar-17	13-Mar-17	12-Mar-17	12-Mar-17
hexamethyl cyclotrisolxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
octamethyl cyclotetrasiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
decamethyl cyclopentasiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
dodecamethyl cyclohexasiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
hexamethyldisiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
octamethyltrisiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
decamethyltetrasiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170
dodecamethylpentasiloxane	µg/m³	170	-	<170	<170	<170	<170	<170	<170	<170	<170	<170	<170

Notes:

- **Criteria not derived (concentration below detection limits)**

< Below Laboratory RDL

Table 14 Summary of Deminimus Screening Results for Indoor Air Parameters
Derive Acceptable Soil Vapour Concentrations (Soil Vapour Screening Levels)

$$Csv = \frac{Cair}{alpha}$$

where
Csv = Allowable Concentration of Soil Vapour
Cair = Concentration in indoor air (or trench air)
alpha = vapour attenuation factor Alpha Coarse Graine Alpha Fine Grained = 2. Demininus Alpha = 0.01 Deminimus Alpha = 0.01

Assumptions in selection of vapour attenuation factors
1. Assume 0.3 metre depth from vapour sample to building foundation
2. Assume residential building with basement (this is considered protective of slab on grade)
3. Alpha values calculated in accordance with CCME, 2014 "A Protocol for the Derivation of Soil Vapour Guidelines for Protection of Human Exposures Via Inhalation"
concern. The physical-chemical properties for benzene have been applied to all

Chemical	Assume Coarse Grained Residential Basement Setting	Assume Fine Grained Residential Basement Setting	Deminimus Screening				
	(Coarse Grained) Soil Vapour Screening (µg/m³)	(Fine Grained) Soil Vapour Screening (µg/m³)	*Soil Vapour Screening (µg/m³)*	*Soil Vapour Screening (µg/m³)*	Worst case concentration in soil vapour probes (including probes within the limit of waste)	Location	Include in Indoor Air Testing? (Y/N)
trans-1,2-dichloroethylene	9.13E+02	8.22E+03	**1.79E+02**	**179**	5.49	XCG-13(SVP)	N
1,2-dibromoethane	9.18E+02	8.27E+03	**1.80E+02**	**180**	0.768	RDL in all	N
1,2-dichlorobenzene	1.96E+05	1.77E+06	**3.85E+04**	**38482**	0.601	RDL in all	N
styrene	2.35E+04	2.11E+05	**4.60E+03**	**4600**	2.41	XCG-4(SVP)	N
1,3,5-trichlorobenzene	3.67E+02	3.31E+03	**7.20E+01**	**72**	*not measured in SV. See note below.		N
1,1,2-trichloroethane	1.83E+03	1.64E+04	**3.58E+02**	**358**	0.546	RDL in all	N
Ethane	8.13E+05	8.13E+05	**8.13E+05**	**813000**	318	XCG-4(SVP)	N
Ethylene	1.74E+05	1.74E+05	**1.74E+05**	**174000**	8400	VW-05	N
Methane	methane concentration ppmv 1,000 to <5000 and soil gas pressure 0.69 to <3.5 kPa	methane concentration ppmv 1,000 to <5000 and soil gas pressure 0.69 to <3.5 kPa	**1.5E+6 to <7.6E+6 ug/m3**	**1,500,000 to <7,600,000 ug/m3**	37,393,865.03 (5.7%)	XCG-4(SVP)	**Y**
Propane	1.80E+06	1.80E+06	**1.80E+06**	**1800000**	524	Non-detect in all, XCG-2 (SVP) was potential highest	N
Dichlorodifluoromethane (Freon 12)	9.08E+04	8.17E+05	**1.78E+04**	**17800**	2950	XCG-13(SVP)	N
1,2-dichlorotetrafluorethane (R114)	7.00E+06	7.00E+06	**7.00E+06**	**7000000**	1790	VW-03	N
Chloromethane	9.18E+03	8.27E+04	**1.80E+08**	**1800**	4.39	VW-01	N
Vinyl Chloride	5.80E+02	5.22E+03	**1.14E+02**	**114**	1250	VW-05 (duplicate)	**Y**
Chloroethane	1.02E+06	9.18E+06	**2.00E+05**	**200000**	23.2	VW-05	N
Trichlorofluormethane (Freon 11)	1.02E+05	9.18E+05	**2.00E+04**	**20000**	5.92	VW-05	N
Ethanol (Ethyl Alcohol)	1.90E+06	1.90E+06	**1.90E+06**	**618000**	180	XCG-4(SVP)	N
2-Propanol (isopropyl alcohol)	4.91E+05	4.91E+05	**4.91E+05**	**491000**	2.46	RDL in all	N
2-Propanone (acetone)	3.15E+06	2.84E+07	**6.18E+05**	**618000**	47.5	XCG-13(SVP)- elevated RDL bc of matrix interference	N
Methyl Ethyl Ketone (2-Butanone)	5.10E+05	4.59E+06	**1.00E+05**	**100000**	6.19	XCG-6(SVP)- elevated RDL bc of matrix interference	N
1,4-dichlorobenzene	9.69E+03	8.73E+04	**1.90E+03**	**1900**	0.601	RDL in all	N
1,1,-dichlorethylene	2.04E+04	1.84E+05	**4.00E+03**	**4000**	5.72	XCG-13(SVP)	N
cis-1,2-dichloroethylene	9.13E+02	8.22E+03	**1.79E+02**	**179**	223	XCG-13(SVP)	**Y**
methylene chloride (dichloromethane)	2.22E+05	2.00E+06	**4.35E+04**	**43478**	2.78	RDL in all	N
chloroform	2.86E+03	2.57E+04	**5.60E+02**	**560**	21.2	VW-03	N
1,1,1-trichloroethane	1.02E+05	9.18E+05	**2.00E+04**	**20000**	0.937	VW-05 (duplicate)	N
trichloroethylene (updated)	4.08E+03	3.67E+04	**8.00E+02**	**800**	11.7	XCG-13 (SVP)	N
tetrachloroethylene	4.08E+03	3.67E+04	**8.00E+02**	**800**	12.6	XCG-10(SVP)	N
benzene	1.55E+03	1.39E+04	**3.03E+02**	**303**	1.35	VW-05	N
toluene	9.69E+05	8.73E+06	**1.90E+05**	**190000**	6.61	VW-05	N
PHC F1	3.04E+05	2.73E+06	**5.95E+04**	**59532**	5830	XCG-13(SVP)	N
PHC F2	1.42E+05	1.28E+06	**2.78E+04**	**27778**	972	XCG-13(SVP)	N
ethylbenzene	2.55E+05	2.30E+06	**5.00E+04**	**50000**	0.434	RDL in all	N
total xylenes	4.59E+04	4.13E+05	**9.00E+03**	**9000**	1.74	XCG-13(SVP)- elevated RDL bc of matrix interference	N
1,3,5-trimethylbenzene	2.04E+03	1.84E+04	**4.00E+02**	**400**	2.46	RDL in all	N
1,2,4-trimethylbenzene	2.04E+03	1.84E+04	**4.00E+02**	**400**	2.46	RDL in all	N
hexane	7.14E+04	6.43E+05	**1.40E+04**	**14000**	7.14	XCG-6(SVP)	N
heptane	4.08E+04	3.67E+05	**8.00E+03**	**8000**	1.92	XCG-6(SVP)	N
cyclohexane	6.12E+05	5.51E+06	**1.20E+05**	**120000**	92.6	XCG-13(SVP)	N
tetrahydrofuran	2.04E+05	1.84E+06	**4.00E+04**	**40000**	1.18	RDL in all	N
propene	3.06E+05	2.76E+06	**6.00E+04**	**60000**	89.2	XCG-4(SVP)	N
2,2,4-trimethylpentane	6.42E+04	6.42E+04	**6.42E+04**	**64173**	8.17	XCG-13(SVP)	N
carbon disulfide	1.02E+04	9.18E+04	**2.00E+03**	**2000**	25.7	XCG-12(SVP)	N

Notes

1. Methane screening will be completed in accordance with Table 6, Draft Soil and Building Methane Gas Management Guide, Oct 2013, (Alberta Health Services)

*1,3,5-trichlorobenzene was detected in MW-06 but not measured in soil vapour because of the following:
(note that MW-06 is assumed to be within the limit of waste, and therefore 1,3,5-trichlorobenzene was not under consideration for indoor air testing)

Henry's Law Constant (HCL)	1.9x 10-3 atm m³/mol		
Convert to HLC (unitless)	0.077661031		
Concentration of 1,3,5-trichlorobenzene detected in Groundwater		0.73	µg/L
Using Henry's Law to convert to soil vapour concentration =	Csv = Cgw (µg/L) X HCL(unitless) x 1000 L/m³		
Concentration in Soil Vapour = Csv = 0.73 µg/L * 0.077661 * 1000 L/m³ =		56.69	µg/m³

This concentration is less than the soil vapour screening value of 72 µg/m³. Therefore, even with very conservative assumptions, groundwater at concentrations detected would not cause a soil vapour concentration to exceed the demininums screening concentrations.

Table 15 Summary of Analytical Results for VOCs in Indoor Air

Sample ID	UNITS	Reportable Detection Limit	Health Based Indoor Air Criteria	Indoor Air Samples											Ambient
				[redacted]HILL CRESCENT/2758	[redacted] HERMARY ST/T21636	[redacted]HERMARY ST/14258		[redacted] HERMARY ST/18232	[redacted] HERMARY ST/129	[redacted] 62 ST/14918	[redacted] 62 ST/14531	[redacted] 62 ST/18260	[redacted]53 AVE/14530	[redacted]53 AVE/2813	OAQ/2595
Laboratory				Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam	Maxxam
Laboratory ID				EBG197	EBG194	EBG196	EBG205	EBG201	EBG200	EBG199	EBG198	EBG195	EBG202	EBG203	EBG204
Date Sampled				3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017	3/14/2017
Summa Canister Pressure on Receipt	**psig**	NV	NV	(-3.9)	(-5.0)	(-4.5)	(-4.5)	(-4.6)	(-4.5)	(-4.0)	(-4.0)	(-3.6)	(-4.5)	(-4.3)	(-2.2)
Vinyl Chloride	**µg/m^3**	0.0511	1.136	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
cis-1,2-Dichloroethylene	**µg/m^3**	0.200	1.790	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methane	**% v/v**	0.1-0.2	0.25-0.5	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Notes:

Note 1	Health Based Indoor Air Criteria is derived from Risk Assessment modelling, which takes a number of conservative assumptions into consideration. The Criteria are not regulated, rather are indicators of possible sources
Bold and underline	Parameter concentration exceeds Health Based Indoor Air Criteria for Commercial Use
NA	Not Analyzed
<	Below Laboratory RDL

APPENDIX F

BOREHOLE LOGS

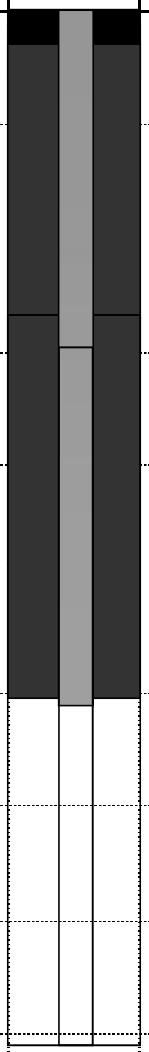
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** MW-01
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 880.576 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/24/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Groundwater Monitoring Well is near the northwest corner of the site, next to the rear fence of 39 Hermary Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Silt (fill) mixed with MSW - organics, paper, plastic, wire, glass, moderate pungent odour, soft to firm, clayey, trace sand, damp to moist, light olive brown.						
1.0							
2.0							
3.0	becomes moist at 3.2 m.						
4.0							
	Sand (native) - compact, silty, some clay, wet, olive grey. No obvious waste material.						
5.0							
6.0	coal fragments at 6.2 m.						
7.0	becomes clayey at 7.4 m.						
8.0							
9.0	End of hole at 9.1 m. 3.0 m PVC installed with threaded cap. 6.1 m threaded 010 machine slotted screen. Completed with flush mount casing set in concrete.						
10.0							
11.0							
12.0							



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Slough :	Completion Depth (m): 9.1
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** MW-02
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.027 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/25/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Groundwater Monitoring Well is near the northeast corner of site behind 1 Hermary Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Silt (fill) - compact, trace silt, damp, light olive. No obvious waste material.						
1.0	becomes wet at 1.5 m.						
	Clay (native) - firm, silty, trace sand, moist, light olive brown.						
2.0							
3.0	Sand (native) - compact, silty, wet, light olive brown.						
	Clay - firm, silty, wet, light olive brown.						
4.0							
5.0							
6.0	End of hole at 6.1 m. 1.5 m PVC installed with threaded cap. 4.6 m threaded 010 machine slotted screen. Completed with flush mount casing set in concrete.						
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

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Slough :	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

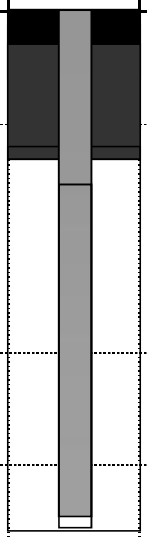
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** MW-03
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.400 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/25/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Groundwater Monitoring Well is near the northeast corner of the Montfort Heights Property.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Sand (fill) mixed with MSW - glass, wood debris, plastic, metal, compact, some pebbles, trace rootlets, damp, olive brown to olive black.						
1.0							
2.0	becomes wet at 2.9 m.						
3.0							
	Clay (native) - firm, silty, wet, light olive. No obvious waste material.						
4.0	Sand (native) - compact, silty, wet, light olive.						
	End of hole at 4.6 m. 1.6 m PVC installed with threaded cap. 3.0 m threaded 010 machine slotted screen. Completed with flush mount casing set in concrete.						
5.0							
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							



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Slough :	Completion Depth (m): 4.6
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

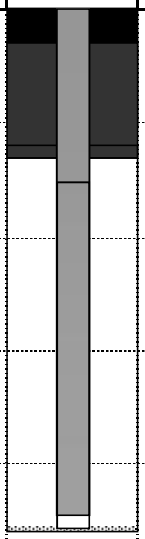
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** MW-04
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.622 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/25/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Groundwater Monitoring Well is near the northwest corner of the parking lot of Montfort Centre Red Deer Catholic Regional Schools.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft to firm, silty, sandy, trace rootlets, moist, dark olive. (~ 40 cm thick).						
	Sand (fill) - loose to compact, silty, masonry brick, moist, light olive brown.						
1.0							
2.0							
3.0	Clay (native) - firm, silty, trace sand, moist, light olive. No obvious waste material.						
	Sand (native) - loose, silty, trace clay, wet, light olive.						
4.0							
	End of hole at 4.6 m. 1.6 m PVC installed with threaded cap. 3.0 m threaded 010 machine slotted screen. Completed with flush mount casing set in concrete.						
5.0							
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							



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Slough :	Completion Depth (m): 4.6
Depth to Groundwater :	Checked By: LTM

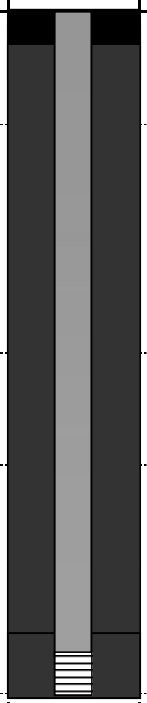
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** VW-01
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 880.531 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/24/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Soil Vapour Well is about 1.2 m east of MW-01, near fence at 39 Hermary Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Silt (fill) mixed with MSW - organics, paper, plastic, wire, glass, moderate pungent odour, soft to firm, clayey, trace sand, damp to moist, light olive brown.						
1.0							
2.0							
3.0							
4.0							
	Sand (native) - compact, silty, some clay, wet, olive grey. No obvious waste material.						
5.0	trace coal at 5.9 m.						
6.0	End of hole at 6.1 m. 5.8 m PVC installed with threaded cap. 0.3 m threaded 020 machine slotted screen. Completed with flush mount casing set in concrete.						
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							



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Slough :	Completion Depth (m): 6.1
Depth to Groundwater :	Checked By: LTM
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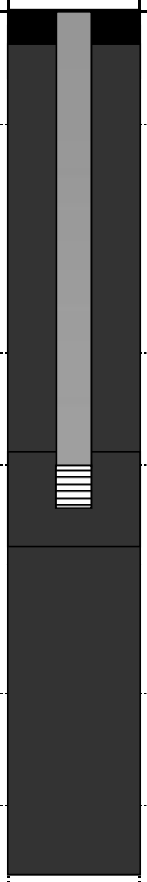
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** VW-02
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.582 m.
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/24/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Soil Vapour Well is about 5 m west of MW-07, near the fence at 21 Hermary Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Sand (fill) mixed with MSW - wood fragments, paper, plastic bags, plastic, sharp pungent odour, compact, silty, some organic loam, trace clay, trace rootlets, damp, olive grey. becomes moist at 0.4 m.						
1.0							
2.0							
3.0	Clay (fill) mixed with MSW - firm, silty, moist, olive.						
4.0							
	Sand (native) - loose, silty, wet, olive. No obvious waste material.						
5.0							
6.0							
7.0	Clay (native) - stiff to firm, silty, wet, olive.						
	End of hole at 7.6 m. 4.0 m PVC installed with threaded cap. 0.3 m threaded 020 machine slotted screen. Completed with flush mount casing set in concrete.						
8.0							
9.0							
10.0							
11.0							
12.0							



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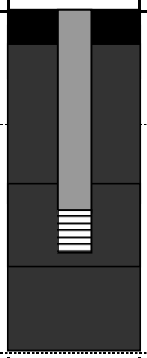
Slough :	Completion Depth (m): 7.6
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** VW-03
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.313 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/25/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Soil Vapour Well is at north side of the site near rear fence, southeast corner of 13 Hermary Street.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Loam (fill) - compact, silty, sandy, trace rootlets, trace pebbles, trace clay, damp, olive black.						
1.0	Sand (fill) - compact, silty, organics, moist, light to dark olive brown.						
	Sand (native) - compact, silty, clayey, moist, light yellow.						
2.0	becomes grey at 1.8 m.						
	becomes wet at 2.4 m.						
3.0	End of hole at 3.0 m.						
	2.7 m PVC installed with threaded cap.						
	0.3 m threaded 020 machine slotted screen.						
	Completed with flush mount casing set in concrete.						
4.0							
5.0							
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							

Tiamat Environmental Consultants Ltd.

Slough :	Completion Depth (m): 3.0
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

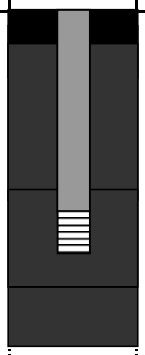
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** VW-04
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 879.590 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/25/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Soil Vapour Well is about 3 m west of MW-04, near the northeast corner of the parking lot of Montfort Centre Red Deer Catholic Regional Schools.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Sand (fill) mixed with MSW - plastic, metal, brick, loose, silty, damp, olive brown.						
1.0							
2.0	becomes wet at 2.4 m.						
3.0	End of hole at 3.0 m. 1.8 m PVC installed with threaded cap. 0.3 m threaded 020 machine slotted screen. Completed with flush mount casing set in concrete.						
4.0							
5.0							
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							



Tiamat Environmental Consultants Ltd.

Slough :	Completion Depth (m): 3.0
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

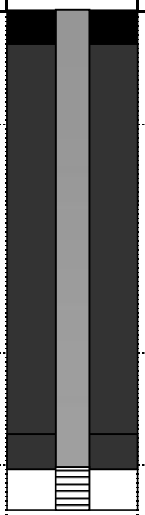
PROJECT: Phase II Environmental Site Assessment	**BOREHOLE No.:** VW-05
PROJECT No.: 12-435	**DRILL TYPE:** SS Auger
LOCATION: Montfort Landfill Site	**GROUND ELEVATION:** 880.019 m
CLIENT: The City of Red Deer	**COMPLETION DATE:** 06/26/2013

Sample Type: Shelby Tube, Split Spoon, Core, Disturbed, No Recovery

Backfill Type: Bentonite, Silica Sand, Grout, Pea Gravel, Drill Cuttings, Bentonite : Sand

Notes: Soil Vapour Well is about 2 m south of MW-05 near the southwest corner of the site.

Depth (m)	Soil Description	Sample Type	Sample No.	SPT (N)	Combustible Soil Vapours (ppm)		Well Details
0.0	Sod and loam (fill) - soft, trace rootlets, moist, dark olive. (~ 3 cm thick).						
	Sand (fill) - compact, silty, loamy, trace clay, trace organics, damp, light olive. No obvious waste material.						
1.0							
	Clay (native) - stiff, silty, trace sand, moist, light grey.						
	sand lense at 1.8 m, about 10 cm thick.						
2.0							
3.0							
4.0							
	End of hole at 4.4 m. 4.1 m PVC installed with threaded cap. 0.3 m threaded 020 machine slotted screen. Completed with flush mount casing set in concrete.						
5.0							
6.0							
7.0							
8.0							
9.0							
10.0							
11.0							
12.0							



Tiamat Environmental Consultants Ltd.

Slough :	Completion Depth (m): 4.4
Depth to Groundwater :	Checked By: LTM
Logged By: JAL/LTM	Page: 1 of 1

Project #: 4-2352-04-03

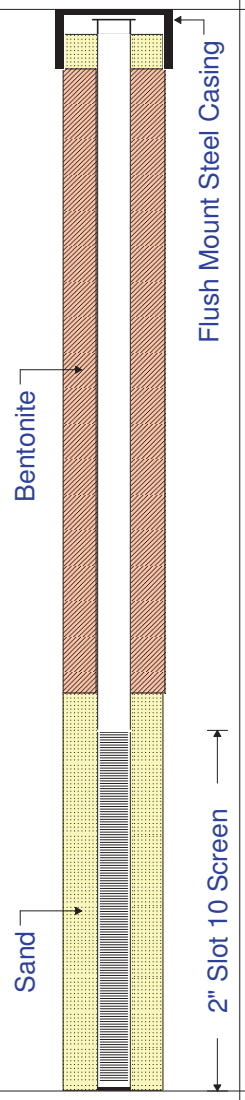
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-1(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	881.2		
0 ft / 0 m		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	879.7		
6 ft / 2 m		***Clay*** Dark brown. High plasticity. No staining or odour. Wet at 7.5 metres bgs.	872.1		
30 ft / 9 m		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 881.206
Ground Surface Elevation: 881.206

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

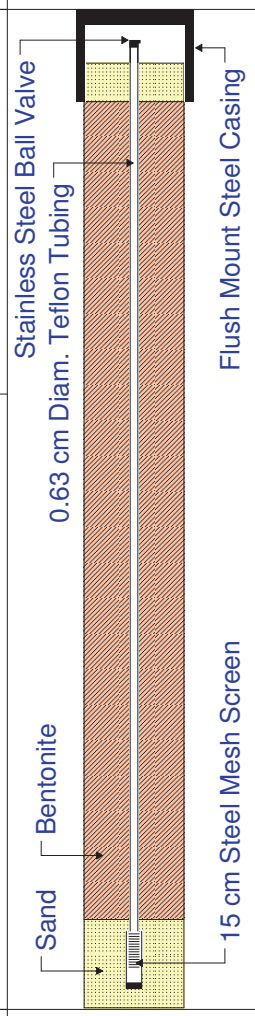
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-1(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	881.3		
0 / 0		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	879.8		
6 / 2		***Clay*** Dark brown. High plasticity. No staining or odour.	877.4		
14 / 4		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 881.326
Ground Surface Elevation: 881.326

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

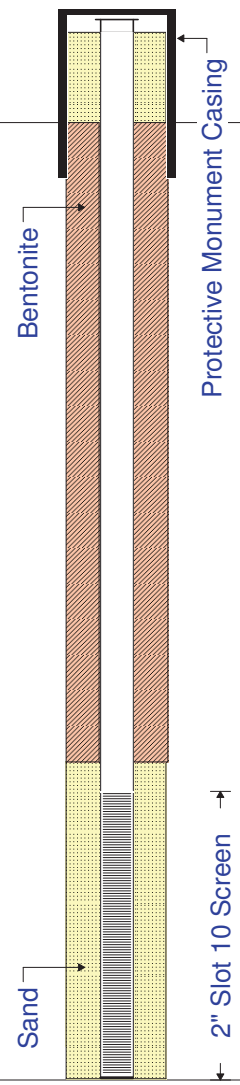
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-2(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	881.1		
		Topsoil Dark brown with some sand and silt. Dry. No staining or odour.	880.5		
		Clayey Silt Medium brown with some fine sand. No staining or odour.			
		Moist at 7.5 metres bgs.			
		Wet at 9.0 metres bgs. Increasing clay content at 9.0 metres bgs.	870.7		
		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 882.328
Ground Surface Elevation: 881.101

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

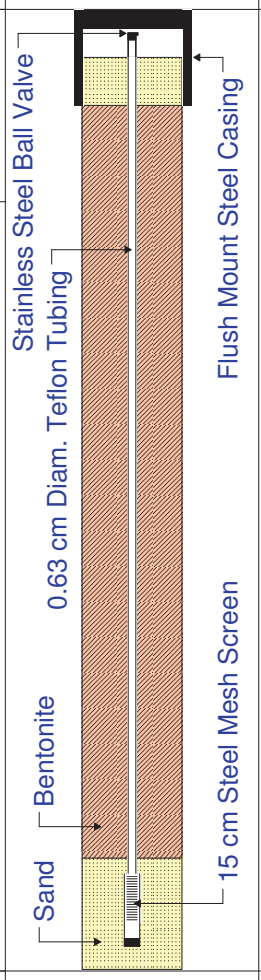
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-2(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	881.2		
0 / 0		***Topsoil*** Dark brown with some sand and silt. Dry. No staining or odour.	880.6		
2		***Clayey Silt*** Medium brown with some fine sand. No staining or odour.	878.1		
4					
6 / 2					
8					
10		End of Borehole			
12					



Groundwater Elevation: N/A
T.O.C. Elevation: 881.163
Ground Surface Elevation: 881.163

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

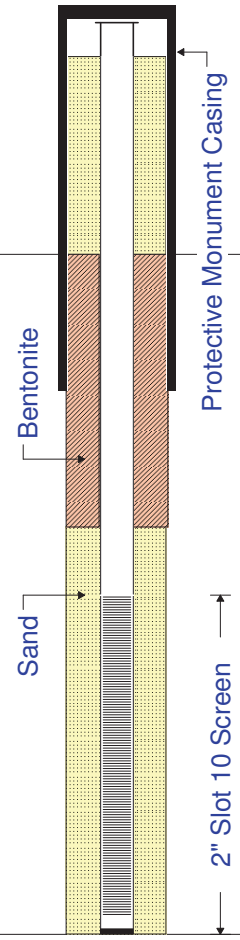
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-4(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
-5, -3, -1		Ground Surface	879.2		
1, 3 (1), 5, 7, 9 (3)		***Topsoil*** Dark brown with pockets of red oxidation. High silt and sand content. Dry. No staining or ordour.			
		Clay content and moisture levels increasing starting at 1.5 metres bgs.	877.4		
		Clay Dark brown with blue reduced pockets. High plasticity. Moist. No staining or odour.	876.2		
11		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 880.342
Ground Surface Elevation: 879.22

Screening Tool: N/A

Monitoring Well Log
For Environmental Purposes Only

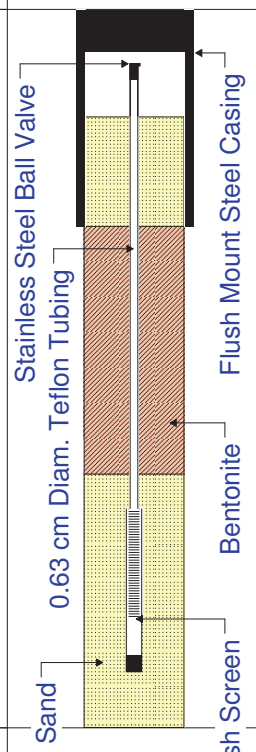
Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-4(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	879.2		
0 / 0		***Topsoil*** Dark brown with pockets of red oxidation. High sand and silt content. Dry. No staining or odour.	878.2		
2					
4		End of Borehole			

Groundwater Elevation: N/A
T.O.C. Elevation: 879.194
Ground Surface Elevation: 879.194

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

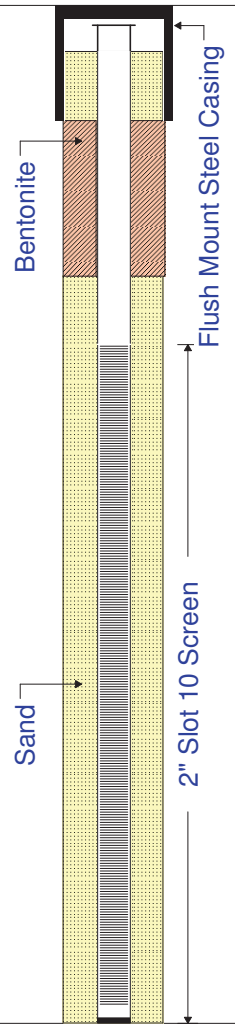
Privileged and Confidential

LOG OF WELL: XCG-5(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 7, 2016 **Checked By:** EM
Completed: December 7, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.3		
0 / 0		***Topsoil*** Dark brown with pockets of red oxidation. High silt and sand content. Dry. No staining or odour.	879.5		
2		***Sand*** Medium brown. Very fine with some silt. Moist at 2.8 metres bgs. No staining or odour.	877.2		
4 / 2		***Clayey Silt*** Dark brown. Wet at 3.2 metres bgs. No staining or odour.	875.7		
6					
8					
10					
12 / 4					
14					
16		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 880.27
Ground Surface Elevation: 880.27

Screening Tool: N/A

Monitoring Well Log
For Environmental Purposes Only

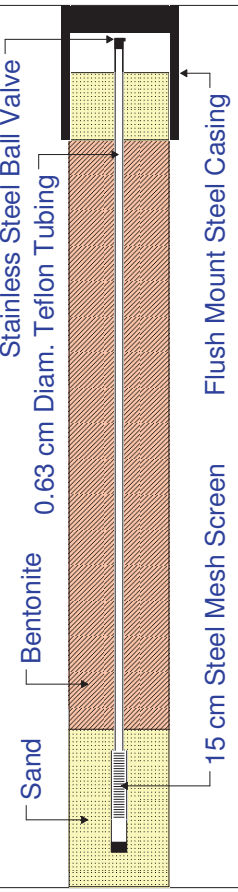
Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-5(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 7, 2016 **Checked By:** EM
Completed: December 7, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.4		
0 / 0		***Topsoil*** Dark brown with pockets of red oxidation. High silt and sand content. Dry. No staining or odour.	879.6		
		Sand Medium brown. Very fine with some silt. Moist at 2.8 metres bgs. No staining or odour.	878.4		
2		End of Borehole			

Groundwater Elevation: N/A
T.O.C. Elevation: 880.356
Ground Surface Elevation: 880.356

Screening Tool: N/A

Monitoring Well Log
For Environmental Purposes Only

Project #: 4-2352-04-03

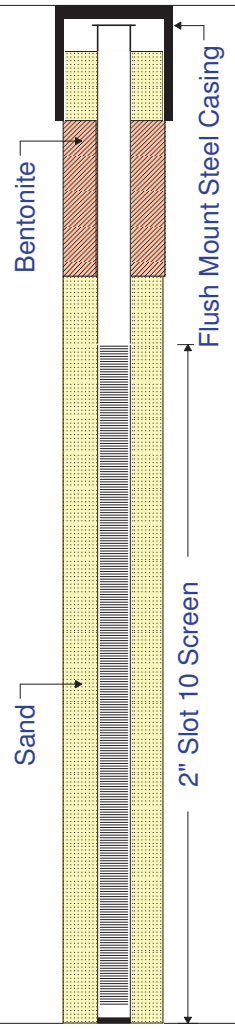
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-6(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 7, 2016 **Checked By:** EM
Completed: December 7, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.0		
0 / 0		***Topsoil*** Dark brown with pockets of red oxidation. High silt and sand content. Dry. No staining or odour.	879.2		
2		***Sand*** Medium brown. Fine with some silt. Some redox (red/blue) striations. No staining or odour.			
4					
6 / 2		Moist at 2.3 metres bgs.			
8					
10		Wet at 3.0 metres bgs.			
12 / 4					
14			875.4		
16		End of Borehole			



Groundwater Elevation: N/A
T.O.C. Elevation: 879.971
Ground Surface Elevation: 879.971

Screening Tool: N/A

Monitoring Well Log
For Environmental Purposes Only

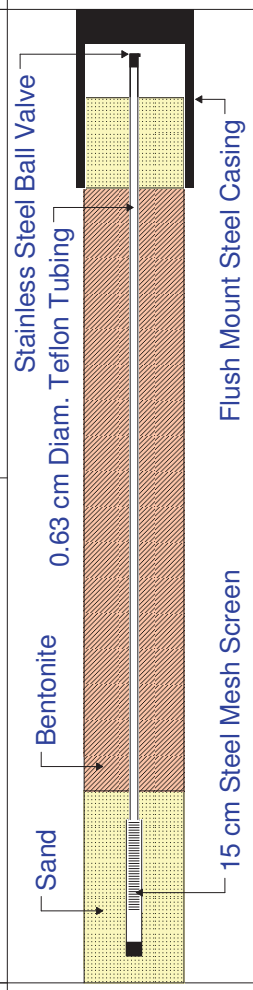
Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-6(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 7, 2016 **Checked By:** EM
Completed: December 7, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	879.9		
0 / 0		***Topsoil*** Dark brown with pockets of red oxidation. High silt and sand content. Dry. No staining or odour.	879.1		
2		***Sand*** Medium brown. Fine with some silt. Some redox (red/blue) striations. No staining or odour.	878.3		
4					
		End of Borehole			
6					

Groundwater Elevation: N/A
T.O.C. Elevation: 879.903
Ground Surface Elevation: 879.903

Screening Tool: N/A

Monitoring Well Log
For Environmental Purposes Only

Project #: 4-2352-04-03

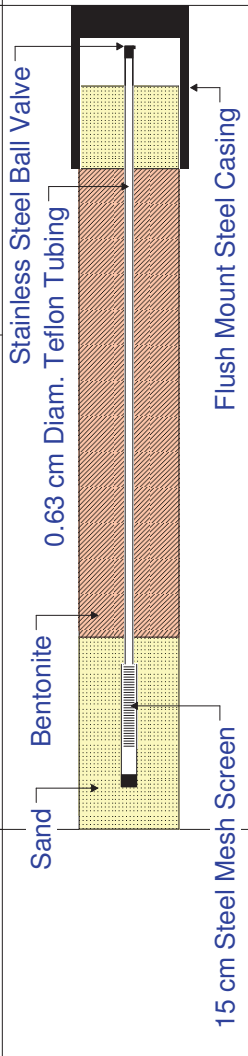
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-9(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.7		
0 / 0		***Topsoil*** Dark brown with silt and sand content. Dry. No staining or odour.	880.1		
2		***Clay*** Dark brown. High plasticity. Mixed with some topsoil. No staining or odour. Clay was disturbed and had been packed back around utilities.	879.2		
4					
		End of Borehole			
6 / 2					



Groundwater Elevation: N/A
T.O.C. Elevation: 880.703
Ground Surface Elevation: 880.703

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

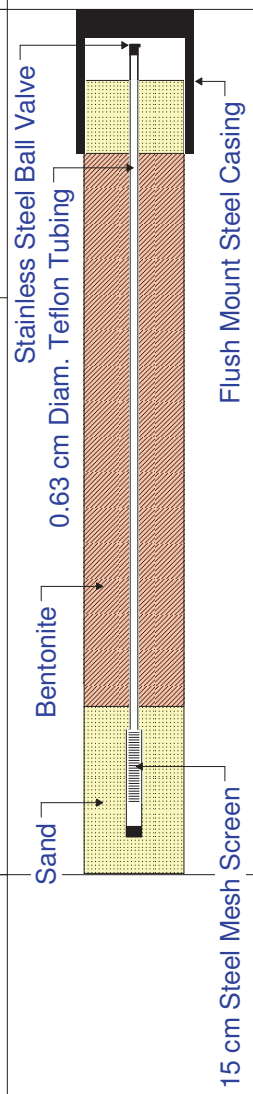
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-10(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	879.1		
0 / 0		***Topsoil*** Dark brown with silt and sand content. Dry. No staining or odour.	878.5		
2		***Clay*** Dark brown. High plasticity. No staining or odour.			
4		Increasing moisture starting at 1.5 metres bgs.	877.3		
6		End of Borehole			
2					
8					



Groundwater Elevation: N/A
T.O.C. Elevation: 879.122
Ground Surface Elevation: 879.122

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

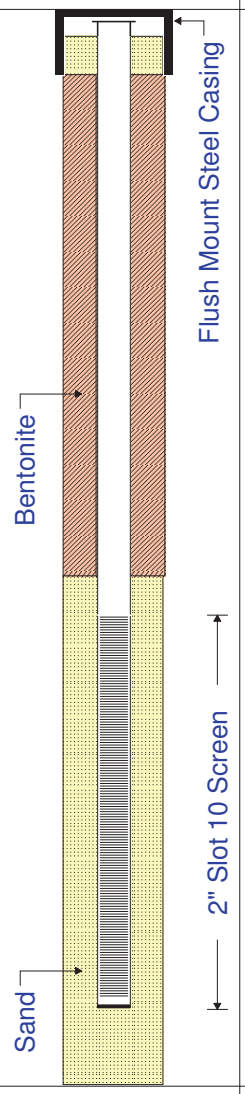
Privileged and Confidential

LOG OF WELL: XCG-12(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.8		
0 / 0		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	880.2		
2		***Clayey Silt*** Medium brown. Not plastic. No staining or odour.			
4					
6 / 2					
8					
10					
12 / 4					
14					
16					
18					
20 / 6					
22					
24		Moisture increasing at 7.0 metres bgs. Note that it would have been preferred to install the screen deeper, but the bottom of the hole collapsed.			
26 / 8					
28			872.3		
		End of Borehole			
30					



Groundwater Elevation: N/A
T.O.C. Elevation: 880.799
Ground Surface Elevation: 880.799

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

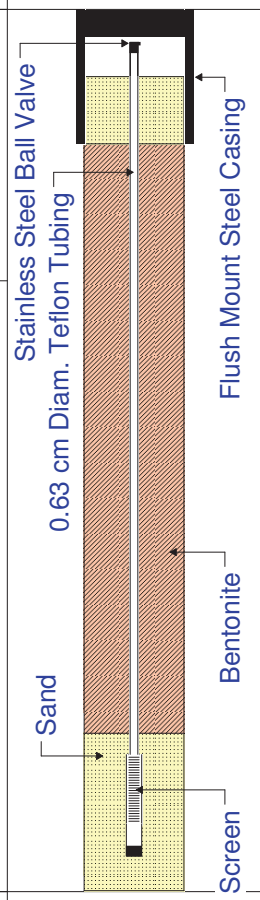
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-12(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.8		
0 / 0		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	880.2		
2		***Clayey Silt*** Medium brown. Not plastic. No staining or odour.	878.8		
4					
6					
2		End of Borehole			
8					



Groundwater Elevation: N/A
T.O.C. Elevation: 880.799
Ground Surface Elevation: 880.799

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

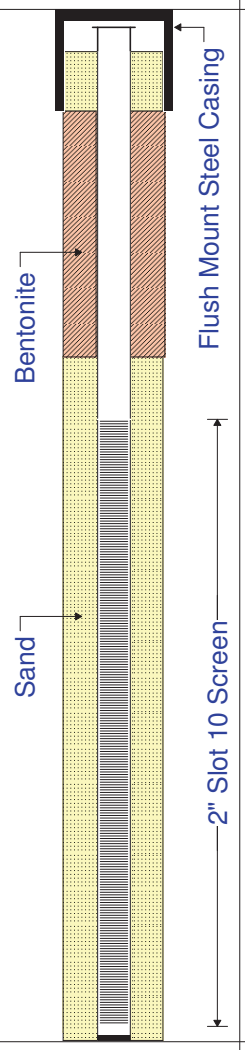
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-13(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	879.7		
0 / 0		***Topsoil*** Some clay. Dry. No staining or odour. Different from topsoil across the site. Homeowner brought additional topsoil in.	878.9		
2		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	878.4		
4		***Clay*** Dark brown / black. No staining or odour. Wet at 3.7 metres bgs.			
6 / 2					
8					
10					
12 / 4					
14					
16			874.5		
		End of Borehole			
18					



Groundwater Elevation: N/A
T.O.C. Elevation: 879.672
Ground Surface Elevation: 879.672

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

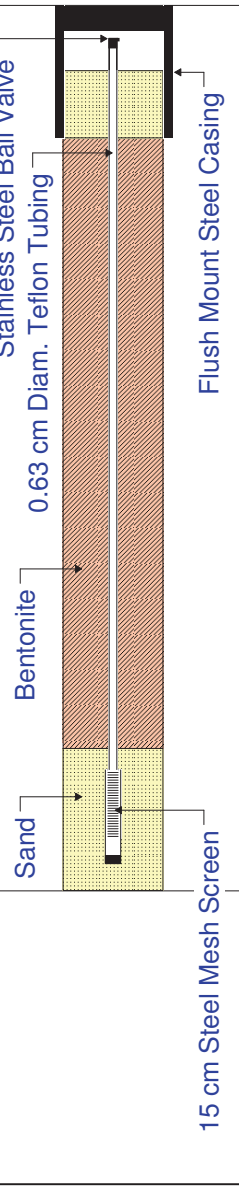
Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

Privileged and Confidential
LOG OF WELL: XCG-13(SVP)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 6, 2016 **Checked By:** EM
Completed: December 6, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	879.7		
0 / 0		***Topsoil*** Some clay. Dry. No staining or odour. Different from topsoil across the site. Homeowner brought topsoil in.	878.9		
2		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	878.4		
4		***Clay*** Dark brown / black. No staining or odour. Wet at 3.7 metres bgs.	877.7		
6 / 2		End of Borehole			
8					



Groundwater Elevation: N/A
T.O.C. Elevation: 879.679
Ground Surface Elevation: 879.679

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A

Project #: 4-2352-04-03

Project: Montfort
Client: City of Red Deer
Location: Red Deer, AB

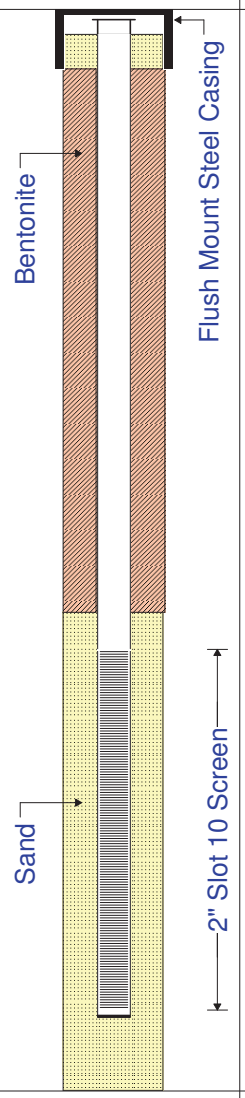
Privileged and Confidential

LOG OF WELL: XCG-14(MW)

Driller: JED Anchors & Environmental
Drill Method: Solid Stem
Sample Method: N/A

Borehole Diameter: 0.15 m
Start Date: December 5, 2016 **Checked By:** EM
Completed: December 5, 2016 **Logged By:** MCL

Depth (ft / m)	Graphic Log	Geology Description	Depth/Elev (m)	Well Completion	Well Details
		Ground Surface	880.7		
0 ft / 0 m		***Topsoil*** Dark brown with some silt and sand. Dry. No staining or odour.	879.5		
4 ft		***Clay*** Dark brown. Decreasing sand starting at 1.4 metres bgs. Increasing moisture starting at 1.5 metres bgs. No staining or odour.			
6 ft / 2 m					
8 ft					
10 ft					
12 ft / 4 m					
14 ft					
16 ft					
18 ft		Wet at 5.5 metres bgs.			
20 ft / 6 m					
22 ft					
24 ft					
26 ft / 8 m					
28 ft		Unstable at 8.5 metres bgs. Note that hole collapsed at 8.5 to 9 metres bgs.	871.6		
30 ft		End of Borehole			
32 ft					



Groundwater Elevation: N/A
T.O.C. Elevation: 880.719
Ground Surface Elevation: 880.719

Monitoring Well Log
For Environmental Purposes Only

Screening Tool: N/A