



**PUBLIC SERVICES AND PROCUREMENT CANADA
ENVIRONMENTAL SERVICES – WESTERN REGION, ON
BEHALF OF TRANSPORT CANADA**

Environmental Monitoring Program for the Resolute Bay Airport Landfills, Resolute Bay, Nunavut

PSPC Project R.112072.001

Final Report

Executive Summary

Dillon Consulting Ltd. and Outcome Consultants Inc in joint venture (DOJV) were contracted by Public Services and Procurement Canada (PSPC) Environmental Services, on behalf of Transport Canada (TC) as site custodian, to execute the second year of the Environmental Monitoring Program (EMP) for the Resolute Bay Airport Landfill site (the “site”) in accordance with the December 2020 *Post-Closure Monitoring Plan* (DOJV 2020) for the Resolute Bay Airport Landfills in Resolute Bay, Nunavut and the Nunavut Water Board (NWB) Amended Renewal Water License (WL) 1BR-RBL1929.

The Resolute Bay Airport is five kilometres northwest of the Inuit hamlet of Resolute, adjacent to Resolute Bay on Cornwallis Island, Nunavut. The site consists of three Areas of Environmental Concern (AECs): two historical landfills and a former vehicle storage area (also referenced as metal storage area). The AECs were remediated in two field seasons during 2018 and 2019. For reporting purposes, the AECs are referenced as the Inactive Solid Waste Landfill (AEC 1), Historical Landfill (AEC 2), and the Former Vehicle and Waste Metal Storage Area (AEC 3).

The post-closure EMP was implemented to evaluate the sustained effectiveness of the site remediation.

DOJV conducted the field activities for the second year of the EMP for the Resolute Bay Airport Landfills site on July 14, 2022, July 27, 2022 and from August 2 – 4, 2022. The program included thermal monitoring of 3 thermistors at AEC 1, monitoring and sampling of groundwater (15 wells) and surface water (4 locations) and visual inspections of all three AEC’s. Groundwater and surface water samples were analysed for dissolved petroleum hydrocarbons (PHCs) Fraction 1 (F1) to F4, benzene, toluene, ethylbenzene and xylenes, oil and grease, total metals, routine water parameters, nutrients, polycyclic aromatic hydrocarbons (PAHs) and phenols to comply with licence monitoring requirements.

Based on visual inspections, the landfills comply with functioning as designed with all three AEC’s overall performance considered generally acceptable. However, at AEC 2 conditions along the western edge of landfill appear to be slightly more degraded than last year. Settlement has caused isolated stress fractures (cracking), depressions and minor exposed metal debris. As well, adjacent down slope it appears some gravel cover may have been removed. A 20 x 30 m disturbed area is marked by uneven grade with possible vehicle tracks. The isolated slope failure (suspected natural in nature) previously noted along the north edge of the remedial area near Excavation 1 at AEC 3 appears the same. Future monitoring can assess any changes to the above noted observations.

Based on the thermal monitoring data collected, the rise and fall of temperatures recorded by the thermistors correlate to ambient temperatures in Resolute Bay. The average monthly temperatures at selected depths within the active layer (above previously observed permafrost – 1.3 to 1.7 mbgs) were evaluated. In general, all three Thermistors show a July/August window where temperatures were recorded above 0°C from 0.5 mbgs to a maximum of 1.25 mbgs. As expected, temperatures at surficial depths fluctuate the most annually, while temperatures at or near observed permafrost depth exhibit

less variability. Data from subsequent years will be compared to the baseline data to monitor permafrost aggradation into the landfill cap.

Fifteen monitoring wells including RBL-1 to 3, AEC1-GW1 (AEC 1), RBL-5 to 7, FL-MW-6, FL-MW-7, 2-MW-8 (AEC 2), RBL-10 to 12, RBL-14 and 15 (AEC 3) were monitored as part of the EMP with nine wells (RBL-1 to 3, AEC1-GW1, RBL-6 to 7, FL-MW-7, 2-MW-8 and RBL-14) being sampled. Six wells were dry and as such no samples were collected. A summary of the groundwater results follows:

- At AEC 1, monitoring wells RBL-3 (hydraulically downgradient) and AEC1-GW1 (hydraulically downgradient of sewage lagoons) had PHC F2 concentrations which exceeded the Ontario Ministry of the Environment, Conservation and Parks (MECP) Table 3 site condition standard (SCS) used. As well, concentrations of Total Suspended Solids (TSS) exceeded the Nunavut Water Board's (NWB) Water Licence (WL) maximum allowable effluent concentration at RBL-1 (hydraulically upgradient) and AEC1-GW1.
- At AEC 2, monitoring wells RBL-7, FL-MW-7/DUP A and 2-MW-8 (all hydraulically downgradient) had PHC F2 concentrations which exceeded the MECP Table 3 SCS guideline used. At monitoring well, 2-MW-8, no sheen was noted but oil and grease concentrations exceeded the NWB WL effluent maximum allowable concentration. TSS concentrations at monitoring wells RBL-7 and FL-MW-7/DUP A exceeded the NWB WL effluent maximum allowable concentration.
- At AEC 3, monitoring well RBL-14/DUP B (hydraulically upgradient) had lead and zinc concentrations that exceeded the MECP Table 3 SCS guideline used. TSS also exceeded the NWB WL effluent maximum allowable concentration.
- All other chemical parameters sampled in the monitoring wells had concentrations below detection limits or below the applied standards or guidelines.

TSS concentrations were noted in monitoring wells where residual sediments may have increased turbidity and may not necessarily reflect in-situ water conditions. As well, TSS concentrations were noted in groundwater that was both upgradient and downgradient and therefore concentrations may reflect background conditions.

Four surface water locations including RBL-4 (AEC1), RBL-8 (AEC 2), RBL-13 and 16 (AEC 3) were sampled hydraulically downgradient of AECs as part of the EMP. A summary of the surface water results follows:

- At AEC 1, surface water sample RBL-4 (and duplicate DUP C) had concentrations of hexavalent chromium and/or zinc that exceeded the applied Canadian Council of Ministers of the Environment (CCME) guidelines.
- At AEC 2, surface water sample RBL-8 had concentrations of aluminum, iron, lead and ammonia that exceeded the CCME guidelines. As well, TSS concentrations exceeded the NWB WL effluent maximum allowable concentration.

- At AEC 3, surface water samples RBL-13 and RBL-16 were sampled in the McMaster River Valley had no measured exceedances.
- All other chemical parameters sampled at surface water locations had concentrations below detection limits and/or below the applied guidelines.

Based on the results of the field and laboratory QA/QC program, the data quality was considered reliable for its intended use.

A longer record over time of groundwater and surface water results are required to compare upgradient vs downgradient locations and to evaluate trends at each sampling location. Groundwater and surface water actions levels as described in the *Post-Closure Monitoring Plan* (DOJV 2020) will be assessed following subsequent data collection. Time trends will be assessed using a moving average approach with actionable criteria backed by a Mann-Kendall analysis.

DOJV recommends the following:

- Begin planning for potential future earthwork improvements at AEC 2 to address issues noted;
- Additional attempts should be made to unblock monitoring well RBL-5 at AEC 2 to obtain upgradient data or make plans to re-drill the well.
- If surface water is not noted on AEC 3 or the immediate adjacent land, no surface water sampling is recommended for AEC 3 moving forward.

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1.0 Introduction

Dillon Consulting Ltd. and Outcome Consultants Inc in joint venture (DOJV) were contracted by Public Services and Procurement Canada (PSPC) Environmental Services on behalf of Transport Canada (TC) as site custodian, to execute the second year of Environmental Monitoring Program (EMP) for the Resolute Bay Airport Landfills site (the “site”) in accordance with the December 2020 *Post-Closure Monitoring Plan* (DOJV 2020) for the Resolute Bay Airport Landfills in Resolute Bay, Nunavut and the Nunavut Water Board (NWB) Amended Renewal Water License (WL) 1BR-RBL1929.

In fiscal year 2020-21 DOJV completed a Post-Closure Monitoring Plan (PCMP), an Operation and Maintenance Manual, Cost Estimate and Project Closure Report for the three waste landfill sites at the Resolute Bay Airport. The three landfill sites are referred to as Inactive Solid Waste Landfill (AEC 1), Historical Landfill (AEC 2), and Former Vehicle and Waste Metal Storage Area (AEC 3). The PCMP contained the specific monitoring requirements with descriptions of methodology and action levels based on observed impacts that may lead to further action or ultimately the cessation of environmental sampling.

1.1 Objectives of the EMP

The goal of the environmental monitoring program is to ensure that present and future risks to human health and the environment from the post remediation site conditions are negligible and that monitoring, at some point in the future, could be terminated with confidence, based on findings of no risk and no deterioration of the site’s environmental conditions.

The post-closure EMP was implemented to evaluate the sustained effectiveness of the site remediation.

The objective for the 2022-2023 fiscal year is to fulfill Nunavut Water Board (NWB) License requirements with regards to annual monitoring and reporting by following/implementing the December 2020 Post-Closure Monitoring Plan requirements.

1.2 Scope of Work

Resolute Bay EMP includes the following tasks for 2022:

- Mobilization and demobilization;
- General site reconnaissance and natural environment monitoring;
- Visual integrity monitoring and inspection of landfill cover and other remediated areas;
- Groundwater monitoring and sampling of monitoring wells at landfills AEC-1, AEC-2 and AEC 3;
- Surface water/seep monitoring and sampling at discharge points;
- Thermal monitoring (download of logger data) from the thermistors to track and confirm permafrost aggradation in AEC 1 landfill cap; and

- Packing and preparation of all water samples and sending them to the designated environmental lab.

2.0 Background Information

2.1 Site Description

The Resolute Bay Airport is legally described as Lot 1001, Quad 58 F/11, Plan 77590 (Public Works and Government Services Canada, 1994). The total area of the site is 2,025 hectares. The Airport is five kilometres northwest of the Inuit hamlet of Resolute, adjacent to Resolute Bay on Cornwallis Island, Nunavut. Cornwallis Island is in the Qikiqtaaluk Region of Nunavut. The Resolute Bay Airport property contains an airstrip, terminal building, hangars, warehouses, fuel storage, and other airport infrastructure. Drinking water for the Hamlet of Resolute Bay is supplied from Strip Lake, a naturally-occurring freshwater lake on the site immediately to the east of the main runway.

Three Areas of Environmental Concern (AECs) were previously identified based on activities, historical and present, associated with the airport and local community.

- AEC 1 is a solid waste landfill developed in the 1960s and 1970s that has not been in official use since 1995. It is located on airport property approximately 2 km north of the north end of the airstrip.
- AEC 2 is a historic landfill that operated between 1947 and 1996. The landfill was used by the military, Transport Canada (TC), and other airport tenants. It is 0.5 km west of the airstrip and in close proximity to restricted access airport activities.
- AEC 3, the historical vehicle storage area, is a metal storage area previously used for vehicle and airport metal waste storage. It is northwest of the Resolute Airport airstrip and 2.75 km northwest of AEC 1. It is an inactive area that resides on the northern perimeter of the Airport property boundary.

The site location is shown in Figure 1 (**Appendix A**).

There are no buildings in the work areas. Adjacent land use includes a municipal sewage lagoon consisting of four separate containment cells, located southeast of AEC 1 and a fenced waste storage area located north of AEC 1 which are both operated by the hamlet and not addressed in this project. The sewage lagoon is known to be operating beyond the design capacity, as chronic overflow issues are known to occur. The open flat areas near AEC 1 have been reported by local contractors to be used by the hamlet to stockpile snow from snow removal activities at the airport. The open flat areas on the east side of AEC 2 have occasionally been used seasonally for stockpiling of snow or large vehicle and equipment/material storage by the airport authorities.

The work areas are characterized by flat to gently sloping terrain, although AEC 1 and AEC 2 are on slopes, with elevations that range from 35 to 66 m above sea level (asl). AEC 3 is on the top of the south slope of the McMaster River Valley at an elevation of approximately 30 to 35 m asl (SENES and Franz 2013). Where present, plant cover is sparse, irregular, and discontinuous.

The loose, unconsolidated sediments at the site and the depth to permafrost mean that drainage in all areas is controlled by the topography. AEC 1 and AEC 3 slope downwards to the west and are located 1 km and 675 m from the bay respectively.

The AEC 1 landfill design was based on a barrier cover design. The constructed barrier was heavily compacted and saturated during construction. The barrier was constructed in mind with the ambient environment to turn to permafrost, which builds an impermeable landfill cap. Further, the drainage swales were constructed to enhance surface water drainage around the landfill to redirect surface water and reducing the potential for landfill leachate production. Swales were implemented at the base of the landfill toes to divert surface water overland flow around the landfill and to existing water bodies.

The AEC 2 landfill design is based on an earthen barrier cover design. The remedial design included a graded cut/fill approach with aggregates used to as a general cover, fill in voids or low spots on the top to promote surficial flow and the construction of drainage swales to promote proper drainage. During the remedial work, surface debris was removed from AEC 2 and brought to AEC 1 if non-hazardous and shipped off-site if deemed to be hazardous. AEC 2 is drained by a complex sequence of interconnected ponds and drainage channels that ultimately discharge towards the south into Resolute Bay. Three small ponded areas west of the landfill capture runoff and drainage from the landfill. These ponds drain approximately 1 km into Meretta/Marida Lake and then to Resolute Lake, and finally Resolute Bay. A patchy, discontinuous wetland has developed at the toe of the Historic Landfill (AEC 2) along its southern extent.

The remedial work at AEC 3 included the removal of physical hazards (by debris removal and/or capping), consolidation of waste and debris, and the containment and control of contaminants in the surface water pathways prior to leaving the site and ultimately, discharging to receiving water bodies. Specifically non-hazardous wastes were consolidated from AEC 3 and moved to AEC 1 and approximately 125 m³ of PHC and metals contaminated soil was excavated and disposed of at a licenced disposal facility. All excavation and disturbed areas were backfilled and the excavations were re-graded with approved borrow material.

2.2 Summary of Previous Programs

The following reports established existing site conditions prior to remediation. These reports identified the presence of contaminants of concern at the site, identified areas of potential and actual environmental contamination, and made assessments of risk to human health and ecological receptors.

- Arcadis, 2015. Remediation Program for AECs at Resolute Bay Airport. Prepared for Public Works Government Services Canada Environmental Services – Western Region on behalf of Transport Canada. Dated December 3, 2015.
- Franz Environmental Inc., 2013. Data Gap and Geotechnical Assessment Resolute Bay Airport Landfill, Nunavut. Prepared for Public Works and Government Services Canada Environmental Services – Western Region on behalf of Transport Canada. Dated December 10, 2013.

- Franz Environmental Inc., 2010. Phase II/III Environmental Site Assessment Final Report, Resolute Bay Airport Landfill Sites, Resolute Bay, Nunavut. Prepared for Public Works and Government Services Canada on behalf of Transport Canada. Dated March 2010.
- Franz Environmental Inc., 2010. Phase I and Preliminary Phase II Environmental Site Assessment Upper Air Monitoring Station, Resolute Bay, Nunavut. Prepared for Public Works and Government Services Canada & Environment Canada on behalf of Transport Canada. Dated February 5, 2010.

The Resolute Bay airport was originally constructed by the Royal Canadian Air Force and has been in operation since 1949 (PSPC, 2022). Transport Canada (TC), on behalf of the Government of Canada, took ownership of the property in 1964 and continued operations until July 1, 1995. From July 1, 1995 to April 1, 1999 the Government of Northwest Territories had ownership and operations continued under the Arctic Airport Division of the Department of Transportation. The Government of Nunavut has owned the property since April 1, 1999.

Environmental audits and environmental site assessments have occurred at the site since 1993. investigations between 1993 and 2005 were undertaken by TC. Since 2009, TC has engaged PSPC to assist with delineation of contaminants of concern, the development of remediation action plans for the site, and development of remediation specifications to tender for remediation contractor services.

Geotechnical and stability issues were identified with respect to the semi-buried waste and the current geometry of both landfills. Chemicals of concern (COCs) exceeding soil, sediment and water guidelines were identified at the storage area and both landfills. The COCs were as follows:

Table 1: Chemicals of Concern and Impacted Media for Airport AECs

Site Location	COCs	Impacted media
Solid Waste Landfill (AEC 1)	Metals, benzene, toluene, Petroleum Hydrocarbons (PHCs) and Polycyclic aromatic hydrocarbons (PAHs)	Soil, sediments, surface water
Historical Landfill (AEC2)	Metals, PHCs, PAHs, benzene, toluene, ethylbenzene	Soil, groundwater, surface water
Former Metal Storage Area (AEC 3)	Metals, PHCs, PAHs	Soil, metal waste material

A Phase II/III ESA was completed by Franz Environmental Inc. (Franz 2010b) in March of 2010 and provided a conceptual remedial action plan (RAP). An informal RAP was later produced by Franz during the 2011-2012 fiscal year. The accepted design included the segregation of hazardous materials, removal, consolidation and off-site disposal of hazardous waste from the AECs. As well, the design included moving nonhazardous waste from the metal storage area (AEC3) and AEC2, into AEC1 (the solid waste landfill) and applying an aggregate capping solution without an impermeable geomembrane. The

landfill toe at AEC 1 was re-designed to be more geotechnically stable. A data gap assessment was completed on the AECs by Franz in 2013-2014. The data gap assessment identified an adjacent municipal sewage lagoon which was a concern for overflowing effluent, a past contributor to leachate production at AEC 1. The sewage lagoon is owned by the Government of Nunavut and as such is not included in the project scope. On July 11, 2014, the Nunavut Water Board (NWB) re-issued a water licence for the project based on the activities outlined in the conceptual RAP. The water licence, 1BR-RBL1419, was initially granted for a period of five years. A renewal application was submitted by Transport Canada on January 31, 2019, and later approved for a period of ten years on May 13, 2019 as NWB Amended Renewal Water Licence No. 1BR-RBL1929.

During the 2014-2015 government fiscal year, PSPC purchased and mobilized 26 marine shipping containers, 10 Liquid hazardous waste containers and 5 solid hazardous waste containers to site in anticipation of remedial activities.

DOJV was retained by PSPC during the 2017-2018 fiscal year to review and modify the existing remediation designs and to support the tendering process such that the remediation work could be contracted and completed by the end of the 2019-2020 fiscal year.

The remedial work contract was awarded to Kudlik Construction Ltd under contract EW699-182827/A, in June 2018. Site remediation was completed over a two Government of Canada fiscal-year (FY) period, FY 2018-2019 and FY 2019-2020. Field activities for FY 2018-2019 began August 14 and ended September 17, 2018. Remedial work which occurred in 2018 included consolidating and packaging hazardous materials, shipping hazardous waste to a licensed waste disposal facility, consolidating non-hazardous waste to the AEC 1 landfill, grading the AEC 1 slope, and preparing borrow sources. All remaining remediation work was completed in the summer of 2019 and included shipping hazardous material offsite, consolidating steel from AEC 2 to AEC 1, stabilizing landfill slopes, aggregate cover development and placement, constructing drainage swales, removing contaminated soil from AEC 3, capping AEC 1 and AEC 2 with gravel, and installing wells for groundwater monitoring.

Transport Canada informed the NWB that On-site monitoring for 2020 was cancelled due to COVID-19 restrictions, and this was approved by NWB.

In August 2021, DOJV completed year 1 of the environmental monitoring activities. The program included the installation of three thermistors at AEC 1, monitoring and sampling of groundwater and surface water, and visual inspections of all three AECs. Based on visual inspections, the landfills were functioning as designed with all three AECs overall performance considered acceptable. Isolated stress fractures (cracking possibly due to sloughing) were noted at AEC 2 paralleling the western edge of the landfill. Isolated slope failure was noted along the north edge of the remediation area near Excavation 1 at AEC 3. However, this was considered to potentially be natural sloughing occurring due to the proximity to the local valley and stream. Eleven monitoring wells were monitored with only six wells having sufficient groundwater to be sampled. At AEC 1, monitoring well RBL-3 (hydraulically downgradient) and duplicate had PHC F2 concentrations above the applied standard. Elevated

concentrations of Total Suspended Solids (TSS) were noted at RBL-1 (hydraulically upgradient) and sample set RBL-3/GW DUP 1. Surface water sample RBL-4 (hydraulically downgradient) had concentrations of hexavalent chromium and ammonia above the applied guidelines. At AEC 2, monitoring well RBL-7 (hydraulically downgradient) had concentrations of cadmium, lead and TSS above the applied standards or maximum allowable discharge concentration respectively. Surface water sample RBL-8 and duplicate (hydraulically downgradient) had concentrations of ammonia that exceeded the applied guidelines. At AEC 3, monitoring well RBL-14 (hydraulically upgradient) had TSS concentrations exceeding the maximum allowable discharge concentration. Surface water locations RBL-13 and RBL-16 had concentrations of aluminum, iron and/or ammonia that exceeded the applied guidelines.

It was noted that TSS concentrations were measured in monitoring wells where residual sediments may have increased turbidity and may not necessarily reflect in-situ water conditions. As well, TSS concentrations above the maximum allowable discharge concentration were noted in groundwater that was both upgradient and downgradient and therefore may reflect background conditions.

3.0 Regulatory Guidelines

3.1 Guideline Overview

The EMP compares environmental quality data with Environmental Quality Guidelines (EQGs) in accordance with Canadian Council of Ministers of the Environment (CCME) where applicable. The following federal guidelines have been considered:

- Canadian Environmental Quality Guidelines. Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life (Freshwater Pathway) (CCME, 2007, with updates).

These guidelines contain numerical limits intended to maintain, improve or protect environmental quality and human health at contaminated sites. The limits come from models and are adjustable based on certain site characteristics, including land use, soil grain size, and whether groundwater is used as a source of drinking water. The guidelines are derived using toxicological data and aesthetic considerations.

For the site, DOJV will use the following characteristics:

- Land use: industrial (non-operational area, open, unrestricted Airport property)
- Soil grain size: coarse (as per field observations of gravel, sand and cobbles observed during thermistor installs)
- Groundwater: not used as a source of drinking water at the airport (drinking water source for Resolute Bay obtained from Char Lake over 2 km from AEC 2 area)
- Aquatic life: freshwater (due to surrounding surface water bodies, marine pathway excluded as ocean bay located > 675 m from landfills)

Where federal guidelines are absent or not applicable to site conditions, provincial guidelines from Ontario were used.

3.2 Groundwater

Federal groundwater EQG have been published by the CCME and apply under the Federal Contaminated Sites Action Plan (FCSAP); however, they have not been applied for assessing the groundwater at the site. Exposure to contaminated groundwater have been deemed not applicable to the site (i.e., groundwater exposure pathway non-operable) for the following reasons:

- Due to the shallow active layer (i.e., soils above the permafrost layer), groundwater is typically intermixed with surface water- creating a zero-contaminant transport distance;
- There is an active groundwater discharge within 10 m of surface water (at AEC 1), further intermixing the two; and

- Overland flow is the primary mode of water transport in the area, as groundwater flow is relatively stagnant.

Groundwater wells installed as per the Water Licence were, however, used as an additional system for detecting pathways of exceedances in the EQGs.

In the absence of groundwater criteria in the water licence, as directed by NWB, groundwater results were compared to the Ontario Ministry of the Environment, Conservation and Parks (MECP), 2011 Site Condition Standards (under Ontario Regulation 153/04). Per Ontario Regulation 153/04 (Section 35 (3), properties are considered non-potable when the property, and all other properties located within 250 m of the boundaries of the property, are supplied by a municipal drinking water system. As there are no potable water wells within 250 m of the site boundary, the site is considered non-potable. As such, the Table 3 Full Depth Generic Site Condition Standards (SCS) in a Non-Potable Groundwater Condition (Table 3 SCS) were considered applicable to the site. The Table 3 SCS for groundwater are not dependent on land use and were designed to protect the groundwater to surface water pathway

A copy of the NWB approval of the guideline used and copies of the CCME and MECP guidelines, current at the time of this report are provided in **Appendix B**.

3.3 Surface Water

The NWB Water Licence No. 1BR-RBL1929 does not specify guidelines for groundwater or surface water but does provide maximum allowable concentrations for effluent discharges for select parameters. Any seepage from the landfills that is noted during environmental sampling, would be tested and compared against the water quality criteria included in the Water Licence:

Table 2: Maximum Allowable Effluent Discharge Limits as per Part D, Condition 11 of Water Licence

Parameter	Maximum Allowable Concentration (mg/L)
pH	6 to 9 (pH units)
Total Suspended Solids (TSS)	50
Oil and Grease	15 and no visible sheen
Total Lead	0.001
Benzene	0.37
Toluene	0.002
Ethylbenzene	0.090

Note: Effluent limits are similar to CWQG for the Protection of Aquatic Life (Freshwater)

Although, no effluent discharges related to the landfill were noted during the site activities, the maximum allowable concentrations provided in the water licence were used as a reference for comparison of water quality.

Applicable federal guidelines used to evaluate surface water results:

- Canadian Environmental Quality Guidelines. Canadian Water Quality Guidelines (CWQG) for the Protection of Aquatic Life (Freshwater Pathway) (CCME, 2007, with updates).

As such, the hierarchy for evaluation guidelines for surface water results was:

1. Effluent guidelines as provided in the Water Licence for select parameters noted above.
2. In the absence of effluent guidelines, CCME Water Quality Guidelines for the Protection of Freshwater Aquatic Life were selected. The landfills are located more than 675 m from the ocean as such the CWQG for Protection of Marine Life were not included for comparison.

4.0 Site Investigation Methodology

Monitoring activities described in this report are based on the 2008 Abandoned Military Site Remediation Protocol (AMSRP) Volume 1 – Main report, developed by Indian and Northern Affairs Canada. This guidance document provides environmental protocols for lower northern arctic contaminated sites which were applied for best practices purposes to the environmental sampling of the Resolute Bay Landfill sites.

4.1 Schedule and Personnel

The on-site work was carried out on July 14, 2022 (Visual Inspection during freshet conditions), July 27, 2022 (Thermistor logger downloads, RBL-5 monitoring well repairs) and between August 2 – 4, 2022 (Visual Inspections, Groundwater and Surface Water Sampling program).

The field team consisted of:

- Field Lead: Keelan Veitch, B.Sc.
- Joadamee Iqaluk (July 14, 2022), Jeese Iqaluk (July 27, 2022) and/or Daniel Flaherty (August 2 – 4, 2022) acting as an Environmental Assistant and/or Wildlife Monitor (from Resolute Bay)

4.2 Health and Safety Plan

DOJV prepared a site-specific health and safety plan (SSHASP) to address and mitigate site specific hazards. The SSHASP was submitted to PSPC on July 24, 2022.

4.3 Visual Inspections

At each AEC, visual inspections were conducted for the following:

4.3.1 Landfill Integrity

The physical integrity was visually inspected, including evidence of settlement, erosion, frost action, vegetation, and ponding/seepage etc. of the remediated area and surrounding areas. The inspection included photographs, notes and completing a checklist as per the format outlined in the *Post-Closure Monitoring Plan* (DOJV 2020).

The assessment documents the current condition of each AEC for each of the above-noted conditions and serves as an on-going basis of comparison to the previous observations and/ or baseline conditions.

4.3.2 Wildlife Survey

Observations of animal usage of the site (i.e., direct observation/sightings, tracks, scat, fur/feathers, carcass remains) and discussions with the local environmental assistant knowledgeable with the site regarding site usage (i.e., fishing, hunting, gathering) were conducted. Mr. Joadamee Iqaluk, Mr. Jesse Iqaluk and/or Mr. Daniel Flaherty, local residents of Resolute Bay, assisted DOJV with field activities and/or acted as a wildlife monitor for the program. They also provided information regarding human and wildlife usage at the site.

4.4 Thermal Monitoring

The three thermistor locations at AEC 1 landfill were monitored as part of the EMP:

Table 3: AEC 1 Thermistor Locations

Well ID	Northing	Easting	Depth
THRMS-01	8295590	440985	3 mbgs
THRMS-02	8295607	441055	3 mbgs
THRMS-03	8295577	441014	3 mbgs

At each thermistor, the data from the loggers was downloaded onto a laptop with the use of ProLog4 software. The data was checked initially for completeness and validity. The battery life was also checked and all thermistors had approximately 2/3 battery life remaining. Following the download, the logger was placed back inside the thermistor to continue to collect hourly temperature readings.

Thermistor locations are illustrated on Figure 2 of **Appendix A**.

4.5 Groundwater Monitoring and Sampling

Fifteen monitoring wells (eleven installed in 2019 and four pre-existing) were monitored as part of the EMP:

Table 4: Monitoring Well Locations

Well ID	Northing (^{a,b})	Easting(^{a,b})	Elevation (metres above sea level)	AEC	Description
RBL-1	8295630 ^(a)	441147 ^(a)	66.2	AEC 1	Monitoring Well installed up-gradient of the Solid Waste Landfill
RBL-2	8295551 ^(a)	440943 ^(a)	52.2	AEC 1	Monitoring Well installed down-gradient of the Solid Waste Landfill
RBL-3	8295608 ^(a)	440901 ^(a)	51.5	AEC 1	Monitoring Well installed down-gradient of the Solid Waste Landfill
AEC1-GW1	8295526 ^(b)	441063 ^(b)	NA	AEC 1	Existing monitoring well located down-gradient of the Sewage Lagoons
RBL-5	8292509 ^(a)	441662 ^(a)	53.1	AEC 2	Monitoring Well installed up-gradient of the Historic Landfill
RBL-6	8292566 ^(a)	441420 ^(a)	42.7	AEC 2	Monitoring Well installed down-gradient of the Historic Landfill
RBL-7	8292634 ^(a)	441384 ^(a)	43.2	AEC 2	Monitoring Well installed down-gradient of the Historic Landfill
FL-MW-6	8292485 ^(b)	441484 ^(b)	NA	AEC 2	Existing monitoring well located down-gradient of the Historic Landfill on south side of east-west road.
FL-MW-7	8292468 ^(b)	441452 ^(b)	NA	AEC 2	Existing monitoring well located down-gradient of the Historic Landfill on south side of east-west road.
2-MW-8	8292499 ^(b)	441451 ^(b)	NA	AEC 2	Existing monitoring well located down-gradient of the Historic Landfill on south side of east-west road.
RBL-10	8296242 ^(a)	440493 ^(a)	43.8	AEC 3	Monitoring Well installed up-gradient of the Former Vehicle and Waste Metal Storage Area (Site 1)
RBL-11	8296265 ^(a)	440383 ^(a)	41.6	AEC 3	Monitoring Well installed down-gradient of the Former Vehicle and Waste Metal Storage Area (Site 1)

Well ID	Northing (^{a,b})	Easting(^{a,b})	Elevation (metres above sea level)	AEC	Description
RBL-12	8296335 ^(a)	440450 ^(a)	42.6	AEC 3	Monitoring Well installed down-gradient of the Former Vehicle and Waste Metal Storage Area (Site 1)
RBL-14	8296449 ^(a)	440682 ^(a)	55.4	AEC 3	Monitoring Well installed up-gradient of the Former Vehicle and Waste Metal Storage Area (Site 2)
RBL-15	8296468 ^(a)	440635 ^(a)	52.7	AEC 3	Monitoring Well installed down-gradient of the Former Vehicle and Waste Metal Storage Area (Site 2)

(a) The X,Y,Z coordinates are represented under UTM Zone 15N and have been confirmed by survey method (+/- <30cm)

(b) The X,Y,Z coordinates are represented under UTM Zone 15N and have been confirmed by handheld GPS method (+/- 3m).

At each monitoring well location groundwater levels were measured with an interface probe. Monitoring wells RBL-6, RBL-7, FL-MW-7 and 2-MW-8 had limited water volume or poor recharge and as such some bottles were not filled. Monitoring well RBL-5 was broken at surface (likely as a results of snow removal activities) and was repaired, however, well depth was only 0.2 mbgs (suspected the well is now blocked) and was dry. Monitoring wells RBL-10, RBL-11, RBL-12 and RBL-15 were also dry.

All other monitoring wells were sampled with dedicated LDPE tubing and purged under low flow protocols using a peristaltic pump. During purging, ground water quality parameters including pH, EC, temperature, and turbidity were monitored using a water quality meter (Horiba U-52) if possible, depending on water volume. As well, given the low water volumes and limited well depths, it was not possible to wait for parameter stabilization before sampling. All pumped water was captured in sampling containers; no purge water was dumped on-site. The initial water was captured in general chemistry bottles. No visible sheen was noted in any of the monitored wells. Groundwater samples which were able to be collected were analyzed for the water license parameters listed in Section 4.8.

Monitoring well locations are illustrated on Figures 2, 3 and 4 of **Appendix A**. Groundwater monitoring data is presented in Table 1 of **Appendix C** and field monitoring and sampling forms are provided in **Appendix D**.

4.6 Surface Water Sampling

Four surface water locations were sampled as part of the EMP:

Table 5: Surface Water/Seep Locations

Location	Northing (°)	Easting(°)	AEC	Description	Notes
RBL-4	8295627	440884	AEC 1	Discharge from the Solid Waste Landfill	
RBL-8	8292688	441366	AEC 2	Discharge from the Historic Landfill	
RBL-13	8296454	440478	AEC 3	Discharge from Former Vehicle and Waste Metal Storage Area (Site 1)	Sampled from the McMaster River Valley (downgradient) in 2022. Last year surface water samples were collected on the south side of the road west of monitoring well RBL-10 due to the presence of water and sighting of Polar Bear in the river valley.
RBL-16	8296336	440340	AEC 3	Discharge from the Former Vehicle and Waste Metal Storage Area (Site 2)	

(a) The X,Y,Z coordinates are represented under UTM Zone 15N and have been confirmed by handheld GPS method (+/- 3m).

In general, surface water sampling was conducted at pre-determined sampling locations down-gradient of AECs and drainage water system. These locations were selected to correspond with previous surface water sampling conducted in order to maintain consistency and have comparable concentrations.

Surface water/seep samples were collected via grab sample with lab bottles directly from the flowing/standing water. Field parameters including pH, temperature, conductivity and turbidity were not measured. Surface water samples were analyzed for the water license parameters as listed in Section 4.8.

Surface water sampling locations are illustrated on Figures 2, 3 and 4 of **Appendix A**. The surface water field sampling forms are provided in **Appendix D**.

4.7 Quality Assurance and Quality Control

4.7.1 Field Methods

Field methods used to ensure the quality of the results were:

- Field staff used fresh disposable nitrile gloves for the collection of each water sample. Any non-dedicated sampling equipment was decontaminated with Alconox and rinsed with distilled water between uses.
- Equipment was rented from a 3rd party supplier and calibrated prior to fieldwork.

- All samples were collected into sterile lab-prepared containers and stored and transported in supplied coolers on ice.
- Samples selected for analysis were analyzed by Bureau Veritas, which is accredited by the Canadian Association of Laboratory Accreditation (CALA).
- Two blind field duplicates for groundwater and one blind field duplicate for surface water were collected by DOJV and analyzed by Bureau Veritas. The analytical results were compared to those of the parent sample using the method of relative percent difference (RPD) to evaluate precision.
- One field blank was prepared by filling sample containers with DI water supplied by Bureau Veritas.
- One trip blank supplied by Bureau Veritas was included in the sampling program.

4.7.2 Laboratory Methods

Laboratory quality control consisted of the following methods:

- Laboratory duplicates were analyzed by the lab based on their quality control program.
- Laboratory blanks, i.e., generic samples of a matrix prepared with known zero concentrations of analytes of concern, were analyzed by the project lab based on its quality program.
- Matrix spikes were also included in the lab quality program. A Matrix spike is a sample of an analyte of concern with a known concentration in the matrix.

Reportable detection limits for the program are dependent on the capabilities of the lab. Generally, detection limits for all analytes are below relevant standards; however, it is possible that matrix interference, high concentrations of other analytes or limited sample volumes will result in increased detection limits.

4.7.3 Data Validation

Field and laboratory quality will be compared to industry standards as shown in Table 6 below. Evaluation methods are derived from the Site Characterization Guidance Manual (CCME, 2016).

Table 6: Data Quality Targets

Quality Control Measure	Evaluation and Mitigation
Field duplicate	Relative percent difference between the primary and duplicate sample should be less than 40 percent for water. Where samples exceed the acceptable value, each analyte-matrix combination should be assessed across the program.
Field/Trip blank	Concentrations of all analytes should be non-detect. Where this is not the case, an evaluation of sampling methodology, site conditions and shipping methods should be conducted.

Quality Control Measure	Evaluation and Mitigation
Laboratory duplicate	Per laboratory quality program, but generally less than 20 percent for water. If laboratory duplicates exceed acceptable range, discuss reasons for the exceedance with the laboratory and assess each analyte across the program.
Laboratory blank	Per laboratory quality program. If laboratory blanks contain detectable concentrations, discuss reasons for the detection with the laboratory and assess each exceeding analyte across the program.
Matrix spike	Per laboratory quality program. If laboratory spikes are outside the acceptable range, discuss reasons for the issue with the laboratory and assess each analyte across the program.

4.8 Laboratory Analytical Program

Laboratory analyses were performed on groundwater and surface water samples for the parameters listed in the Water License as follows:

Table 7: Groundwater and Surface Water Analyses

Group	Parameters
General chemistry	pH, conductivity, total suspended solids, ammonia nitrogen, nitrate-nitrite, oil and grease, total phenols, sulfate, total hardness, alkalinity, sodium, potassium, magnesium, calcium, chloride, phosphorus
Metals	aluminum, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, zinc
Fuel-related compounds	Petroleum hydrocarbons, polycyclic aromatic hydrocarbons, benzene, toluene, ethylbenzene and xylenes, visual oil & grease

5.0 Summary of AEC 1 Conditions

5.1 Area Summary

The monitoring of AEC 1 landfill included visual observations to assess its physical integrity, including evidence for erosion, ponding, frost action, settlement and lateral movement. Groundwater samples were collected from the wells located upgradient and downgradient from AEC 1 and a surface water sample was collected downgradient of AEC 1.

A plan view of AEC 1 is shown on Figure 2 in **Appendix A**.

5.2 Photographic Record

The photographic record of AEC 1 was completed as per the work plan. Copies of the photographs and a figure showing photo locations are provided in **Appendix F**, where photograph captions provide the landfill viewpoint number where applicable.

5.3 Visual Inspection Evaluation and Stability Assessment

The visual inspection of AEC 1 and surrounding area was conducted on July 14, 2022 and between August 2 and 4, 2022 by the field lead and Environmental Assistant. The visual monitoring checklist was completed using the format provided in the Post Closure Monitoring Plan (DOJV 2020) and is presented as Table 8 of this report. Field notes relating to the visual inspection are included in **Appendix D**. Table 8 and Table 9 below present the visual inspection results and definitions (severity/extent) respectively for 2022 and in relation to last year's monitoring of the AEC 1.

Table 8: Visual Inspection Report for AEC 1

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Settlement	N	Not Observed	Not Observed
Erosion	N	Not Observed	Not Observed
Frost Action	N	Not Observed	Not Observed
Animal Borrows	N	Not Observed	Not Observed

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Vegetation	Y	Acceptable / Isolated. Near toe of landfill only. No vegetation on landfill cap.	Acceptable / Isolated. Near toe of landfill only. No vegetation on landfill cap. Refer to Photos 12 through 15 in Appendix F .
Staining	N	Not Observed	Not Observed
Vegetation Stress	N	Not Observed	Not Observed
Seepage / Ponded Water	Y	Acceptable / Occasional Pooling proximal to the toe landfill in small features and along swale near sewage ponds.	Acceptable / Occasional Pooling proximal to the toe landfill in small features and along swale near sewage ponds. Refer to Photo 10 and 11, in Appendix F .
Exposed Debris	N	Not Observed	Not Observed
Grades/Topography	Y	Acceptable, as per landfill design	Acceptable, as per landfill design
Distance to downgradient surface water bodies	Y	Occasional. Surface water mapped as previously reported. No new surface water bodies	Occasional. Surface water as previously reported. No new surface water bodies
Distance to freshwater/marine habitat and habitat usage	Y	Acceptable. Set back from marine discharge	Acceptable. Set back from marine discharge
Terrestrial Habitat	N	Acceptable. Canadian Geese and scat observed near surface water ponds approximately 200 m south of monitoring well RBL-2	Not observed
Land use	Y	Acceptable. Industrial (non-operational, open, unrestricted Airport property)	Acceptable. Industrial (non-operational, open, unrestricted Airport property)

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Debris	N	Acceptable. None observed on-site	Not observed
Landfill cover	Y	Acceptable, as per landfill design	Acceptable, as per landfill design
Snow, Sun Exposure, Surface Temperature, Wind effects	Y	Not observed. No significant weather-related conditions	Not observed. No significant weather-related conditions
Surface Drainage	Y	Acceptable, as per landfill design. Drainage within swale systems, drainage acting as designed	Acceptable, as per landfill design.
Sewage Overflow	N	Acceptable, as per landfill design, no sewage overflow was observed.	Acceptable, as per landfill design, no sewage overflow was observed.
Potential Percolation into Landfill Cap	Y	Acceptable, as per landfill design, no pooling of water on landfill cap	Acceptable, as per landfill design, no water pooling on landfill cap.
Runoff Diversion	Y	Acceptable. Swales/channels functioning as per landfill design	Acceptable, as per landfill design
Monitoring Well Condition	Y	Acceptable. Minor repairs to RBL-3 (sand and bentonite added to base to solidify casing)	Acceptable. AEC1-GW1 casing slightly bent. J plug added. Refer to Photo 8, in Appendix F .
Overall Landfill Performance	Acceptable		

Table 9: Visual Inspection Report for AEC 1 - Definitions

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

5.3.1 Vegetation

A large area of vegetation growth (approximately 75 m x 75 m) is observed proximal to the toe of the landfill and along the southern edge of the landfill, off-site and downgradient from the sewage ponds, consistent with previous observations. Refer to Photo 12 through 17 in **Appendix F**.

5.3.2 Seepage / Ponded Water

Areas of ponded water were observed 5 m - 20 m from west toe of the landfill; the waters did not contain any evidence of staining or product seepage from the landfill. Conditions at the site were generally dry at the time of assessment.

5.3.3 Summary

Based on the observations, the performance of the AEC 1 landfill was rated as Acceptable.

5.4 Thermal Monitoring Data

The thermistor results for the first year of monitoring are:

Table 10: Thermistor Results (August 29, 2021 – July 27, 2022)

Location	Observed permafrost depth as per installation logs (mbgs)	Depth (mbgs) / Month with Average Monthly Temperatures above 0°C
Thermistor 1	1.7	0.5 (June 2022) 0.5, 0.75 and 1.0 (July 2022)
Thermistor 2	1.3	0.5 and 0.75 (August 2021) 0.5 and 0.75 (July 2022)
Thermistor 3	1.4	0.5, 0.75, 1.0 and 1.25 (August 2021) 0.5, 0.75, 1.0 (July 2022)

Based on the thermal monitoring data collected, the rise and fall of temperatures recorded by the thermistors correlate to ambient temperatures in Resolute Bay, which are presented in Charts 1a and 1b in **Appendix G**. Average recorded monthly temperatures were above zero from approximately mid-May until end of August 2021 and June 8 to September 6, 2022.

Charts 2a, b and c in **Appendix G** show the average monthly temperatures at selected depths (active layer) from the loggers installed in 2021 (downloaded in July 2022) for Thermistors 1, 2 and 3 respectively. Charts 3a, b and c in **Appendix G** show the raw data (all temperature points) at the same selected depths (active layer) over the same period of time. As expected, temperatures at surficial depths fluctuate the most annually, while temperatures at or near observed permafrost depth exhibit less variability.

Data from subsequent years will be compared to these baseline data/charts to monitor permafrost aggradation into the landfill cap.

5.5 Analytical Results – Groundwater Samples

Four groundwater samples (RBL-1 to -3 and AEC1-GW1) were collected at AEC 1 for parameters as specified in the NWB Water Licence (WL) and submitted to Bureau Veritas in Ottawa, Ontario. Concentration of benzene, toluene, ethylbenzene, xylenes (BTEX) and Petroleum Hydrocarbons (PHC) fractions F1 through F4 were mostly non-detect. However, exceedances for PHC F2 were noted at monitoring wells RBL-3 (hydraulically downgradient) (160 ug/L) and AEC1-GW1 (hydraulically downgradient of sewage lagoons) (190 ug/L) which exceeded the MECP Table 3 SCS guideline (150 ug/L). Concentrations of Total Suspended Solids (TSS) exceeded the NWB WL effluent maximum allowable concentration (50 mg/L) in samples RBL-1 (hydraulically upgradient) (490 mg/L) and AEC1-GW1 (hydraulically downgradient of sewage lagoons) (200 mg/L). Polycyclic Aromatic Hydrocarbons (PAH) concentrations were non-detect for all parameters except for 1-Methylnaphthene (range from 0.23 to 3.2 µg/L), 2-Methylnaphthene (range from 0.34 to 5.6 µg/L) and Naphthalene (range 0.3 to 0.73 µg/L), however, values were generally three orders of magnitude below the applied guidelines (1,800 µg/L, 1,800 µg/L and 1,400 µg/L respectively). Select total metals, nutrients, routine water parameters, phenols and/or oil and grease were detected but values ranged from the same order to three orders of magnitude below guidelines.

AEC 1 monitoring well locations and results are illustrated on Figure 2. The analytical results compared to the selected guidelines are presented in Table 2a in **Appendix C**. Laboratory Certificates of Analysis reports are included in **Appendix E**.

5.6 Analytical Results – Surface Water Samples

One surface water sample (RBL-4 – hydraulically downgradient) and a duplicate (DUP C) were collected at AEC 1. All BTEX and PHCs, PAH parameters, Oil and Grease and Phenols were non-detect and therefore below guidelines. Select total metals, routine water and/or nutrient parameters were generally detected but were below guidelines (ranging from same order to two orders of magnitude below) except for hexavalent chromium (range 1.5 to 1.6 ug/L) and zinc (17 ug/L) concentrations that exceeded the CCME guidelines of 1 ug/L and 10 ug/L respectively.

AEC 1 surface water locations and results are illustrated on Figure 2. The analytical results and selected guidelines are presented in Table 2b in **Appendix C**. Laboratory Certificates of Analysis reports are included in **Appendix E**.

6.0 Summary of AEC 2 Conditions

6.1 Area Summary

The monitoring of AEC 2 landfill included visual observations to assess its physical integrity, including evidence for erosion, ponding, frost action, settlement and lateral movement. Groundwater and surface water samples were collected downgradient from AEC 2.

A plan view of AEC 2 and the site physical attributes is shown on Figure 3 in **Appendix A**.

6.2 Photographic Record

The photographic record of the AEC 2 was completed as per the work plan. Copies of the photographs and a figure showing photo locations are provided in **Appendix F**, where photograph captions provide the landfill viewpoint number where applicable.

6.3 Visual Inspection Evaluation and Stability Assessment

The visual inspection of the AEC 2 and surrounding area was conducted on July 14, 2022 and between August 2 and 4, 2022 by the field lead and Environmental Assistant. The visual monitoring checklist was completed using the format provided in the Post Closure Monitoring Plan (DOJV 2020) and is presented as Table 11 of this report. Field notes and a site sketch relating to the visual inspection are included in **Appendix D**. Table 11 and Table 12 below present the visual inspection results and definitions (severity/extent) respectively for 2022 and in relation to last year's monitoring of AEC 2.

Table 11: Visual Inspection Report for AEC 2

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Settlement	Y	Acceptable / Isolated stress fracture approx. 15 - 20 m in length along western edge of landfill, minor cracking observed.	Marginal / Isolated - stress fractures, cracking and depressions ~ 30 m in length along west crest of landfill. Appears to be more degraded than last year (2021). Refer to Photos 27 through 31, in Appendix F . A field sketch is included in Appendix D .
Erosion	N	Not Observed	Not Observed
Frost Action	N	Not Observed	Not Observed

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Animal Borrows	N	Not Observed	Not Observed
Vegetation	Y	Acceptable / Isolated. Near toe of landfill only. No vegetation on landfill cap.	Acceptable / Isolated. Near toe of landfill only. No vegetation on landfill cap.
Staining	N	Not Observed	Not Observed
Vegetation Stress	N	Not Observed. Vegetation downgradient from the toe of landfill	Not Observed. Vegetation downgradient from the toe of landfill
Seepage / Ponded Water	Y	Acceptable. Occasional and pooling at toe landfill in small features consistent with previous observations.	Acceptable. Occasional and pooling at toe landfill in small features consistent with previous observations.
Exposed Debris	N	Acceptable/ Isolated. Domestic debris (very minor) on cap of landfill. Not considered as dumping, possibly windblown debris from community use from surrounding area.	Acceptable / Isolated. A small piece of exposed metal debris was observed in the disturbed area on the west crest of the landfill.
Grades/Topography	Y	Acceptable, as per landfill design	Acceptable / Isolated. A disturbed area (~20 x ~30 m) with less and uneven gravel (possible vehicle tracks) was noted on west slope of the landfill. Refer to Photos 26 and 32, in Appendix F . A field sketch is included in Appendix D .
Distance to downgradient surface water bodies	Y	Occasional. No surface water at toe of landfill. Small pond as previously mapped. No new surface water bodies	Occasional. No surface water at toe of landfill. Small pond as previously mapped. No new surface water bodies

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Distance to freshwater/marine habitat and habitat usage	Y	Acceptable. Set back from marine discharge	Acceptable. Set back from marine discharge
Terrestrial Habitat	Y	Acceptable. Arctic fox observed at toe of landfill along access road. Canadian Geese and scat observed near surface water ponds	None observed
Land use	Y	Acceptable. Industrial (non-operational, open, unrestricted Airport property)	Acceptable. Industrial (non-operational, open, unrestricted Airport property)
Debris	N	Acceptable. None observed	None observed
Landfill cover	Y	Acceptable, as per landfill design.	Acceptable / Isolated. A disturbed area (~20 x ~30 m) with less and uneven gravel (possible vehicle tracks) was noted on west slope of the landfill. Refer to Photos 26 and 32, in Appendix F . A field sketch is included in Appendix D .
Snow, Sun Exposure, Surface Temperature, Wind	Y	Acceptable. No significant weather-related conditions	Acceptable. No significant weather-related conditions
Surface Drainage	Y	Acceptable, as per landfill design. Drainage within swale systems, drainage acting as designed	Acceptable, as per landfill design.
Surface Water Drainage, Runoff Diversion and Potential Percolation into Landfill Cap	Y	Acceptable. Swales and drainage system operating as designed	Acceptable. Swales and drainage system operating as designed

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Permafrost Degradation	N	Acceptable. None observed	None observed
Monitoring Well Condition	Y	Acceptable. Minor repairs to RBL-6 (sand and bentonite added at base to solidify well casing)	Marginal / Isolated. RBL-5 was broken at surface (likely from snow removal activities), repaired, however, depth is shallow, possibly blocked with soil. The well most likely will not yield water moving forward. Refer to Photos 13 to 15, in Appendix F . Existing well FL-MW-6 was dry and the PVC is loose within the well casing.
Overall Landfill Performance	Acceptable but with discrete isolated areas and concerns of settlement, cracking, landfill cover and exposed debris		

Table 12: Visual Inspection Report for AEC 2 - Definitions

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on landfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.

Performance/Severity Rating	Description
Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

6.3.1 Settlement

The central area along the western edge of the landfill appears to have increased cracking and settlement resulting in depressions and minor isolated piece of exposed metal debris. This settlement area is approximately 30 m in length along a slight rise or escarpment. This feature does not impact the integrity of the landfill but has the potential to lead to future issues.

Table 13: AEC 2 Settlement Observation Details

Checklist Item	Feature Letter	Relative Location	Length (m)	Width (m)	Depth (m)	Extent	Description (Change)	Photo Reference
Settlement	A (Figure 3)	Central Western portion of Landfill	30 m length, 4 m width		0.1 to 0.4	<10%	Increased settlement (depressions) cracks, exposed metal debris	#27 to #31

6.3.2 Disturbed Area

Adjacent to the settlement area noted above, along the landfill's west slope, a disturbed area of approximately 20 x 30 m was noted. This area appears to have less gravel and uneven topography. The area appears to have vehicle tracks indicating possible gravel removal from unknown parties. Refer to Photos #26 and #32 in **Appendix F**.

6.3.3 Vegetation

One area of vegetation growth was observed proximal to the toe of the landfill off-site (near access road and on southside of the road) and downgradient which is consistent with previous observations. The area was not mapped as the vegetation growth is believed to be natural and is not associated with landfill performance.

6.3.4 Seepage / Ponded Water

Areas of ponded water were observed 10 - 20 m from the west toe of the landfill as noted in previous sampling; they did not contain any evidence of staining or product seepage from the landfill.

6.3.5 Summary

Based on the observations, the performance of the AEC 2 landfill was rated as Acceptable with some exceptions. The areas of concern noted above should be monitored and potential surficial repairs on the west crest/slope should be considered.

6.4 Analytical Results – Groundwater Samples

Four groundwater samples (RBL-6, RBL-7, FL-MW-7/duplicate (DUP A) and 2-MW-8 - all hydraulically downgradient) were collected at AEC 2. Concentrations of BTEX and PHCs were detected but values were on average one to three orders of magnitude below guidelines. However, exceedances for PHC F2 were measured at monitoring wells RBL-7 (240 ug/L), FL-MW-7/DUP A (370 ug/L) and 2-MW-8 (360 ug/L) which exceeded the MECP Table 3 SCS guideline (150 ug/L). Oil and Grease was detected in three wells (no analysis from RBL-6 due to sample volume) and exceeded at 2-MW-8 (40,000ug/L) compared to the NWB WL effluent maximum allowable concentration (15,000 ug/L). However, a sheen was not observed. Concentrations of TSS (ranged from 57 mg/L to 550 mg/L) exceeded the NWB WL effluent maximum allowable concentration (50 mg/L) in samples DUP A (FL-MW-7) and RBL-7 respectively. Select total metals, nutrients and/or routine water parameters were detected but ranged from the same to four orders of magnitude below guideline values. All PAH parameters and Phenols were non-detectable.

AEC 2 monitoring well locations and results are illustrated on Figure 3. The analytical table results and selected guidelines are presented in Table 2a in **Appendix C**. Laboratory Certificates of Analysis reports are included in **Appendix E**.

6.5 Analytical Results – Surface Water Samples

One surface water sample (RBL-8 -hydraulically downgradient) was collected at AEC 2. BTEX and PHCs (except F2 and F3) and PAH parameters were non-detect and therefore below guidelines. Select total metals, routine water and/or nutrient parameters were generally detected but were below guidelines except for aluminium (180 ug/L), iron (2,200 ug/L), lead (4.7ug/L), TSS (160 mg/L) and ammonia (0.053 mg/L) that exceeded the applied guidelines of 100 ug/L, 300 ug/L, 1 ug/L, 50mg/L and 0.0231 mg/L respectively.

AEC 2 surface water locations and results are illustrated on Figure 3. The analytical table results and selected guidelines are presented in Table 2b in **Appendix C**. Laboratory Certificates of Analysis reports are included in **Appendix E**.

7.0 Summary of AEC 3 Conditions

7.1 Area Summary

The monitoring of AEC 3 landfill included visual observations to assess its physical integrity, including evidence for erosion, ponding, frost action, settlement and lateral movement. Groundwater water samples could only be collected up-gradient of AEC 3 (monitoring well RBL-14); all other monitoring wells at AEC 3 were dry. There was no ponded surface water within the remedial area of AEC 3 or south of the access road (as per last year) and as such surface water samples were collected downgradient in the McMaster River Valley.

A plan view of AEC 3 and the site physical attributes is shown on Figure 4 in **Appendix A**.

7.2 Photographic Record

The photographic record of the AEC 3 was completed as per the work plan. Copies of the photographs and a figure showing photo locations are provided in **Appendix F**, where photograph captions provide the landfill viewpoint number where applicable.

7.3 Visual Inspection Evaluation and Stability Assessment

The visual inspection of the AEC 3 and surrounding area was conducted on July 14, 2022 and between August 2 and 4, 2022 by the field lead and Environmental Assistant. The visual monitoring checklist was completed using the format provided in the Post Closure Monitoring Plan (DOJV 2020) and is presented as Table 14 of this report. Field notes relating to the visual inspection are included in **Appendix D**. Table 14 and Table 15 below present the visual inspection results and definitions (severity/extent) respectively for 2022 and in relation to last year's monitoring of AEC 3.

Table 14: Visual Inspection Report for AEC 3

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
Settlement	Y	Acceptable / Isolated. Settlement and slope failure approximately 15 m in length along northern edge of remedial area, with evidence of a minor shallow earth slide. This may have been natural	Acceptable / Isolate. Same slope slide as last year. No apparent change. Refer to Photos 10 and 11 for AEC 3 in Appendix F .

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
		due to proximity to the local valley and stream.	
Erosion	N	Not Observed	Not Observed
Frost Action	N	Not Observed	Not Observed
Animal Borrows	N	Not Observed	Not Observed
Vegetation	N	Not Observed	Not Observed
Staining	N	Not Observed	Acceptable / Isolated. Two small burn pit areas were noted at central area of site (southwest of RBL-12)
Vegetation Stress	N	Not Observed	Not Observed
Seepage / Ponded Water	Y	Acceptable. No water pooling in remedial area. Occasional and pooling south of the remedial area, consistent with previous observations.	Acceptable. No pooling on-site.
Exposed Debris	N	Not Observed	Not observed
Grades/Topography	Y	Acceptable, as per landfill design	Acceptable, as per landfill design
Distance to downgradient surface water bodies	Y	Occasional. No surface water noted downgradient.	Occasional. Surface water within McMaster River Valley sampled to verify.
Distance to freshwater/marine habitat and habitat usage	Y	Acceptable. No flow to valley stream to the North	Acceptable. Surface water within McMaster River Valley sampled to verify.
Terrestrial Habitat	Y	Acceptable. Polar bear observed to the northwest	Acceptable. No wildlife observed

Feature	Presence (Y/N)	Severity Rating / Extent (2021 Observations)	Severity Rating / Extent (2022 Observations)
		of the AEC. Presence of the bear limited taking of observations in valley/stream to north.	
Land use	Y	Acceptable. Wildlands	Acceptable / Isolated. Evidence of burn pits on site.
Debris	N	Not observed	Not observed
Permafrost Degradation	N	Acceptable. None observed	Acceptable. None observed
Landfill cover	Y	Acceptable, as per landfill design	Acceptable, as per landfill design
Snow, Sun Exposure, Surface Temperature, Wind	Y	Acceptable. No significant weather-related conditions	Acceptable. No significant weather-related conditions
Surface Water Drainage and Potential Percolation into Remedial Excavations	Y	Acceptable as per landfill design. No pooling of water on remedial areas or north side of access road.	Acceptable as per landfill design. No pooling of water on remedial areas or north side of access road.
Runoff Diversion	Y	Acceptable. No runoff from remedial area.	Acceptable. No runoff from remedial area.
Monitoring Well Condition	Y	Good condition – Acceptable. Minor repairs to RBL-10 (sand and bentonite added to base to solidify well casing)	Acceptable. No issues flagged
Overall Landfill Performance		Acceptable	

Table 15: Visual Inspection Report for AEC 3 - Definitions

Performance/Severity Rating	Description
Acceptable	Noted features are of little consequence. The remedial area is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on backfill stability to date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting backfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement. • Liner exposed. • Slope failure.
Extent	Description
Isolated	Singular feature
Occasional	Features of note occurring at irregular intervals/locations
Numerous	Many features of note, impacted less than 50% of the surface area of the landfill
Extensive	Impacting greater than 50% of the surface area of the landfill

7.3.1

Settlement

The area of natural settlement/slope slide observed along the central western edge of the remedial area appears the same as last year (approximately 15 m in length). This feature is small in nature and does not impact the integrity of the remedial work. Future monitoring can assess any changes if noted.

Table 16: AEC 3 Settlement Observation Details

Checklist Item	Feature Letter	Relative Location	Length (m); Width (m)	Depth (m)	Extent	Description (Change)	Additional Comments	Photo Reference
Settlement	A (Figure 4)	NW portion of Remedial area	15 m; 5 m	0.2	<1%	No new evidence of increased slope failure or settlement	Natural settlement along valley crest	#10 and #11

7.3.2 Staining / Burn Pits

Evidence of two small burn pits (soot/ash) were noted in the central area of site (southwest of RBL-12). Refer to Photo 12 in **Appendix F**.

7.3.3 Seepage / Ponded Water

There was no ponded water within the remedial area or south of the access road as per last year. Surface water from the McMaster River (hydraulically downgradient) was sampled.

7.3.4 Summary

Based on the observations, the performance of the AEC 3 was rated as Acceptable.

7.4 Analytical Results – Groundwater Samples

One groundwater sample pair (RBL-14 / duplicate (DUP B) - hydraulically upgradient) was collected at AEC 3. Concentrations of BTEX and PHCs, Oil and Grease and PAH parameters were non-detect except for 1-Methylnaphthene (range from 0.23 to 0.27 µg/L), 2-Methylnaphthene (range from 0.42 to 0.49 µg/L) and Naphthalene (0.1 µg/L), however, values were generally four orders of magnitude below the applied guidelines (1,800 µg/L, 1,800 µg/L and 1,400 µg/L respectively). Select total metals, nutrients and/or routine water parameters were detected but ranged from the same to two orders of magnitude below guideline values with the exception of lead (range 55ug/L to 93 ug/L), zinc (1,500ug/L) and TSS (range 110ug/L to 170 mg/L) at RBL-14 which exceeded the applied guidelines of 25 ug/L, 1,100 ug/L and 50 mg/L respectively.

AEC 3 monitoring well locations and results are illustrated on Figure 4. The analytical results and selected guidelines are presented in Table 2a in **Appendix C**. Laboratory analytical reports are included in **Appendix E**.

7.5 Analytical Results – Surface Water Samples

Two surface water samples (RBL-13 and RBL-16) were collected hydraulically downgradient in the McMaster River Valley at AEC 3. All BTEX and PHCs, PAH parameters, Oil and Grease and Phenols were non-detect and therefore below guidelines. Select total metals, routine water and/or nutrient parameters ranged from non detect to detect with concentrations that were the same order to two orders of magnitude below guideline values.

AEC 3 surface water locations and results are illustrated on Figure 4. The analytical table results and selected guidelines are presented in Table 2b in **Appendix C**. Laboratory Certificates of Analysis reports are included in **Appendix E**.

8.0

QA/QC Discussion

A QA/QC program was conducted to assess data reliability. A discussion of the quality assurance and quality control methods are detailed below.

8.1

Hold Times

Samples submitted to the laboratory for NO₂ (N), NO₂ (N) + NO₃ (N) were analyzed past the recommended hold times described in the CCME 2016 Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 4 Analytical Methods (CCME, 2016). This was due to the short hold time for analysis of these parameters. Samples were collected from August 2nd to 4th and shipped/received at Bureau Veritas in Yellowknife on August 5th. The coolers were re-iced and shipped internally by BV and received on August 8th in Calgary for analysis. The lab indicated that exceedance of hold times can increase the uncertainty of test results but does not necessarily imply that results are compromised.

8.2

Field Duplicates

The reliability of data relates to the certainty that sample results are representative of conditions over a certain scale at the sample location and are not influenced by a small particle of highly impacted material. This is assessed through collection and analysis of field duplicate samples.

Field duplicates were collected for groundwater and surface water at a ratio of approximately 1 per 10 samples. Two field duplicates for groundwater and one field duplicate for surface water were prepared.

For each sample pair of original and its field duplicate, the relative percent differences (RPD) was calculated using the following formula:

$$RPD = [|X_1 - X_2| / X_3] \times 100\%$$

Where:

- RPD = relative percent difference
- X₁ = original groundwater or surface water sample concentration
- X₂ = duplicate groundwater or surface water concentration
- X₃ = average concentration = (X₁ + X₂)/2

Where one or both concentrations of a parameter are non-detect, or very low, i.e., less than five times the reportable detection limit (RDL), the RPD for that parameter pair is not calculated. This is because the variability of results at concentrations close to the detection level can be high. The generally accepted industry standard for acceptable RPD's analyses is less than or equal to 40% for field

duplicated water samples described by the CCME Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment, Volume 1 Guidance Manual (CCME, 2016b).

Table 17: Duplicate Sample Analysis Results

Location	Pair	# RPD calcs	Average RPD %	Maximum RPD % (Parameter)	Parameters > 40% RPD (%)
AEC 1: Inactive Solid Waste Landfill	RBL-4 and DUP C	15	6%	60% (Cadmium)	Cadmium (60%)
AEC 2: Historical Landfill	FL-MW-7 and DUP A	38	14%	56% (Cadmium)	Aluminum (50%) Cadmium (56%) Lead (47%) Titanium (54%) Vanadium (47%)
AEC 3: Former Vehicle and Metal Storage Area	RBL-14 and DUP B	31	31%	145% (Zinc)	Aluminum (71%) Arsenic (67%) Chromium (67%) Cobalt (58%) Copper (61%) Iron (84%) Lead (51%) Nickel (67%) Vanadium (71%) Zinc (145%)

These results are likely due to non-homogenous sampling but do not compromise the validity of the results.

The RPD results are presented in Table 2a for groundwater and Table 2b for surface water in **Appendix C**.

8.3 Field/Trip Blanks

A field blank sample was prepared in the field by DOJV personnel using DI water supplied by Bureau Veritas. A trip blank was provided by Bureau Veritas for the program. Both the field and trip blank samples were submitted for analysis for PHC and PAH parameters. Laboratory analytical results indicated the reported concentrations of the tested parameters were non-detect. The field and trip blank results indicate that sample handling and sampling equipment did not influence the analytical results in the program.

The field and trip blank results are presented in Table 2a in **Appendix C**.

8.4 Laboratory QA/QC

Precision of lab results is assessed by reviewing the laboratory's internal QA/QC results which accompany the certificate of laboratory results. All water analyses were done by Bureau Veritas Laboratories. Their QA/QC section contains the results of internal checks such as analysis of lab blanks, spikes and duplicates.

In general, the laboratory QA/QC results were considered acceptable with the exception of the following:

Table 18: Laboratory QA/QC Results

BV Job Number	Method Blank outside control limits ¹ (Parameter – (above or below))	Detection Limit raised ² (Parameter – (sample))	Matrix Spike Recovery or RPD outside control limit ³ (Parameter – (above or below))	Sample analyzed past Method Specified Hold Time ⁴ (Parameter – (sample))	Duplicate exceeds acceptance criteria ⁵ (Parameter – (sample))
C258095		Sulphate (AEC1-GW1) Nitrogen (RBL-1) Total Suspended Solids (TSS) (RBL-1, AEC1-GW1, RBL-2 and -3) Phosphorus (RBL-1, AEC1-GW1) Mercury (RBL-1, AEC1-GW1)	Phenols (AEC1-GW1 – non-calculable/above) PHC F3 (above) Terphenyl-D14 (above) Chrysene (above)	NO ₂ , NO ₂ +NO ₃ (RBL-1, AEC1-GW1, RBL-2, -3, -4 and DUP C)	
C258047		Sulphate (FL-MW-7, DUP A) Nitrate plus Nitrite (FL-MW-7, RBL-8) TSS (RBL-7, FL-MW-7, DUP A, RBL-8) Oil and Grease (2-MW-8) Mercury (2-MW-8, FL-MW-7, DUP A) Elements by ICPMS (DUP A)	Terphenyl-D14 (RBL-6, -7, 2-MW-8, FL-MW-7, DUP A, RBL-8, FB/TB) Terphenyl-D14 (above) Thallium (below) Aluminum, Iron, Silicon, Silver, Titanium and Zinc (above)	NO ₂ , NO ₂ +NO ₃ (RBL-7, 2-MW-8, FL-MW-7, DUP A, RBL-8)	Aluminum, Iron, Silver, Titanium, Zinc (RBL-7) Zinc (DUP A)

BV Job Number	Method Blank outside control limits ¹ (Parameter – (above or below))	Detection Limit raised ² (Parameter – (sample))	Matrix Spike Recovery or RPD outside control limit ³ (Parameter – (above or below))	Sample analyzed past Method Specified Hold Time ⁴ (Parameter – (sample))	Duplicate exceeds acceptance criteria ⁵ (Parameter – (sample))
C258103	Total Aluminum (above)	TSS (RBL-14, DUP B) Elements by ICPMS (RBL-14, DUP B)	Terphenyl-D14 (RBL-14, DUP B, RBL-13 and -16) Terphenyl-D14 (above) TSS (not calculated) Iron (above)	NO ₂ , NO ₂ +NO ₃ (RBL-14, DUP B, RBL-13 and -16)	

(1) Data inspected. All data < RDL or greater than 10x Method Blank

(2) Dilution was required due to matrix interference or based on sample volume used for analysis.

(3) Recovery or RPD outside control limit. Original sample diluted to remove interference. The overall quality of this analysis meets acceptability criteria.

(4) Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

(5) Due to sample matrix. Reanalysis yields similar result.

Bureau Veritas indicated that the overall quality control for this analysis met acceptability criteria. The results are presented as part of laboratory certificates of analysis and a separate letter from Bureau Veritas approving DOJV's QA/QC program can be found in **Appendix E**.

8.5 Summary

Based on the results of the assessment above, the data quality for the program was considered reliable for its intended use.

9.0

Conclusions and Recommendations

DOJV conducted the field activities for the second year of the Environmental Monitoring Program (EMP) for the Resolute Bay Airport Landfill site on July 14, 2022, July 27, 2022 and from August 2 – 4, 2022. The three landfill sites are referred to as Inactive Solid Waste Landfill (AEC 1), Historical Landfill (AEC 2), and Former Vehicle and Waste Metal Storage Area (AEC 3). The program included thermal monitoring of 3 thermistors at AEC 1, monitoring and sampling of groundwater (15 wells) and surface water sampling (4 locations) and visual inspections of all three AEC's.

Based on visual inspections, the landfills comply with functioning as designed with all three AEC's overall performance considered generally acceptable. However, at AEC 2 conditions along the western edge of landfill appear to be slightly more degraded than last year. Settlement has caused isolated stress fractures (cracking), depressions and minor exposed metal debris. As well, adjacent down slope it appears some gravel cover may have been removed. A 20 x 30 m disturbed area is marked by uneven grade with possible vehicle tracks. The isolated slope failure (suspected natural in nature) previously noted along the north edge of the remedial area near Excavation 1 at AEC 3 appears the same. Future monitoring can assess any changes to the above noted observations.

Based on the thermal monitoring data collected, the rise and fall of temperatures recorded by the thermistors correlate to ambient temperatures in Resolute Bay. The average monthly temperatures at selected depths within the active layer (above previously observed permafrost – 1.3 to 1.7 mbgs) were evaluated. In general, all three Thermistors show a July/August window where temperatures were recorded above 0oC from 0.5 mbgs to a maximum of 1.25 mbgs. As expected, temperatures at surficial depths fluctuate the most annually, while temperatures at or near observed permafrost depth exhibit less variability. Data from subsequent years will be compared to the baseline data to monitor permafrost aggradation into the landfill cap.

Fifteen wells including RBL-1 to 3, AEC1-GW1 (AEC 1), RBL-5 to 7, FL-MW-6, FL-MW-7, 2-MW-8 (AEC 2), RBL-10 to 12, RBL-14 and 15 (AEC 3) were monitored as part of the EMP with nine wells (RBL-1 to 3, AEC1-GW1, RBL-6 to 7, FL-MW-7, 2-MW-8 and RBL-14) being sampled. Six wells were dry and as such no samples were collected. At AEC 1, monitoring wells RBL-3 (hydraulically downgradient) and AEC1-GW1 (hydraulically downgradient of sewage lagoons) had PHC F2 concentrations which exceeded the MECP Table 3 SCS guideline used. As well, concentrations of Total Suspended Solids (TSS) exceeded the NWB WL effluent maximum allowable concentration at RBL-1 (hydraulically upgradient) and AEC1-GW1. At AEC 2, monitoring wells RBL-7, FL-MW-7/DUP A and 2-MW-8 (all hydraulically downgradient) had PHC F2 concentrations which exceeded the MECP Table 3 SCS guideline used. At monitoring well, 2-MW-8, no sheen was noted but oil and grease concentrations exceeded the NWB WL effluent maximum allowable concentration. TSS concentrations at monitoring wells RBL-7 and FL-MW-7/DUP A exceeded the NWB WL effluent maximum allowable concentration. At AEC 3, monitoring well RBL-14/DUP B (hydraulically upgradient) had lead and zinc concentrations that exceeded the MECP Table 3 SCS

guideline used. TSS also exceeded the NWB WL effluent maximum allowable concentration. All other chemical parameters sampled in monitoring wells had concentrations below detection limits or below the applied guidelines. TSS concentrations were related to higher turbidity within monitoring wells due to residual sediments and does not reflect in-situ water conditions. As well, TSS were noted in monitoring wells both upgradient and downgradient and therefore concentrations may reflect background conditions.

Four surface water locations including RBL-4 (AEC1), RBL-8 (AEC 2), RBL-13 and 16 (AEC 3) were sampled hydraulically downgradient of AECs as part of the EMP. At AEC 1, surface water sample pair RBL-4 (and duplicate DUP C) had concentrations of hexavalent chromium and/or zinc that exceeded the applied CCME guidelines. At AEC 2, surface water sample RBL-8 had concentrations of aluminum, iron, lead and ammonia that exceeded the CCME guidelines. As well, TSS concentrations exceeded the NWB WL effluent maximum allowable concentration. At AEC 3, surface water samples RBL-13 and RBL-16 were sampled in the McMaster River Valley had no measured exceedances. All other chemical parameters sampled at surface water locations had concentrations below detection limits and/or below the applied guidelines.

Based on the results of the field and laboratory QA/QC program, the data quality was considered reliable for its intended use.

A longer record over time of groundwater and surface water results are required to compare upgradient vs downgradient locations and to evaluate trends at each sampling location. Groundwater and surface water actions levels as described in the *Post-Closure Monitoring Plan* (DOJV 2020) will be assessed following subsequent data collection. Time trends will be assessed using a moving average approach with actionable criteria backed by a Mann-Kendall analysis.

DOJV recommends the following:

- Begin planning for potential future earthwork improvements at AEC 2 to address issues noted;
- Additional attempts should be made to unblock monitoring well RBL-5 at AEC 2 to obtain upgradient data or make plans to re-drill the well.
- If surface water is not noted on AEC 3 or the immediate adjacent land, no surface water sampling is recommended for AEC 3 moving forward.

10.0

Closure

This report was prepared exclusively for the purposes, project, and site location outlined in the report. The report is based on information provided to, or obtained by DOJV as indicated in the report, and applies solely to site conditions and the regulatory frameworks existing at the time of the on-site work and interpretation.

This report was prepared by DOJV for the sole benefit of our client PSPC, on behalf of Transport Canada. The material in it reflects DOJV's best judgment in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. DOJV accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this information is satisfactory for your requirements.

Sincerely,

DILLON-OUTCOME JOINT VENTURE



Keelan Veitch, B.Sc.
Intermediate Professional



Steve Livingstone, M.Sc., P.Geo
Senior Professional



Don Plenderleith, P.Eng (NU, NT, ON, QC)
Senior Professional Engineer



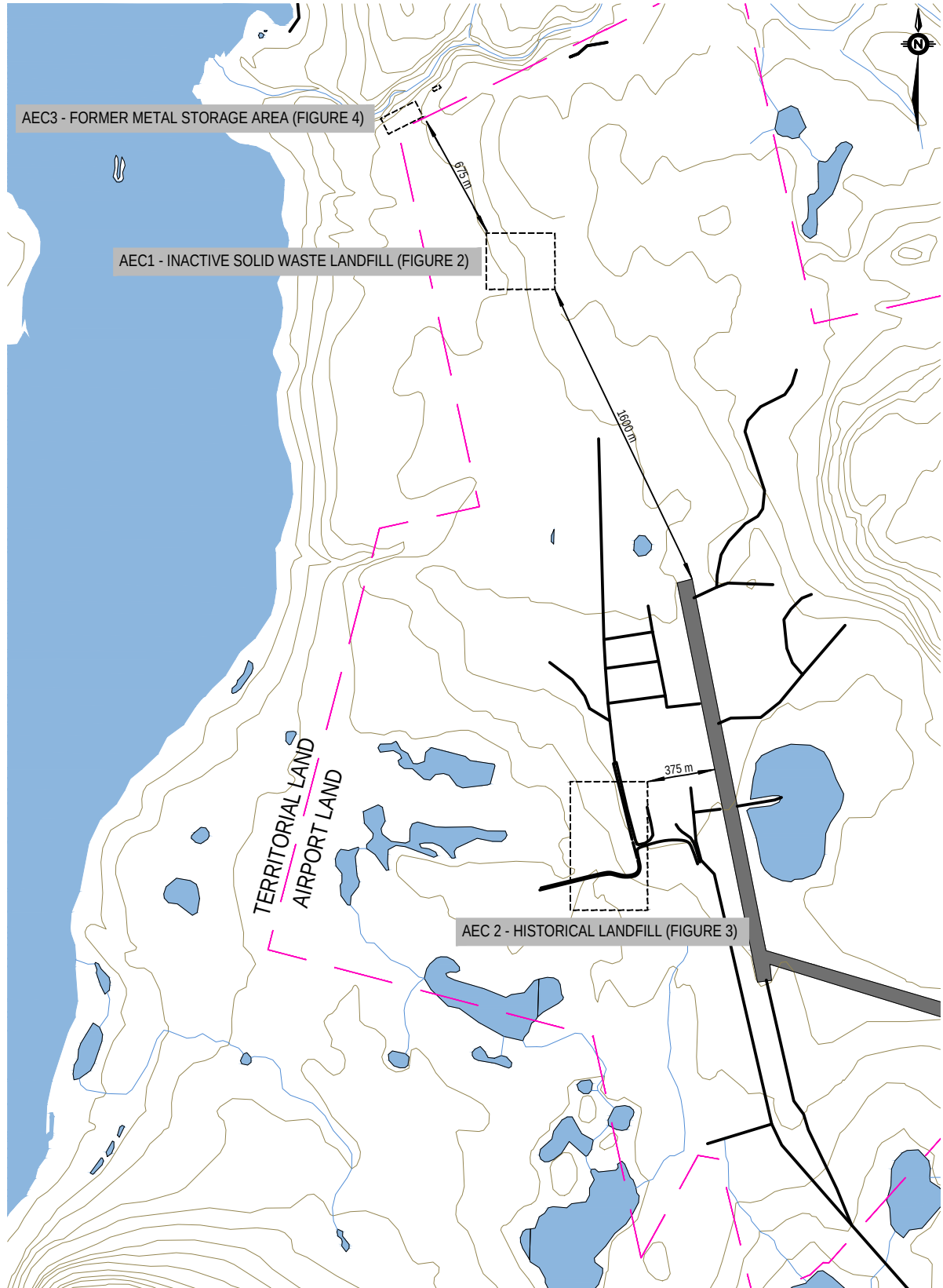
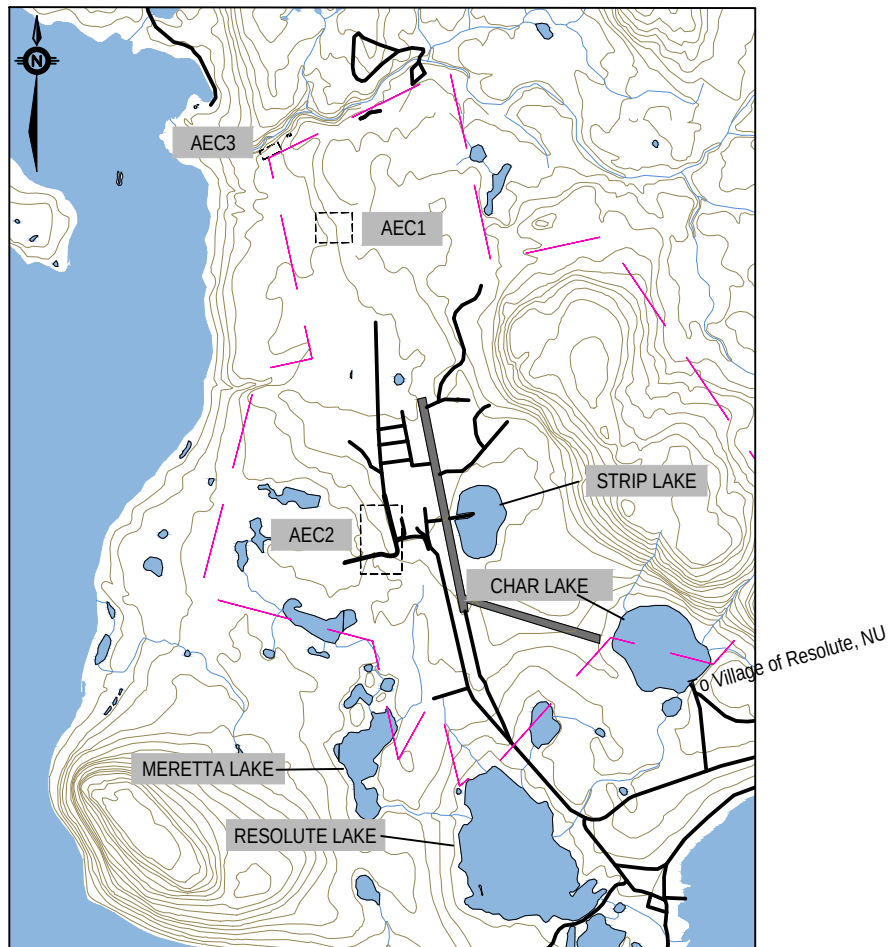
11.0

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Appendix A

Figures



GENERAL NOTES

Drawing Source:
1. Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

LEGEND

	AIRPORT PROPERTY LINE
	AREA OF ENVIRONMENTAL CONCERN (AEC)

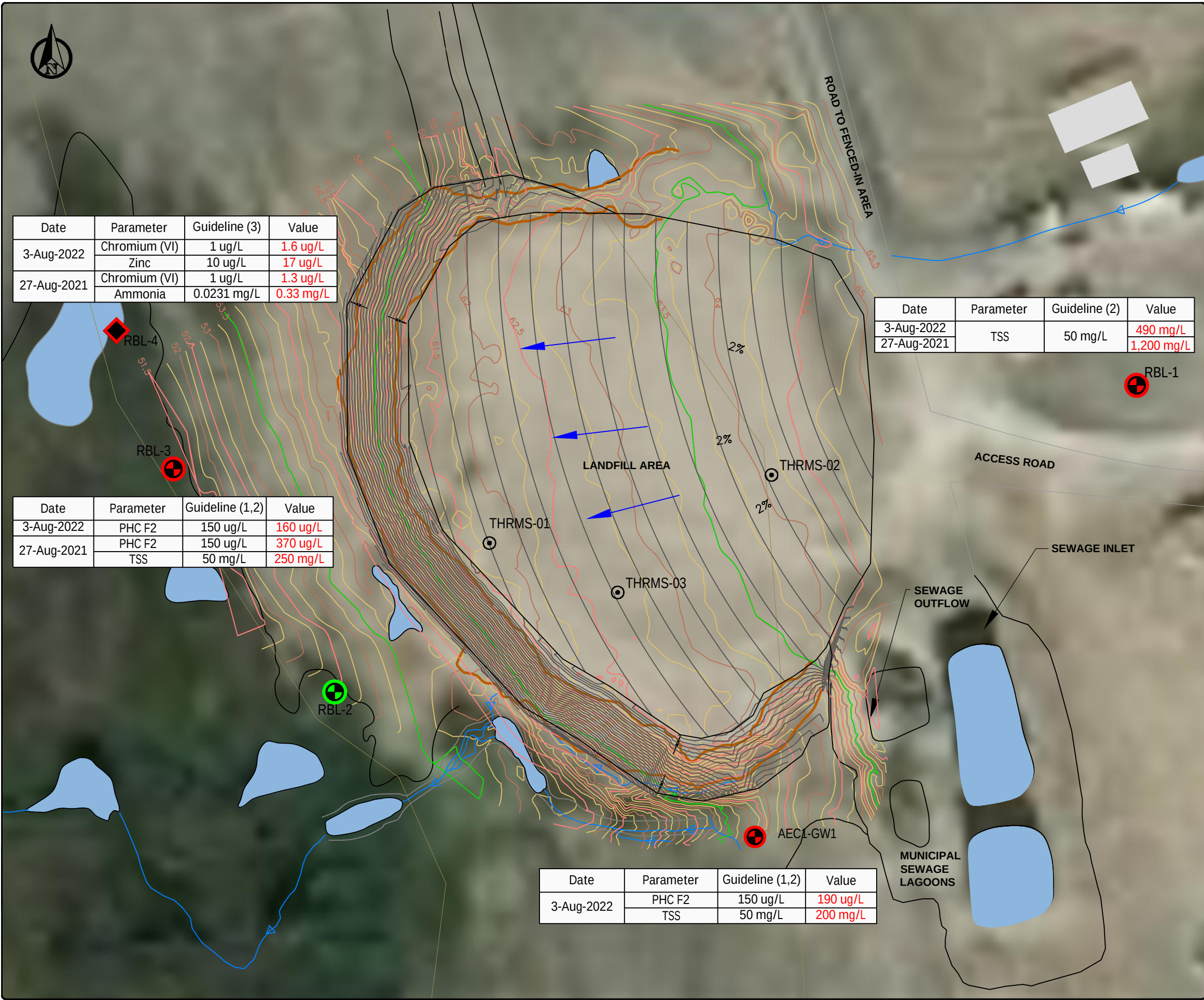
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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM
SITE LOCATION

OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: N/A
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14-Resolute Bay MW and SW results(221205).dwg	SHEET NUMBER: 1 OF 4	REV: 0



Date	Parameter	Guideline (3)	Value
3-Aug-2022	Chromium (VI)	1 ug/L	1.6 ug/L
	Zinc	10 ug/L	17 ug/L
27-Aug-2021	Chromium (VI)	1 ug/L	1.3 ug/L
	Ammonia	0.0231 mg/L	0.33 mg/L

Date	Parameter	Guideline (1,2)	Value
3-Aug-2022	PHC F2	150 ug/L	160 ug/L
27-Aug-2021	PHC F2	150 ug/L	370 ug/L
	TSS	50 mg/L	250 mg/L

Date	Parameter	Guideline (1,2)	Value
3-Aug-2022	PHC F2	150 ug/L	190 ug/L
	TSS	50 mg/L	200 mg/L

Date	Parameter	Guideline (2)	Value
3-Aug-2022	TSS	50 mg/L	490 mg/L
27-Aug-2021			1,200 mg/L

GENERAL NOTES

- Drawing Source:
- Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)
- Environmental Criteria:
- Ontario Ministry of the Environment 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011), Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition
 - Maximum Allowable Effluent Discharge Concentration as per Water Licence No. 1BR-RBL1929
 - CCME Water Quality for the Protection of Aquatic Life, Freshwater Pathway (Marine Pathway excluded)
 - Contours are considered the extent of the landfill.

LEGEND

	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL
	SURFACE WATER SAMPLE
	THERMISTOR
	SAMPLE MEETS APPLICABLE CRITERIA
	SAMPLE EXCEEDS APPLICABLE CRITERIA
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION

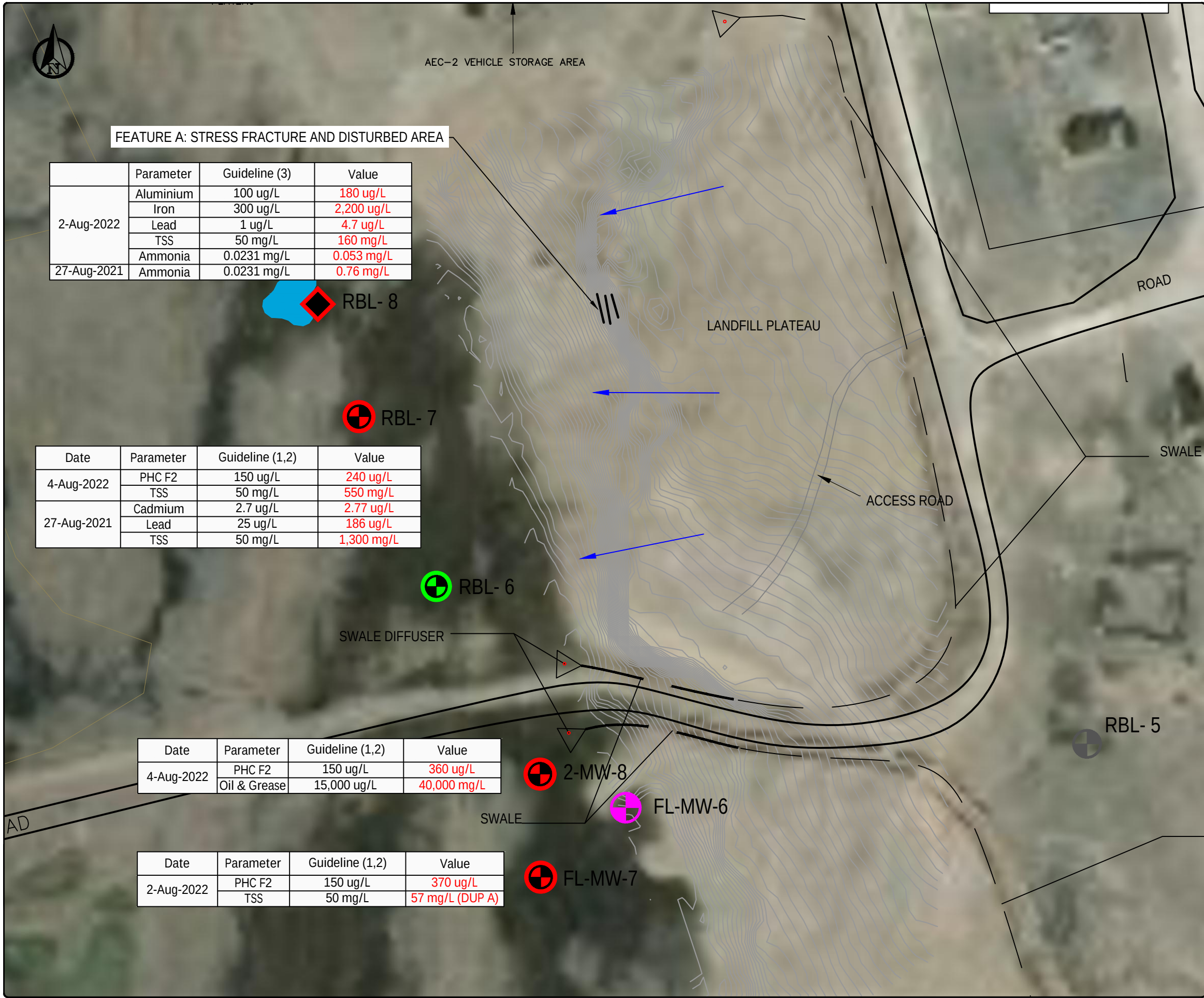
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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM
AEC 1: INACTIVE SOLID WASTE LANDFILL
MONITORING WELL AND SURFACE WATER
LOCATIONS AND RESULTS

OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: N/A
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14-Resolute Bay MW and SW results(221205).dwg	SHEET NUMBER: 2 OF 4	REV: 0



GENERAL NOTES

Drawing Source:
1. Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

Environmental Criteria:
1. Ontario Ministry of the Environment 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011). Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition
2. Maximum Allowable Effluent Discharge Concentration as per Water Licence No. 1BR-RBL1929
3. CCME Water Quality for the Protection of Aquatic Life, Freshwater Pathway (Marine Pathway excluded)

LEGEND

	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL
	EXISTING MONITORING WELL (NOT SAMPLED)
	SURFACE WATER SAMPLE
	THERMISTOR
	SAMPLE MEETS APPLICABLE CRITERIA
	SAMPLE EXCEEDS APPLICABLE CRITERIA
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION

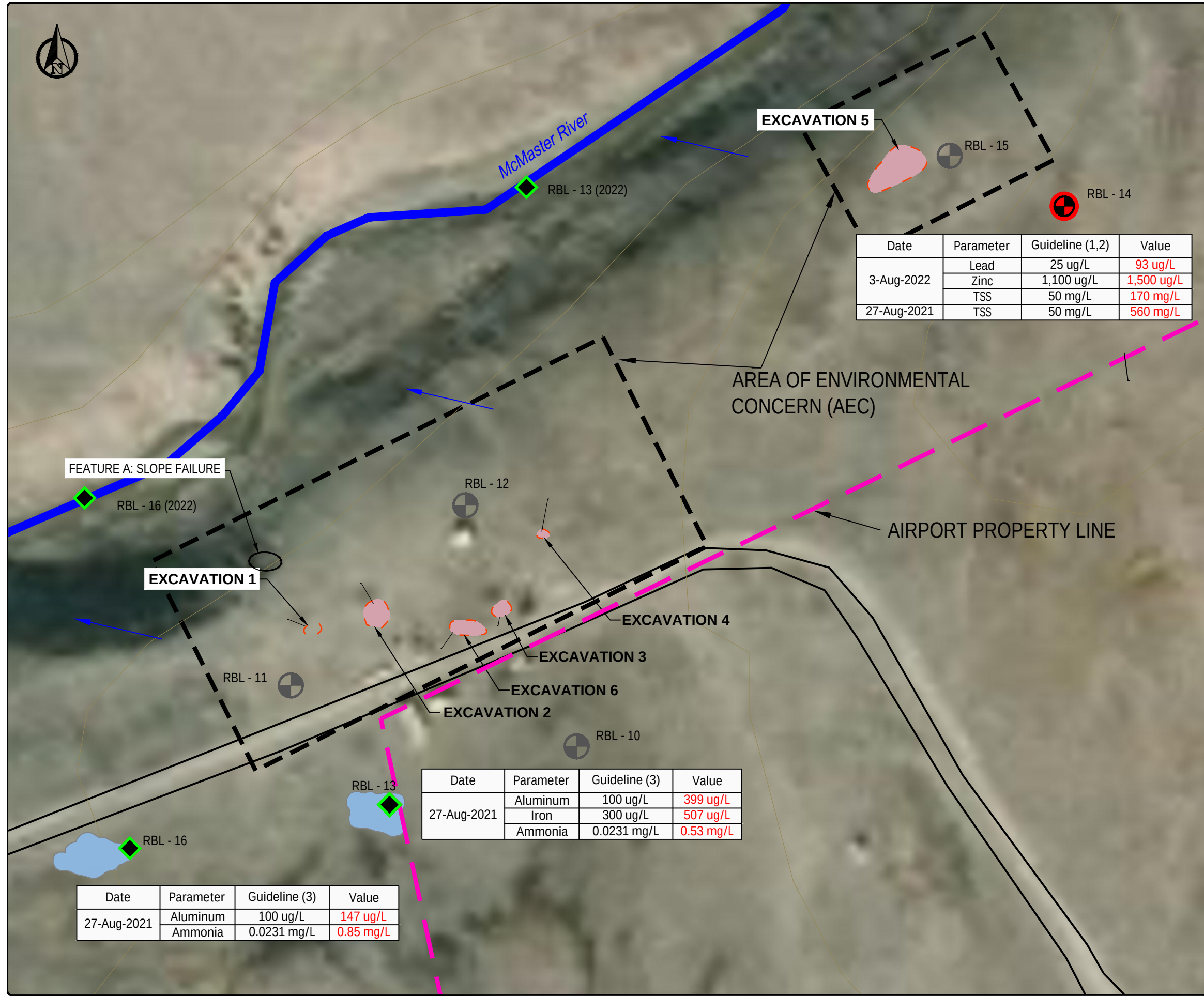
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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM
AEC 2: HISTORICAL LANDFILL
MONITORING WELL AND SURFACE WATER
LOCATIONS AND RESULTS

OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: N/A
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14-Resolute Bay MW and SW results(221205).dwg	SHEET NUMBER: 3 OF 4	REV: 0



GENERAL NOTES

Drawing Source:

- Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

Environmental Criteria:

- Ontario Ministry of the Environment 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011), Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition
- Maximum Allowable Effluent Discharge Concentration as per Water Licence No. 1BR-RBL1929
- CCME Water Quality for the Protection of Aquatic Life, Freshwater Pathway (Marine Pathway excluded)

LEGEND	
	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL
	SURFACE WATER SAMPLE
	THERMISTOR
	SAMPLE MEETS APPLICABLE CRITERIA
	SAMPLE EXCEEDS APPLICABLE CRITERIA
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION

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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM AEC 3: FORMER VEHICLE AND WASTE METAL STORAGE AREA MONITORING WELL AND SURFACE WATER LOCATIONS AND RESULTS			
OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: N/A	
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15	
DRAWING NAME: P2022-14-Resolute Bay MW and SW results(221205).dwg	SHEET NUMBER: 4 OF 4	REV: 0	

Appendix B

NWB Guideline Approval and Copy of Guidelines Used

 Merci de penser à l'environnement avant d'imprimer ce courriel / Thank you for thinking of the environment before printing this email

**Soil, Ground Water and Sediment Standards for Use Under
Part XV.1 of the *Environmental Protection Act***

**Ministry of the Environment
April 15, 2011**

PIBS # 7382e01

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INTRODUCTION

This document, consisting of Tables 1 to 9, sets out the prescribed contaminants and the applicable site condition standards for those contaminants for the purposes of Part XV.1 of the *Environmental Protection Act*. The Tables can be summarized as follows:

Table 1:	Full Depth Background Site Condition Standards
Table 2:	Full Depth Generic Site Condition Standards in a Potable Ground Water Condition.
Table 3:	Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition.
Table 4:	Stratified Site Condition Standards in a Potable Ground Water Condition.
Table 5:	Stratified Site Condition Standards in a Non-Potable Ground Water Condition.
Table 6:	Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition
Table 7:	Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition
Table 8	Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Groundwater Condition
Table 9	Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Groundwater Condition

HOW TO READ THESE TABLES

Tables 1 to 9 set out prescribed contaminants by listing contaminants in the column of rows that has the heading row entitled “Contaminant”. Tables 1 to 9 set out prescribed standards for these contaminants by indicating in the appropriate locations the maximum concentrations of the contaminants in soil, ground water and sediment, which are expressed in a number that is to be read as µg/g dry weight for soil and sediment, and as µg/L for ground water, unless otherwise indicated in the table. Within Tables 2 – 7 separate values for each of the two soil texture groups are listed. The value for coarse soils is the one that is not bracketed, whereas the value for medium and fine textured soils is given within brackets. Where there are no bracketed values, the value applies to both soil groups.

The standard for a property that is applicable for a type of property use in a particular medium, can be found in the row named for the contaminant and in the column that has the heading row that indicates the applicable medium and the type of property use for which the record of site condition is filed.

A contaminant that is listed and for which the abbreviation “N/V” appears in the cell, instead of a number representing a maximum concentration, is a contaminant for which a standard is not prescribed. The abbreviation “N/V” means “no value”.

A contaminant that is listed and for which the abbreviation “N/A” appears in the cell, instead of a number representing a maximum concentration, is a contaminant for which a standard is not prescribed because no standard is required. The abbreviation “N/A” means “not applicable”.

Notes on Table 1

Table 1 sets out the “Full Depth Background Site Condition Standards”. The soil standards in Table 1 are background values derived from the Ontario Typical Range values for

the land uses indicated and are considered representative of upper limits of typical province-wide background concentrations in soils that are not contaminated by point sources.

The groundwater standards in Table 1 were derived from the Provincial Groundwater Monitoring Information System (PGMIS) from 20002 to 2007 and from groundwater well surveillance data (DWSP) from 1997 -2002. For parameters where sufficient data was not available values have been derived from the most recent effects-based water criteria including Provincial Water Quality Objectives and the Ontario Drinking Water Quality Standards as upper limits and Method Detection Limit as a lower limit. These values are considered to be generally achievable in site situations typical of background while providing a level of human health and ecosystem protection consistent with background conditions and protective of sensitive ecosystems.

The sediment standards in Table 1 are the same standards (adverse effects-based) developed for the Table 8 and 9 for properties within 30 m of a water body. These values are within the range of measured background sediment where data is available in the 1993 Sediment Guidelines and are considered to provide a level of human health and ecosystem protection consistent with background and protective of sensitive ecosystems.

Notes on Table 6, 7, 8, and 9

Tables 6 and 7 are to be used in situations where there is less than 2 m of overburden above bedrock. They can also be used in situations where the QP is not satisfied that Tables 2 and 3 are suitable due to shallow depth to groundwater. Tables 6 and 7 were derived on the same basis as Tables 2 and 3 except that the calculation for dilution occurring in the aquifer is removed, and biodegradation between the groundwater and the basement is assumed to not be occurring.

Tables 8 and 9 are to be used where all or part of a property lies within 30 m of a surface water body. These standards were derived with the objective of protecting surface water bodies from movement of soil directly into surface water to become sediment, and assuming that there is no dilution in the groundwater for the aquatic protection pathway.

Additional notes

- 1) For all tables, the methyl naphthalene soil standard is applicable to both 1-methyl naphthalene and 2 –methyl naphthalene, with the provision that if both are detected the sum of the two concentrations cannot exceed the standard.
- 2) There are two boron parameters in the tables, one for a hot water extract (HWS) that is designed for protection of plants and soil invertebrates, and one for a total (mixed strong acid digest). The HWS boron can be used by itself for all surface soils, as plants are the most sensitive receptor for boron. For subsurface soils the total boron standard can be used by itself, since plant protection for soils below the root zone is not a significant concern.
- 3) Conditions can exist at a site for which the assumptions used to develop the generic criteria **may** not **be** valid. The QP must ascertain that the site conditions are appropriate for use of the generic standards such that he/she can be comfortable with signing the certifications on the RSC. To assist the QP in recognizing the types of conditions that may be important in this respect the following examples are given:
 - a) if the contaminated zone has a volume larger than 340m³ or a source length or width greater than 13 metres then all pathways which employ source depletion or groundwater

transport (Soil to Nose, S-GW1, S-IA, S-GW3, GW2 and GW3 components of the standards) may be affected.

b) if a high permeability zone is present in the vadose zone which provides a direct preferential pathway to the building then the soil properties assumed in the generic J&E modelling to determine the S-IA and GW2 components of the standard may change.

c) if the annual average of the capillary fringe of the water table is < 0.8 metres from the outer edge of the gravel crush of the building foundation, then the 10 x biodegradation factor assumed in the GW2 pathway may be non-conservative.

d) if the average Organic Carbon content (foc) of soil above the water table is < 0.002 then more contaminant may be in the water and gas phases than assumed in the generic standards.

f) if there is a continuous source of the contaminant then the pathways which assume a depleting source (i.e., S-IA, S-GW1, and Soil to Nose) might be non-conservative.

g) if there is a surface water body that could be affected by the property from contaminant migration via groundwater, and the surface water has total hardness less than 70 mg/L (as CaCO_3) and/or has pH less than 6.7, the aquatic protection values for some metals and pentachlorophenol may be non-conservative. In such cases, the QP may need to consider whether a site-specific estimate of hardness and pH resulting from mixing of groundwater and surface water is needed to estimate an appropriate aquatic protection value for this site.

The existence of any of the above conditions does not necessarily indicate that the generic criteria are not valid for a given site. There are many interrelated parameters and factors that were used in the development of the generic standards, and in many cases one factor, such as any of those above, can be outweighed by differences in other factors in a manner that, overall, there is sufficient natural protection provided by the site. In addition, it must also be considered that the component that drives the standard may not be affected by the particular limiting condition described above (e.g. a terrestrial ecological driver, but there are high permeable zones in the vadose zone). The QP should consider these types of factors in assessing the appropriateness of the use of the generic standards.

TABLE 1: Full Depth Background Site Condition Standards

Table 1	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment (µg/g)
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Uses	All Types of Property Uses
Acenaphthene	0.05	0.072	4.1	NV
Acenaphthylene	0.093	0.093	1	NV
Acetone	0.5	0.5	2700	NV
Aldrin	0.05	0.05	0.01	0.002
Anthracene	0.05	0.16	0.1	0.22
Antimony	1	1.3	1.5	NV
Arsenic	11	18	13	6
Barium	210	220	610	NV
Benzene	0.02	0.02	0.5	NV
Benz[a]anthracene	0.095	0.36	0.2	0.32
Benzo[a]pyrene	0.05	0.3	0.01	0.37
Benzo[b]fluoranthene	0.3	0.47	0.1	NV
Benzo[ghi]perylene	0.2	0.68	0.2	0.17
Benzo[k]fluoranthene	0.05	0.48	0.1	0.24
Beryllium	2.5	2.5	0.5	NV
Biphenyl 1,1'-	0.05	0.05	0.5	NV
Bis(2-chloroethyl)ether	0.5	0.5	5	NV
Bis(2-chloroisopropyl)ether	0.5	0.5	120	NV
Bis(2-ethylhexyl)phthalate	5	5	10	NV
Boron (Hot Water Soluble)*	NA	NA	NA	NA
Boron (total)	36	36	1700	NV
Bromodichloromethane	0.05	0.05	2	NV
Bromoform	0.05	0.05	5	NV
Bromomethane	0.05	0.05	0.89	NV
Cadmium	1	1.2	0.5	0.6
Carbon Tetrachloride	0.05	0.05	0.2	NV
Chlordane	0.05	0.05	0.06	0.007
Chloroaniline p-	0.5	0.5	10	NV
Chlorobenzene	0.05	0.05	0.5	NV
Chloroform	0.05	0.05	2	NV
Chlorophenol, 2-	0.1	0.1	8.9	NV
Chromium Total	67	70	11	26
Chromium VI	0.66	0.66	25	NV
Chrysene	0.18	2.8	0.1	0.34
Cobalt	19	21	3.8	50
Copper	62	92	5	16
Cyanide (CN-)	0.051	0.051	5	0.1
Dibenz[a h]anthracene	0.1	0.1	0.2	0.06
Dibromochloromethane	0.05	0.05	2	NV
Dichlorobenzene, 1,2-	0.05	0.05	0.5	NV
Dichlorobenzene, 1,3-	0.05	0.05	0.5	NV
Dichlorobenzene, 1,4-	0.05	0.05	0.5	NV
Dichlorobenzidine, 3,3'-	1	1	0.5	NV
Dichlorodifluoromethane	0.05	0.05	590	NV
DDD	0.05	0.05	1.8	0.008
DDE	0.05	0.05	10	0.005
DDT	0.078	1.4	0.05	0.007
Dichloroethane, 1,1-	0.05	0.05	0.5	NV
Dichloroethane, 1,2-	0.05	0.05	0.5	NV
Dichloroethylene, 1,1-	0.05	0.05	0.5	NV
Dichloroethylene, 1,2-cis-	0.05	0.05	1.6	NV
Dichloroethylene, 1,2-trans-	0.05	0.05	1.6	NV
Dichlorophenol, 2,4-	0.1	0.1	20	NV
Dichloropropane, 1,2-	0.05	0.05	0.5	NV
Dichloropropene,1,3-	0.05	0.05	0.5	NV
Dieldrin	0.05	0.05	0.05	0.002

Table 1	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment (µg/g)
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Uses	All Types of Property Uses
Diethyl Phthalate	0.5	0.5	30	NV
Dimethylphthalate	0.5	0.5	30	NV
Dimethylphenol, 2,4-	0.2	0.2	10	NV
Dinitrophenol, 2,4-	2	2	10	NV
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	5	NV
Dioxane, 1,4	0.2	0.2	50	NV
Dioxin/Furan (TEQ)	0.000007	0.000007	0.000015	NV
Endosulfan	0.04	0.04	0.05	NV
Endrin	0.04	0.04	0.05	0.003
Ethylbenzene	0.05	0.05	0.5	NV
Ethylene dibromide	0.05	0.05	0.2	NV
Fluoranthene	0.24	0.56	0.4	0.75
Fluorene	0.05	0.12	120	0.19
Heptachlor	0.05	0.05	0.01	NV
Heptachlor Epoxide	0.05	0.05	0.01	0.005
Hexachlorobenzene	0.01	0.01	0.01	0.02
Hexachlorobutadiene	0.01	0.01	0.01	NV
Hexachlorocyclohexane Gamma-	0.01	0.01	0.01	NV
Hexachloroethane	0.01	0.01	0.01	NV
Hexane (n)	0.05	0.05	5	NV
Indeno[1 2 3-cd]pyrene	0.11	0.23	0.2	0.2
Lead	45	120	1.9	31
Mercury	0.16	0.27	0.1	0.2
Methoxychlor	0.05	0.05	0.05	NV
Methyl Ethyl Ketone	0.5	0.5	400	NV
Methyl Isobutyl Ketone	0.5	0.5	640	NV
Methyl Mercury **	NV	NV	0.12	NV
Methyl tert-Butyl Ether (MTBE)	0.05	0.05	15	NV
Methylene Chloride	0.05	0.05	5	NV
Methylnaphthalene, 2-(1-) ***	0.05	0.59	2	NV
Molybdenum	2	2	23	NV
Naphthalene	0.05	0.09	7	NV
Nickel	37	82	14	16
Pentachlorophenol	0.1	0.1	0.5	NV
Petroleum Hydrocarbons F1****	17	25	420	NV
Petroleum Hydrocarbons F2	10	10	150	NV
Petroleum Hydrocarbons F3	240	240	500	NV
Petroleum Hydrocarbons F4	120	120	500	NV
Phenanthrene	0.19	0.69	0.1	0.56
Phenol	0.5	0.5	5	NV
Polychlorinated Biphenyls	0.3	0.3	0.2	0.07
Pyrene	0.19	1	0.2	0.49
Selenium	1.2	1.5	5	NV
Silver	0.5	0.5	0.3	0.5
Styrene	0.05	0.05	0.5	NV
Tetrachloroethane, 1,1,1,2-	0.05	0.05	1.1	NV
Tetrachloroethane, 1,1,2,2-	0.05	0.05	0.5	NV
Tetrachloroethylene	0.05	0.05	0.5	NV
Thallium	1	1	0.5	NV
Toluene	0.2	0.2	0.8	NV
Trichlorobenzene, 1,2,4-	0.05	0.05	0.5	NV
Trichloroethane, 1,1,1-	0.05	0.05	0.5	NV
Trichloroethane, 1,1,2-	0.05	0.05	0.5	NV
Trichloroethylene	0.05	0.05	0.5	NV
Trichlorofluoromethane	0.05	0.25	150	NV
Trichlorophenol, 2,4,5-	0.1	0.1	0.2	NV
Trichlorophenol, 2,4,6-	0.1	0.1	0.2	NV
Uranium	1.9	2.5	8.9	NV
Vanadium	86	86	3.9	NV
Vinyl Chloride	0.02	0.02	0.5	NV

Table 1	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment (µg/g)
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Uses	All Types of Property Uses
Xylene Mixture	0.05	0.05	72	NV
Zinc	290	290	160	120
Electrical Conductivity (mS/cm)	0.47	0.57	NA	NA
Chloride	NA	NA	790000	NV
Sodium Adsorption Ratio	1	2.4	NA	NA
Sodium	NA	NA	490000	NV

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(29) 7.9	(29) 7.9	(29) 21	4.1
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	1
Acetone	(28) 16	(28) 16	(28) 16	2700
Aldrin	0.05	0.05	(0.11) 0.088	0.35
Anthracene	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	7.5	(50) 40	6
Arsenic	11	18	18	25
Barium	390	390	670	1000
Benzene	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	5
Benz[a]anthracene	(0.63) 0.5	(0.63) 0.5	0.96	1
Benzo[a]pyrene	0.078	0.3	0.3	0.01
Benzo[b]fluoranthene	0.78	0.78	0.96	0.1
Benzo[ghi]perylene	(7.8) 6.6	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.78	0.96	0.1
Beryllium	(5) 4	(5) 4	(10) 8	4
Biphenyl 1,1'-	(1.1) 0.31	(1.1) 0.31	(210) 52	0.5
Bis(2-chloroethyl)ether	0.5	0.5	0.5	5
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(1.8) 0.67	(13) 11	120
Bis(2-ethylhexyl)phthalate	5	5	(35) 28	10
Boron (Hot Water Soluble)*	1.5	1.5	2	NA
Boron (total)	120	120	120	5000
Bromodichloromethane	(1.9) 1.5	(1.9) 1.5	(1.9) 1.5	16
Bromoform	(0.26) 0.27	(0.26) 0.27	(1.7) 0.61	25
Bromomethane	0.05	0.05	0.05	0.89
Cadmium	1	1.2	1.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(0.12) 0.05	(0.71) 0.21	(5) 0.79
Chlordane	0.05	0.05	0.05	7
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	10
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	30
Chloroform	(0.18) 0.05	(0.18) 0.05	(0.18) 0.47	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(2) 1.6	(3.9) 3.1	8.9
Chromium Total	160	160	160	50
Chromium VI	(10) 8	(10) 8	(10) 8	25
Chrysene	(7.8) 7	(7.8) 7	9.6	0.1
Cobalt	22	22	(100) 80	3.8
Copper	(180) 140	(180) 140	(300) 230	87
Cyanide (CN-)	0.051	0.051	0.051	66
Dibenz[a h]anthracene	0.1	0.1	0.1	0.2
Dibromochloromethane	(2.9) 2.3	(2.9) 2.3	(2.9) 2.3	25
Dichlorobenzene, 1,2-	(1.7) 1.2	(1.7) 1.2	(1.7) 1.2	3
Dichlorobenzene, 1,3-	(6) 4.8	(6) 4.8	(12) 9.6	59
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.097) 0.083	(0.57) 0.2	1
Dichlorobenzidine, 3,3'-	1	1	1	0.5
Dichlorodifluoromethane	(25) 16	(25) 16	(25) 16	590
DDD	3.3	3.3	4.6	10
DDE	(0.33) 0.26	(0.33) 0.26	(0.65) 0.52	10
DDT	0.078	1.4	1.4	2.8
Dichloroethane, 1,1-	(0.6) 0.47	(0.6) 0.47	(0.6) 0.47	5
Dichloroethane, 1,2-	0.05	0.05	0.05	(5) 1.6
Dichloroethylene, 1,1-	0.05	0.05	(0.48) 0.064	(14) 1.6
Dichloroethylene, 1,2-cis-	(2.5) 1.9	(2.5) 1.9	(2.5) 1.9	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(0.75) 0.084	(2.5) 1.3	(17) 1.6
Dichlorophenol, 2,4-	(0.27) 0.19	(0.27) 0.19	(0.27) 0.19	20
Dichloropropane, 1,2-	(0.085) 0.05	(0.085) 0.05	(0.68) 0.16	5
Dichloropropene,1,3-	(0.081) 0.05	(0.081) 0.05	(0.081) 0.059	0.5
Dieldrin	0.05	0.05	(0.11) 0.088	0.35

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	0.5	38
Dimethylphthalate	0.5	0.5	0.5	38
Dimethylphenol, 2,4-	(53) 38	(53) 38	(53) 38	59
Dinitrophenol, 2,4-	(2.9) 2	(2.9) 2	(2.9) 2	10
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	0.5	5
Dioxane, 1,4	0.2	1.8	1.8	50
Dioxin/Furan (TEQ)	0.000013	0.000013	0.000099	0.000015
Endosulfan	0.04	0.04	(0.38) 0.3	1.5
Endrin	0.04	0.04	0.04	0.48
Ethylbenzene	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
Ethylene dibromide	0.05	0.05	0.05	0.2
Fluoranthene	0.69	0.69	9.6	0.41
Fluorene	(69) 62	(69) 62	(69) 62	120
Heptachlor	0.15	0.15	0.19	1.5
Heptachlor Epoxide	0.05	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.52	0.66	1
Hexachlorobutadiene	(0.014) 0.012	(0.014) 0.012	(0.095) 0.031	(0.6) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.071) 0.089	(0.43) 0.21	2.1
Hexane (n)	(34) 2.8	(34) 2.8	(88) 46	(520) 51
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	(0.48) 0.38	(0.95) 0.76	0.2
Lead	45	120	120	10
Mercury	(1.8) 0.25	(1.8) 0.27	(20) 3.9	(1) 0.29
Methoxychlor	0.13	0.13	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(44) 16	(88) 70	1800
Methyl Isobutyl Ketone	(4.3) 1.7	(4.3) 1.7	(210) 31	640
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	15
Methylene Chloride	(0.96) 0.1	(0.96) 0.1	(2) 1.6	50
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(3.4) 0.99	(42) 30	3.2
Molybdenum	6.9	6.9	40	70
Naphthalene	(0.75) 0.6	(0.75) 0.6	(28) 9.6	11
Nickel	(130) 100	(130) 100	(340) 270	100
Pentachlorophenol	0.1	0.1	(3.3) 2.9	30
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(7.8) 6.2	(16) 12	1
Phenol	9.4	9.4	9.4	890
Polychlorinated Biphenyls	0.35	0.35	1.1	3
Pyrene	78	78	96	4.1
Selenium	2.4	2.4	5.5	10
Silver	(25) 20	(25) 20	(50) 40	1.5
Styrene	(2.2) 0.7	(2.2) 0.7	(43) 34	5.4
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.05) 0.058	(0.11) 0.087	1.1
Tetrachloroethane, 1,1,2,2-	0.05	0.05	(0.094) 0.05	1
Tetrachloroethylene	(2.3) 0.28	(2.3) 0.28	(2.5) 1.9	(17) 1.6
Thallium	1	1	3.3	2
Toluene	(6) 2.3	(6) 2.3	(9) 6.4	24
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(1.4) 0.36	(16) 3.2	70
Trichloroethane, 1,1,1-	(3.4) 0.38	(3.4) 0.38	(12) 6.1	200
Trichloroethane, 1,1,2-	0.05	0.05	(0.11) 0.05	(5) 4.7
Trichloroethylene	(0.52) 0.061	(0.52) 0.061	(0.61) 0.55	(5) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	(5.8) 4	150
Trichlorophenol, 2,4,5-	(5.5) 4.4	(5.5) 4.4	(10) 9.1	8.9
Trichlorophenol, 2,4,6-	(2.9) 2.1	(2.9) 2.1	(2.9) 2.1	2
Uranium	23	23	33	20
Vanadium	86	86	86	6.2
Vinyl Chloride	(0.022) 0.02	(0.022) 0.02	(0.25) 0.032	(1.7) 0.5

Table 2	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Xylene Mixture	(25) 3.1	(25) 3.1	(30) 26	300
Zinc	340	340	340	1100
Electrical Conductivity (mS/cm)	0.7	0.7	1.4	NA
Chloride	NA	NA	NA	790000
Sodium Adsorption Ratio	5	5	12	NA
Sodium	NA	NA	NA	490000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition

Table 3	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(58) 7.9	96	(1700) 600
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	1.8
Acetone	(28) 16	(28) 16	130000
Aldrin	0.05	(0.11) 0.088	8.5
Anthracene	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	(50) 40	20000
Arsenic	18	18	1900
Barium	390	670	29000
Benzene	(0.17) 0.21	(0.4) 0.32	(430) 44
Benz[a]anthracene	(0.63) 0.5	0.96	4.7
Benzo[a]pyrene	0.3	0.3	0.81
Benzo[b]fluoranthene	0.78	0.96	0.75
Benzo[ghi]perylene	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.96	0.4
Beryllium	(5) 4	(10) 8	67
Biphenyl 1,1'-	(1.1) 0.31	(210) 52	(2200) 1000
Bis(2-chloroethyl)ether	0.5	0.5	300000
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(14) 11	20000
Bis(2-ethylhexyl)phthalate	5	(35) 28	140
Boron (Hot Water Soluble)*	1.5	2	NA
Boron (total)	120	120	45000
Bromodichloromethane	13	18	85000
Bromoform	(0.26) 0.27	(1.7) 0.61	(770) 380
Bromomethane	0.05	0.05	(56) 5.6
Cadmium	1.2	1.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(1.5) 0.21	(8.4) 0.79
Chlordane	0.05	0.05	28
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	400
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	630
Chloroform	(0.18) 0.05	(0.18) 0.47	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(3.9) 3.1	3300
Chromium Total	160	160	810
Chromium VI	(10) 8	(10) 8	140
Chrysene	(7.8) 7	9.6	1
Cobalt	22	(100) 80	66
Copper	(180) 140	(300) 230	87
Cyanide (CN-)	0.051	0.051	66
Dibenz[a h]anthracene	0.1	0.1	0.52
Dibromochloromethane	9.4	13	82000
Dichlorobenzene, 1,2-	(4.3) 3.4	(8.5) 6.8	(9600) 4600
Dichlorobenzene, 1,3-	(6) 4.8	(12) 9.6	9600
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.84) 0.2	(67) 8
Dichlorobenzidine, 3,3'-	1	1	640
Dichlorodifluoromethane	(25) 16	(25) 16	4400
DDD	3.3	4.6	45
DDE	(0.33) 0.26	(0.65) 0.52	20
DDT	1.4	1.4	2.8
Dichloroethane, 1,1-	(11) 3.5	(21) 17	(3100) 320
Dichloroethane, 1,2-	0.05	0.05	(12) 1.6
Dichloroethylene, 1,1-	0.05	(0.48) 0.064	(17) 1.6
Dichloroethylene, 1,2-cis-	(30) 3.4	(37) 55	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(9.3) 1.3	(17) 1.6
Dichlorophenol, 2,4-	(2.1) 1.7	(4.2) 3.4	4600
Dichloropropane, 1,2-	(0.085) 0.05	(0.68) 0.16	(140) 16
Dichloropropene,1,3-	(0.083) 0.05	(0.21) 0.18	(45) 5.2
Dieldrin	0.05	(0.11) 0.088	0.75

Table 3	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	38
Dimethylphthalate	0.5	0.5	38
Dimethylphenol, 2,4-	(420) 390	(440) 390	39000
Dinitrophenol, 2,4-	38	(66) 59	11000
Dinitrotoluene, 2,4 & 2,6-	0.92	1.2	2900
Dioxane, 1,4	1.8	1.8	(7300000)1900000
Dioxin/Furan (TEQ)	0.000013	0.000099	(0.023) 0.014
Endosulfan	0.04	(0.38) 0.3	1.5
Endrin	0.04	0.04	0.48
Ethylbenzene	(15) 2	(19) 9.5	2300
Ethylene dibromide	0.05	0.05	(0.83) 0.25
Fluoranthene	0.69	9.6	130
Fluorene	(69) 62	(69) 62	400
Heptachlor	0.15	0.19	2.5
Heptachlor Epoxide	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.66	3.1
Hexachlorobutadiene	(0.014) 0.012	(0.095) 0.031	(4.5) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.43) 0.21	(200) 94
Hexane (n)	(34) 2.8	(88) 46	(520) 51
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	(0.95) 0.76	0.2
Lead	120	120	25
Mercury	(1.8) 0.27	(20) 3.9	(2.8) 0.29
Methoxychlor	0.13	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(88) 70	(1500000) 470000
Methyl Isobutyl Ketone	(4.3) 1.7	(210) 31	(580000) 140000
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(3.2) 11	(1400) 190
Methylene Chloride	(0.96) 0.1	(2) 1.6	(5500) 610
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(85) 76	1800
Molybdenum	6.9	40	9200
Naphthalene	(0.75) 0.6	(28) 9.6	(6400) 1400
Nickel	(130) 100	(340) 270	490
Pentachlorophenol	0.1	(3.3) 2.9	62
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(16) 12	580
Phenol	9.4	9.4	12000
Polychlorinated Biphenyls	0.35	1.1	(15) 7.8
Pyrene	78	96	68
Selenium	2.4	5.5	63
Silver	(25) 20	(50) 40	1.5
Styrene	(2.2) 0.7	(43) 34	(9100) 1300
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.11) 0.087	(28) 3.3
Tetrachloroethane, 1,1,2,2-	0.05	(0.094) 0.05	(15) 3.2
Tetrachloroethylene	(2.3) 0.28	(21) 4.5	(17) 1.6
Thallium	1	3.3	510
Toluene	(6) 2.3	(78) 68	18000
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(16) 3.2	(850) 180
Trichloroethane, 1,1,1-	(3.4) 0.38	(12) 6.1	(6700) 640
Trichloroethane, 1,1,2-	0.05	(0.11) 0.05	(30) 4.7
Trichloroethylene	(0.52) 0.061	(0.61) 0.91	(17) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	2500
Trichlorophenol, 2,4,5-	(5.5) 4.4	10	1600
Trichlorophenol, 2,4,6-	(4.2) 3.8	(4.2) 3.8	230
Uranium	23	33	420
Vanadium	86	86	250
Vinyl Chloride	(0.022) 0.02	(0.25) 0.032	(1.7) 0.5

Table 3	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Xylene Mixture	(25) 3.1	(30) 26	4200
Zinc	340	340	1100
Electrical Conductivity (mS/cm)	0.7	1.4	#N/A
Chloride	NA	NA	2300000
Sodium Adsorption Ratio	5	12	NA
Sodium	NA	NA	2300000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 4: Stratified Site Condition Standards in a Potable Ground Water Condition

Table 4	Soil Standards (other than sediment) µg/g				Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Acenaphthene	(29) 7.9	(29) 7.9	(29) 21	(29) 21	4.1
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	1
Acetone	(28) 16	(28) 16	(28) 16	(28) 16	2700
Aldrin	0.05	4.7	(0.11) 0.088	6.3	0.35
Anthracene	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	63	(50) 40	63	6
Arsenic	18	18	18	47	25
Barium	390	(8600) 7700	670	(8600) 7700	1000
Benzene	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	(1.3) 0.92	5
Benz[a]anthracene	(0.63) 0.5	0.96	0.96	36	1
Benzo[a]pyrene	0.3	0.3	0.3	3.6	0.01
Benzo[b]fluoranthene	0.78	0.96	0.96	36	0.1
Benzo[ghi]perylene	(7.8) 6.6	9.6	9.6	360	0.2
Benzo[k]fluoranthene	0.78	0.96	0.96	36	0.1
Beryllium	(5) 4	60	(10) 8	60	4
Biphenyl 1,1'-	(1.1) 0.31	(83) 11	(210) 52	(210) 52	0.5
Bis(2-chloroethyl)ether	0.5	0.5	0.5	0.5	5
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(13) 11	(13) 11	(13) 11	120
Bis(2-ethylhexyl)phthalate	5	(1200) 830	(35) 28	(1200) 830	10
Boron (Hot Water Soluble)*	1.5	NA	2	NA	NA
Boron (total)	NA	(7900) 5000	NA	(7900) 5000	5000
Bromodichloromethane	(1.9) 1.5	(1.9) 1.5	(1.9) 1.5	(1.9) 1.5	16
Bromoform	(0.26) 0.27	(0.26) 0.27	(1.7) 0.61	(2.7) 2	25
Bromomethane	0.05	0.05	0.05	0.05	0.89
Cadmium	1.2	7.9	1.9	7.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(0.12) 0.05	(0.71) 0.21	(0.71) 0.43	(5) 0.79
Chlordane	0.05	0.8	0.05	30	7
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	10
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	30
Chloroform	(0.18) 0.05	(0.18) 0.05	(0.18) 0.47	(0.19) 0.85	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(5.1) 3.7	(3.9) 3.1	(5.1) 3.7	8.9
Chromium Total	160	(18000) 11000	160	(18000) 11000	50
Chromium VI	(10) 8	40	(10) 8	40	25
Chrysene	(7.8) 7	9.6	9.6	(28) 20	0.1
Cobalt	22	250	(100) 80	2500	3.8
Copper	(180) 140	5600	(300) 230	5600	87
Cyanide (CN-)	0.051	0.051	0.051	0.051	66
Dibenz[a h]anthracene	0.1	0.1	0.1	3.6	0.2
Dibromochloromethane	(2.9) 2.3	(2.9) 2.3	(2.9) 2.3	(2.9) 2.3	25
Dichlorobenzene, 1,2-	(1.7) 1.2	(1.7) 1.2	(1.7) 1.2	(1.7) 1.2	3
Dichlorobenzene, 1,3-	(6) 4.8	(34) 24	(12) 9.6	(34) 24	59
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.097) 0.083	(0.57) 0.2	(0.57) 0.39	1
Dichlorobenzidine, 3,3'-	1	1	1	1	0.5
Dichlorodifluoromethane	(25) 16	(25) 16	(25) 16	(25) 16	590
DDD	3.3	4.6	4.6	110	10
DDE	(0.33) 0.26	3.2	(0.65) 0.52	110	10
DDT	1.4	3.2	1.4	110	2.8
Dichloroethane, 1,1-	(0.6) 0.47	(0.6) 0.47	(0.6) 0.47	(0.6) 0.47	5
Dichloroethane, 1,2-	0.05	0.05	0.05	(0.05) 0.055	(5) 1.6
Dichloroethylene, 1,1-	0.05	0.05	(0.48) 0.064	(0.53) 0.12	(14) 1.6
Dichloroethylene, 1,2-cis-	(2.5) 1.9	(2.5) 1.9	(2.5) 1.9	(2.5) 1.9	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(0.75) 0.084	(2.5) 1.3	(2.5) 1.9	(17) 1.6
Dichlorophenol, 2,4-	(0.27) 0.19	(0.27) 0.19	(0.27) 0.19	(0.27) 0.19	20
Dichloropropane, 1,2-	(0.085) 0.05	(0.085) 0.05	(0.68) 0.16	(0.74) 0.33	5
Dichloropropene,1,3-	(0.081) 0.05	(0.081) 0.05	(0.081) 0.059	(0.081) 0.059	0.5
Dieldrin	0.05	(0.12) 0.11	(0.11) 0.088	(0.12) 0.11	0.35

Table 4	Soil Standards (other than sediment) µg/g				Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Diethyl Phthalate	0.5	0.5	0.5	0.5	38
Dimethylphthalate	0.5	0.5	0.5	0.5	38
Dimethylphenol, 2,4-	(53) 38	(53) 38	(53) 38	(53) 38	59
Dinitrophenol, 2,4-	(2.9) 2	(2.9) 2	(2.9) 2	(2.9) 2	10
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	0.5	0.5	5
Dioxane, 1,4	1.8	(7.7) 7.5	1.8	(7.7) 7.5	50
Dioxin/Furan (TEQ)	0.000013	0.000051	0.000099	(0.0026) 0.0018	0.000015
Endosulfan	0.04	(0.51) 0.46	(0.38) 0.3	(0.51) 0.46	1.5
Endrin	0.04	(0.079) 0.071	0.04	(0.079) 0.071	0.48
Ethylbenzene	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
Ethylene dibromide	0.05	0.05	0.05	0.05	0.2
Fluoranthene	0.69	9.6	9.6	(34) 24	0.41
Fluorene	(69) 62	(69) 62	(69) 62	(69) 62	120
Heptachlor	0.15	0.19	0.19	(2) 1.8	1.5
Heptachlor Epoxide	0.05	0.05	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.66	0.66	(4) 2.9	1
Hexachlorobutadiene	(0.014) 0.012	(0.014) 0.012	(0.095) 0.031	(0.11) 0.06	(0.6) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.071) 0.089	(0.43) 0.21	(0.69) 0.49	2.1
Hexane (n)	(34) 2.8	(34) 2.8	(88) 46	(88) 54	(520) 51
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	0.96	(0.95) 0.76	36	0.2
Lead	120	1000	120	1000	10
Mercury	(1.8) 0.27	(1.8) 0.27	(20) 3.9	(30) 13	(1) 0.29
Methoxychlor	0.13	1.6	1.6	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(180) 16	(88) 70	(310) 150	1800
Methyl Isobutyl Ketone	(4.3) 1.7	(66) 6.6	(210) 31	(210) 64	640
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	(2.3) 1.6	15
Methylene Chloride	(0.96) 0.1	(0.96) 0.1	(2) 1.6	(5.7) 3	50
Methlynaphthalene, 2-(1-) ***	(3.4) 0.99	(42) 30	(42) 30	(42) 30	3.2
Molybdenum	6.9	1200	40	1200	70
Naphthalene	(0.75) 0.6	(4.6) 0.65	(28) 9.6	(130) 93	11
Nickel	(130) 100	510	(340) 270	510	100
Pentachlorophenol	0.1	(3.3) 2.9	(3.3) 2.9	(3.3) 2.9	30
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(150) 98	(250) 230	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(7200) 5800	(2500) 1700	(7200) 5800	500
Petroleum Hydrocarbons F4	(5600) 2800	(8000) 6900	(6600) 3300	(8000) 6900	500
Phenanthrene	(7.8) 6.2	(24) 17	(16) 12	(24) 17	1
Phenol	9.4	(53) 46	9.4	(53) 46	890
Polychlorinated Biphenyls	0.35	2.7	1.1	4.1	3
Pyrene	78	96	96	(330) 240	4.1
Selenium	2.4	1200	5.5	1200	10
Silver	(25) 20	490	(50) 40	490	1.5
Styrene	(2.2) 0.7	(19) 16	(43) 34	(66) 47	5.4
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.05) 0.058	(0.11) 0.087	(0.14) 0.15	1.1
Tetrachloroethane, 1,1,2,2-	0.05	0.05	(0.094) 0.05	(0.11) 0.05	1
Tetrachloroethylene	(2.3) 0.28	(2.3) 0.28	(2.5) 1.9	(2.5) 1.9	(17) 1.6
Thallium	1	3.3	3.3	33	2
Toluene	(6) 2.3	(9) 6.2	(9) 6.4	(9) 6.4	24
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(1.4) 0.36	(16) 3.2	(22) 10	70
Trichloroethane, 1,1,1-	(3.4) 0.38	(3.4) 0.38	(12) 6.1	(12) 9.8	200
Trichloroethane, 1,1,2-	0.05	0.05	(0.11) 0.05	(0.13) 0.068	(5) 4.7
Trichloroethylene	(0.52) 0.061	(0.52) 0.061	(0.61) 0.55	(0.69) 0.55	(5) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	(5.8) 4	(5.8) 4	150
Trichlorophenol, 2,4,5-	(5.5) 4.4	(13) 9.1	(10) 9.1	(13) 9.1	8.9
Trichlorophenol, 2,4,6-	(2.9) 2.1	(2.9) 2.1	(2.9) 2.1	(2.9) 2.1	2
Uranium	23	300	33	300	20
Vanadium	86	160	86	160	6.2
Vinyl Chloride	(0.022) 0.02	(0.022) 0.02	(0.25) 0.032	(0.25) 0.057	(1.7) 0.5

Table 4	Soil Standards (other than sediment) µg/g				Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Xylene Mixture	(25) 3.1	(25) 3.1	(30) 26	(30) 26	300
Zinc	340	(24000) 15000	340	(24000) 15000	1100
Electrical Conductivity (mS/cm)	0.7	NA	1.4	NA	N/A
Chloride	NA	NV	NA	NV	790000
Sodium Adsorption Ratio	5	NA	12	NA	N/A
Sodium	NA	NV	NA	NV	490000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 5: Stratified Site Condition Standards in a Non-Potable Ground Water Condition

Table 5	Soil Standards (other than sediment) µg/g				Non-Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Acenaphthene	(58) 7.9	(58) 7.9	96	(620) 330	(1700) 600
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	1.8
Acetone	(28) 16	(28) 16	(28) 16	(28) 16	130000
Aldrin	0.05	4.7	(0.11) 0.088	6.3	8.5
Anthracene	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	2.4
Antimony	7.5	63	(50) 40	63	20000
Arsenic	18	18	18	47	1900
Barium	390	(8600) 7700	670	(8600) 7700	29000
Benzene	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	(4.4) 6.1	(430) 44
Benz[a]anthracene	(0.63) 0.5	0.96	0.96	36	4.7
Benzo[a]pyrene	0.3	0.3	0.3	3.6	0.81
Benzo[b]fluoranthene	0.78	0.96	0.96	36	0.75
Benzo[ghi]perylene	(7.8) 6.6	9.6	9.6	360	0.2
Benzo[k]fluoranthene	0.78	0.96	0.96	36	0.4
Beryllium	(5) 4	60	(10) 8	60	67
Biphenyl 1,1'-	(1.1) 0.31	(83) 11	(210) 52	(210) 52	(2200) 1000
Bis(2-chloroethyl)ether	0.5	0.5	0.5	16	300000
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(14) 11	(14) 11	(14) 11	20000
Bis(2-ethylhexyl)phthalate	5	(8300) 7100	(35) 28	(8300) 7100	140
Boron (Hot Water Soluble)*	1.5	NA	2	NA	NA
Boron (total)	NA	(7900) 5000	NA	(7900) 5000	45000
Bromodichloromethane	13	18	18	(63) 50	85000
Bromoform	(0.26) 0.27	(0.26) 0.27	(1.7) 0.61	(2.7) 2	(770) 380
Bromomethane	0.05	0.05	0.05	0.05	(56) 5.6
Cadmium	1.2	7.9	1.9	7.9	2.7
Carbon Tetrachloride	(0.12) 0.05	(0.12) 0.05	(1.5) 0.21	(1.7) 0.43	(8.4) 0.79
Chlordane	0.05	0.8	0.05	30	28
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	400
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	630
Chloroform	(0.18) 0.05	(0.18) 0.05	(0.18) 0.47	(0.19) 0.85	(22) 2.4
Chlorophenol, 2-	(2) 1.6	(23) 21	(3.9) 3.1	(23) 21	3300
Chromium Total	160	(18000) 11000	160	(18000) 11000	810
Chromium VI	(10) 8	40	(10) 8	40	140
Chrysene	(7.8) 7	9.6	9.6	360	1
Cobalt	22	250	(100) 80	2500	66
Copper	(180) 140	5600	(300) 230	5600	87
Cyanide (CN-)	0.051	0.051	0.051	0.051	66
Dibenz[a h]anthracene	0.1	0.1	0.1	3.6	0.52
Dibromochloromethane	9.4	13	13	(61) 48	82000
Dichlorobenzene, 1,2-	(4.3) 3.4	(52) 35	(8.5) 6.8	(68) 60	(9600) 4600
Dichlorobenzene, 1,3-	(6) 4.8	(67) 59	(12) 9.6	(67) 59	9600
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.097) 0.083	(0.84) 0.2	(0.97) 0.39	(67) 8
Dichlorobenzidine, 3,3'-	1	1	1	25	640
Dichlorodifluoromethane	(25) 16	(25) 16	(25) 16	(25) 16	4400
DDD	3.3	4.6	4.6	110	45
DDE	(0.33) 0.26	3.2	(0.65) 0.52	110	20
DDT	1.4	3.2	1.4	110	2.8
Dichloroethane, 1,1-	(11) 3.5	(31) 3.5	(21) 17	(45) 120	(3100) 320
Dichloroethane, 1,2-	0.05	0.05	0.05	(0.05) 0.055	(12) 1.6
Dichloroethylene, 1,1-	0.05	0.05	(0.48) 0.064	(0.53) 0.12	(17) 1.6
Dichloroethylene, 1,2-cis-	(30) 3.4	(30) 3.4	(37) 55	(43) 110	(17) 1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(0.75) 0.084	(9.3) 1.3	(11) 2.9	(17) 1.6
Dichlorophenol, 2,4-	(2.1) 1.7	(52) 46	(4.2) 3.4	(52) 46	4600
Dichloropropane, 1,2-	(0.085) 0.05	(0.085) 0.05	(0.68) 0.16	(0.75) 0.33	(140) 16
Dichloropropene,1,3-	(0.083) 0.05	(0.083) 0.05	(0.21) 0.18	(0.24) 0.34	(45) 5.2
Dieldrin	0.05	(0.12) 0.11	(0.11) 0.088	(0.12) 0.11	0.75

Table 5	Soil Standards (other than sediment) µg/g				Non-Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Diethyl Phthalate	0.5	0.5	0.5	0.5	38
Dimethylphthalate	0.5	0.5	0.5	0.5	38
Dimethylphenol, 2,4-	(420) 390	(440) 390	(440) 390	(440) 390	39000
Dinitrophenol, 2,4-	38	(66) 59	(66) 59	(66) 59	11000
Dinitrotoluene, 2,4 & 2,6-	0.92	1.2	1.2	(17) 15	2900
Dioxane, 1,4	1.8	100	1.8	(1500) 810	7300000) 1900000
Dioxin/Furan (TEQ)	0.000013	0.00051	0.000099	0.0044	(0.023) 0.014
Endosulfan	0.04	(0.51) 0.46	(0.38) 0.3	(0.51) 0.46	1.5
Endrin	0.04	(0.079) 0.071	0.04	(0.079) 0.071	0.48
Ethylbenzene	(15) 2	(16) 2	(19) 9.5	(19) 17	2300
Ethylene dibromide	0.05	0.05	0.05	0.05	(0.83) 0.25
Fluoranthene	0.69	9.6	9.6	360	130
Fluorene	(69) 62	(69) 62	(69) 62	(69) 62	400
Heptachlor	0.15	0.19	0.19	(2) 1.8	2.5
Heptachlor Epoxide	0.05	0.05	0.05	0.05	0.048
Hexachlorobenzene	0.52	0.66	0.66	(15) 14	3.1
Hexachlorobutadiene	(0.014) 0.012	(0.014) 0.012	(0.095) 0.031	(0.11) 0.06	(4.5) 0.44
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	1.2
Hexachloroethane	(0.071) 0.089	(0.071) 0.089	(0.43) 0.21	1.7	(200) 94
Hexane (n)	(34) 2.8	(34) 2.8	(88) 46	(88) 54	(520) 51
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	0.96	(0.95) 0.76	36	0.2
Lead	120	1000	120	1000	25
Mercury	(1.8) 0.27	(1.8) 0.27	(20) 3.9	(30) 13	(2.8) 0.29
Methoxychlor	0.13	1.6	1.6	1.6	6.5
Methyl Ethyl Ketone	(44) 16	(180) 16	(88) 70	(380) 150	(1500000) 470000
Methyl Isobutyl Ketone	(4.3) 1.7	(66) 6.6	(210) 31	(210) 64	(580000) 140000
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	0.15
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(1.4) 0.75	(3.2) 11	(3.4) 14	(1400) 190
Methylene Chloride	(0.96) 0.1	(0.96) 0.1	(2) 1.6	(9.8) 3	(5500) 610
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(85) 34	(85) 76	(85) 76	1800
Molybdenum	6.9	1200	40	1200	9200
Naphthalene	(0.75) 0.6	(4.6) 0.65	(28) 9.6	(220) 200	(6400) 1400
Nickel	(130) 100	510	(340) 270	510	490
Pentachlorophenol	0.1	(3.3) 2.9	(3.3) 2.9	(3.3) 2.9	62
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	(65) 55	(65) 55	750
Petroleum Hydrocarbons F2	(150) 98	(150) 98	(250) 230	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(7200) 5800	(2500) 1700	(7200) 5800	500
Petroleum Hydrocarbons F4	(5600) 2800	(8000) 6900	(6600) 3300	(8000) 6900	500
Phenanthrene	(7.8) 6.2	(300) 270	(16) 12	(300) 270	580
Phenol	9.4	(53) 46	9.4	(53) 46	12000
Polychlorinated Biphenyls	0.35	2.7	1.1	4.1	(15) 7.8
Pyrene	78	96	96	(2900) 2600	68
Selenium	2.4	1200	5.5	1200	63
Silver	(25) 20	490	(50) 40	490	1.5
Styrene	(2.2) 0.7	(19) 16	(43) 34	(75) 66	(9100) 1300
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.05) 0.058	(0.11) 0.087	(0.14) 0.24	(28) 3.3
Tetrachloroethane, 1,1,2,2-	0.05	0.05	(0.094) 0.05	(0.11) 0.05	(15) 3.2
Tetrachloroethylene	(2.3) 0.28	(2.3) 0.28	(21) 4.5	(21) 9.5	(17) 1.6
Thallium	1	3.3	3.3	33	510
Toluene	(6) 2.3	(50) 6.2	(78) 68	(78) 68	18000
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(1.4) 0.36	(16) 3.2	(22) 10	(850) 180
Trichloroethane, 1,1,1-	(3.4) 0.38	(3.4) 0.38	(12) 6.1	(12) 9.8	(6700) 640
Trichloroethane, 1,1,2-	0.05	0.05	(0.11) 0.05	(0.13) 0.068	(30) 4.7
Trichloroethylene	(0.52) 0.061	(0.52) 0.061	(0.61) 0.91	(0.69) 1.8	(17) 1.6
Trichlorofluoromethane	(5.8) 4	(5.8) 4	(5.8) 4	(5.8) 4	2500
Trichlorophenol, 2,4,5-	(5.5) 4.4	(30) 27	10	(30) 27	1600
Trichlorophenol, 2,4,6-	(4.2) 3.8	(4.2) 3.8	(4.2) 3.8	(4.2) 3.8	230
Uranium	23	300	33	300	420
Vanadium	86	160	86	160	250
Vinyl Chloride	(0.022) 0.02	(0.022) 0.02	(0.25) 0.032	(0.28) 0.057	(1.7) 0.5

Table 5	Soil Standards (other than sediment) µg/g				Non-Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use		Industrial/ Commercial/Community Property Use		All Types of Property Use
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
Xylene Mixture	(25) 3.1	(25) 3.1	(30) 26	(30) 26	4200
Zinc	340	(24000) 15000	340	(24000) 15000	1100
Electrical Conductivity (mS/cm)	0.7	NA	1.4	NA	#N/A
Chloride	NA	NV	NA	NV	2300000
Sodium Adsorption Ratio	5	NA	12	NA	NA
Sodium	NA	NV	NA	NV	2300000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition

Table 6	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(29) 7.9	(29) 7.9	(29) 21	4.1
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	(0.17) 0.15	1
Acetone	(28) 16	(28) 16	(28) 16	2700
Aldrin	0.05	0.05	(0.11) 0.088	0.35
Anthracene	(0.74) 0.67	(0.74) 0.67	(0.74) 0.67	1
Antimony	7.5	7.5	(50) 40	6
Arsenic	11	18	18	25
Barium	390	390	670	1000
Benzene	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	0.5
Benz[a]anthracene	(0.63) 0.5	(0.63) 0.5	0.96	1
Benzo[a]pyrene	0.078	0.3	0.3	0.01
Benzo[b]fluoranthene	0.78	0.78	0.96	0.1
Benzo[ghi]perylene	(7.8) 6.6	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.78	0.96	0.1
Beryllium	(5) 4	(5) 4	(10) 8	4
Biphenyl 1,1'-	(1.1) 0.31	(1.1) 0.31	(210) 52	0.5
Bis(2-chloroethyl)ether	0.5	0.5	0.5	5
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(1.8) 0.67	(13) 11	120
Bis(2-ethylhexyl)phthalate	5	5	(35) 28	10
Boron (Hot Water Soluble)*	1.5	1.5	2	NA
Boron (total)	120	120	120	5000
Bromodichloromethane	(1.9) 1.5	(1.9) 1.5	(1.9) 1.5	16
Bromoform	(0.26) 0.27	(0.26) 0.27	(1.7) 0.61	5
Bromomethane	0.05	0.05	0.05	0.89
Cadmium	1	1.2	1.9	2.1
Carbon Tetrachloride	(0.12) 0.05	(0.12) 0.05	(0.71) 0.21	0.2
Chlordane	0.05	0.05	0.05	0.06
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	(0.53) 0.5	10
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	(2.7) 2.4	30
Chloroform	(0.18) 0.05	(0.18) 0.05	(0.18) 0.47	2
Chlorophenol, 2-	(2) 1.6	(2) 1.6	(3.9) 3.1	8.9
Chromium Total	160	160	160	50
Chromium VI	(10) 8	(10) 8	(10) 8	25
Chrysene	(7.8) 7	(7.8) 7	9.6	0.1
Cobalt	22	22	(100) 80	3.8
Copper	(180) 140	(180) 140	(300) 230	69
Cyanide (CN-)	0.051	0.051	0.051	52
Dibenz[a h]anthracene	0.1	0.1	0.1	0.2
Dibromochloromethane	(2.9) 2.3	(2.9) 2.3	(2.9) 2.3	25
Dichlorobenzene, 1,2-	(1.7) 1.2	(1.7) 1.2	(1.7) 1.2	3
Dichlorobenzene, 1,3-	(6) 4.8	(6) 4.8	(12) 9.6	59
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.097) 0.083	(0.57) 0.2	0.5
Dichlorobenzidine, 3,3'-	1	1	1	0.5
Dichlorodifluoromethane	(25) 16	(25) 16	(25) 16	590
DDD	3.3	3.3	4.6	1.8
DDE	(0.33) 0.26	(0.33) 0.26	(0.65) 0.52	10
DDT	0.078	1.4	1.4	0.05
Dichloroethane, 1,1-	(0.6) 0.47	(0.6) 0.47	(0.6) 0.47	5
Dichloroethane, 1,2-	0.05	0.05	0.05	0.5
Dichloroethylene, 1,1-	0.05	0.05	(0.48) 0.064	0.5
Dichloroethylene, 1,2-cis-	(2.5) 1.9	(2.5) 1.9	(2.5) 1.9	1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(0.75) 0.084	(2.5) 1.3	1.6
Dichlorophenol, 2,4-	(0.27) 0.19	(0.27) 0.19	(0.27) 0.19	20
Dichloropropane, 1,2-	(0.085) 0.05	(0.085) 0.05	(0.68) 0.16	0.58
Dichloropropene, 1,3-	(0.081) 0.05	(0.081) 0.05	(0.081) 0.059	0.5
Dieldrin	0.05	0.05	(0.11) 0.088	0.35

Table 6	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	0.5	30
Dimethylphthalate	0.5	0.5	0.5	30
Dimethylphenol, 2,4-	(53) 38	(53) 38	(53) 38	59
Dinitrophenol, 2,4-	(2.9) 2	(2.9) 2	(2.9) 2	10
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	0.5	5
Dioxane, 1,4	0.2	1.8	1.8	50
Dioxin/Furan (TEQ)	0.000013	0.000013	0.000099	0.000015
Endosulfan	0.04	0.04	(0.38) 0.3	0.56
Endrin	0.04	0.04	0.04	0.36
Ethylbenzene	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
Ethylene dibromide	0.05	0.05	0.05	0.2
Fluoranthene	0.69	0.69	9.6	0.41
Fluorene	(69) 62	(69) 62	(69) 62	120
Heptachlor	0.15	0.15	0.19	0.038
Heptachlor Epoxide	0.05	0.05	0.05	0.038
Hexachlorobenzene	0.52	0.52	0.66	1
Hexachlorobutadiene	(0.014) 0.012	(0.014) 0.012	(0.095) 0.031	0.012
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	(0.063) 0.056	0.95
Hexachloroethane	(0.071) 0.089	(0.071) 0.089	(0.43) 0.21	0.17
Hexane (n)	(34) 2.8	(34) 2.8	(88) 46	5
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	(0.48) 0.38	(0.95) 0.76	0.2
Lead	45	120	120	10
Mercury	(1.8) 0.25	(1.8) 0.27	(20) 3.9	0.1
Methoxychlor	0.13	0.13	1.6	0.3
Methyl Ethyl Ketone	(44) 16	(44) 16	(88) 70	1800
Methyl Isobutyl Ketone	(4.3) 1.7	(4.3) 1.7	(210) 31	640
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	(0.0094) 0.0084	0.12
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	15
Methylene Chloride	(0.96) 0.1	(0.96) 0.1	(2) 1.6	26
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(3.4) 0.99	(42) 30	3.2
Molybdenum	6.9	6.9	40	70
Naphthalene	(0.75) 0.6	(0.75) 0.6	(28) 9.6	7
Nickel	(130) 100	(130) 100	(340) 270	100
Pentachlorophenol	0.1	0.1	(3.3) 2.9	30
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	(65) 55	420
Petroleum Hydrocarbons F2	(150) 98	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(7.8) 6.2	(16) 12	1
Phenol	9.4	9.4	9.4	890
Polychlorinated Biphenyls	0.35	0.35	1.1	0.2
Pyrene	78	78	96	4.1
Selenium	2.4	2.4	5.5	10
Silver	(25) 20	(25) 20	(50) 40	1.2
Styrene	(2.2) 0.7	(2.2) 0.7	(43) 34	5.4
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.05) 0.058	(0.11) 0.087	1.1
Tetrachloroethane, 1,1,2,2-	0.05	0.05	(0.094) 0.05	0.5
Tetrachloroethylene	(2.3) 0.28	(2.3) 0.28	(2.5) 1.9	0.5
Thallium	1	1	3.3	2
Toluene	(6) 2.3	(6) 2.3	(9) 6.4	24
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(1.4) 0.36	(16) 3.2	3
Trichloroethane, 1,1,1-	(3.4) 0.38	(3.4) 0.38	(12) 6.1	23
Trichloroethane, 1,1,2-	0.05	0.05	(0.11) 0.05	0.5
Trichloroethylene	(0.52) 0.061	(0.52) 0.061	(0.61) 0.55	0.5
Trichlorofluoromethane	(5.8) 4	(5.8) 4	(5.8) 4	150
Trichlorophenol, 2,4,5-	(5.5) 4.4	(5.5) 4.4	(10) 9.1	8.9
Trichlorophenol, 2,4,6-	(2.9) 2.1	(2.9) 2.1	(2.9) 2.1	2
Uranium	23	23	33	20
Vanadium	86	86	86	6.2
Vinyl Chloride	(0.022) 0.02	(0.022) 0.02	(0.25) 0.032	0.5

Table 6	Soil Standards (other than sediment) µg/g			Potable Ground Water µg/L
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Xylene Mixture	(25) 3.1	(25) 3.1	(30) 26	72
Zinc	340	340	340	890
Electrical Conductivity (mS/cm)	0.7	0.7	1.4	NA
Chloride	NA	NA	NA	790000
Sodium Adsorption Ratio	5	5	12	NA
Sodium	NA	NA	NA	490000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 7: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition

Table 7	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Acenaphthene	(58) 7.9	96	17
Acenaphthylene	(0.17) 0.15	(0.17) 0.15	1
Acetone	(28) 16	(28) 16	100000
Aldrin	0.05	(0.11) 0.088	3
Anthracene	(0.74) 0.67	(0.74) 0.67	1
Antimony	7.5	(50) 40	16000
Arsenic	18	18	1500
Barium	390	670	23000
Benzene	(0.17) 0.21	(0.4) 0.32	0.5
Benz[a]anthracene	(0.63) 0.5	0.96	1.8
Benzo[a]pyrene	0.3	0.3	0.81
Benzo[b]fluoranthene	0.78	0.96	0.75
Benzo[ghi]perylene	(7.8) 6.6	9.6	0.2
Benzo[k]fluoranthene	0.78	0.96	0.4
Beryllium	(5) 4	(10) 8	53
Biphenyl 1,1'-	(1.1) 0.31	(210) 52	(1700) 1000
Bis(2-chloroethyl)ether	0.5	0.5	240000
Bis(2-chloroisopropyl)ether	(1.8) 0.67	(14) 11	20000
Bis(2-ethylhexyl)phthalate	5	(35) 28	30
Boron (Hot Water Soluble)*	1.5	2	NA
Boron (total)	120	120	36000
Bromodichloromethane	13	18	67000
Bromoform	(0.26) 0.27	(1.7) 0.61	5
Bromomethane	0.05	0.05	0.89
Cadmium	1.2	1.9	2.1
Carbon Tetrachloride	(0.12) 0.05	(1.5) 0.21	0.2
Chlordane	0.05	0.05	0.06
Chloroaniline p-	(0.53) 0.5	(0.53) 0.5	320
Chlorobenzene	(2.7) 2.4	(2.7) 2.4	140
Chloroform	(0.18) 0.05	(0.18) 0.47	2
Chlorophenol, 2-	(2) 1.6	(3.9) 3.1	2600
Chromium Total	160	160	640
Chromium VI	(10) 8	(10) 8	110
Chrysene	(7.8) 7	9.6	0.7
Cobalt	22	(100) 80	52
Copper	(180) 140	(300) 230	69
Cyanide (CN-)	0.051	0.051	52
Dibenz[a h]anthracene	0.1	0.1	0.4
Dibromochloromethane	9.4	13	65000
Dichlorobenzene, 1,2-	(4.3) 3.4	(8.5) 6.8	150
Dichlorobenzene, 1,3-	(6) 4.8	(12) 9.6	7600
Dichlorobenzene, 1,4-	(0.097) 0.083	(0.84) 0.2	0.5
Dichlorobenzidine, 3,3'-	1	1	500
Dichlorodifluoromethane	(25) 16	(25) 16	3500
DDD	3.3	4.6	1.8
DDE	(0.33) 0.26	(0.65) 0.52	17
DDT	1.4	1.4	0.05
Dichloroethane, 1,1-	(11) 3.5	(21) 17	11
Dichloroethane, 1,2-	0.05	0.05	0.5
Dichloroethylene, 1,1-	0.05	(0.48) 0.064	0.5
Dichloroethylene, 1,2-cis-	(30) 3.4	(37) 55	1.6
Dichloroethylene, 1,2-trans-	(0.75) 0.084	(9.3) 1.3	1.6
Dichlorophenol, 2,4-	(2.1) 1.7	(4.2) 3.4	3700
Dichloropropane, 1,2-	(0.085) 0.05	(0.68) 0.16	0.58
Dichloropropene,1,3-	(0.083) 0.05	(0.21) 0.18	0.5
Dieldrin	0.05	(0.11) 0.088	0.56

Table 7	Soil Standards (other than sediment)		Non- Potable Ground Water µg/L
	µg/g		
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	30
Dimethylphthalate	0.5	0.5	30
Dimethylphenol, 2,4-	(420) 390	(440) 390	31000
Dinitrophenol, 2,4-	38	(66) 59	9000
Dinitrotoluene, 2,4 & 2,6-	0.92	1.2	2300
Dioxane, 1,4	1.8	1.8	190000
Dioxin/Furan (TEQ)	0.000013	0.000099	0.0001
Endosulfan	0.04	(0.38) 0.3	0.56
Endrin	0.04	0.04	0.36
Ethylbenzene	(15) 2	(19) 9.5	54
Ethylene dibromide	0.05	0.05	0.2
Fluoranthene	0.69	9.6	44
Fluorene	(69) 62	(69) 62	290
Heptachlor	0.15	0.19	0.038
Heptachlor Epoxide	0.05	0.05	0.038
Hexachlorobenzene	0.52	0.66	3.1
Hexachlorobutadiene	(0.014) 0.012	(0.095) 0.031	0.012
Hexachlorocyclohexane Gamma-	(0.063) 0.056	(0.063) 0.056	0.95
Hexachloroethane	(0.071) 0.089	(0.43) 0.21	0.17
Hexane (n)	(34) 2.8	(88) 46	5
Indeno[1 2 3-cd]pyrene	(0.48) 0.38	(0.95) 0.76	0.2
Lead	120	120	20
Mercury	(1.8) 0.27	(20) 3.9	0.1
Methoxychlor	0.13	1.6	0.3
Methyl Ethyl Ketone	(44) 16	(88) 70	21000
Methyl Isobutyl Ketone	(4.3) 1.7	(210) 31	5200
Methyl Mercury **	(0.0094) 0.0084	(0.0094) 0.0084	0.12
Methyl tert-Butyl Ether (MTBE)	(1.4) 0.75	(3.2) 11	15
Methylene Chloride	(0.96) 0.1	(2) 1.6	26
Methylnaphthalene, 2-(1-) ***	(3.4) 0.99	(85) 76	1500
Molybdenum	6.9	40	7300
Naphthalene	(0.75) 0.6	(28) 9.6	7
Nickel	(130) 100	(340) 270	390
Pentachlorophenol	0.1	(3.3) 2.9	50
Petroleum Hydrocarbons F1****	(65) 55	(65) 55	420
Petroleum Hydrocarbons F2	(150) 98	(250) 230	150
Petroleum Hydrocarbons F3	(1300) 300	(2500) 1700	500
Petroleum Hydrocarbons F4	(5600) 2800	(6600) 3300	500
Phenanthrene	(7.8) 6.2	(16) 12	380
Phenol	9.4	9.4	9600
Polychlorinated Biphenyls	0.35	1.1	0.2
Pyrene	78	96	5.7
Selenium	2.4	5.5	50
Silver	(25) 20	(50) 40	1.2
Styrene	(2.2) 0.7	(43) 34	43
Tetrachloroethane, 1,1,1,2-	(0.05) 0.058	(0.11) 0.087	1.1
Tetrachloroethane, 1,1,2,2-	0.05	(0.094) 0.05	0.5
Tetrachloroethylene	(2.3) 0.28	(21) 4.5	0.5
Thallium	1	3.3	400
Toluene	(6) 2.3	(78) 68	320
Trichlorobenzene, 1,2,4-	(1.4) 0.36	(16) 3.2	3
Trichloroethane, 1,1,1-	(3.4) 0.38	(12) 6.1	23
Trichloroethane, 1,1,2-	0.05	(0.11) 0.05	0.5
Trichloroethylene	(0.52) 0.061	(0.61) 0.91	0.5
Trichlorofluoromethane	(5.8) 4	(5.8) 4	2000
Trichlorophenol, 2,4,5-	(5.5) 4.4	10	1300
Trichlorophenol, 2,4,6-	(4.2) 3.8	(4.2) 3.8	180
Uranium	23	33	330
Vanadium	86	86	200
Vinyl Chloride	(0.022) 0.02	(0.25) 0.032	0.5

Table 7	Soil Standards (other than sediment) µg/g		Non- Potable Ground Water µg/L
Contaminant	Residential/ Parkland/Institutional Property Use	Industrial/ Commercial/Community Property Use	All Types of Property Use
Xylene Mixture	(25) 3.1	(30) 26	72
Zinc	340	340	890
Electrical Conductivity (mS/cm)	0.7	1.4	NA
Chloride	NA	NA	1800000
Sodium Adsorption Ratio	5	12	NA
Sodium	NA	NA	1800000

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 8 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Potable Ground Water Condition

Table 8	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment µg/g
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All types of Property Use	All Types of Property Use
Acenaphthene	0.05	0.072	4.1	NV
Acenaphthylene	0.093	0.093	1	NV
Acetone	0.5	0.5	2700	NV
Aldrin	0.05	0.05	0.35	0.002
Anthracene	0.22	0.22	1	0.22
Antimony	1	1.3	6	NV
Arsenic	11	18	25	6
Barium	210	220	1000	NV
Benzene	0.02	0.02	5	NV
Benz[a]anthracene	0.32	0.36	1	0.32
Benzo[a]pyrene	0.078	0.3	0.01	0.37
Benzo[b]fluoranthene	0.3	0.47	0.1	NV
Benzo[ghi]perylene	0.2	0.68	0.2	0.17
Benzo[k]fluoranthene	0.24	0.48	0.1	0.24
Beryllium	2.5	2.5	4	NV
Biphenyl 1,1'-	0.05	0.05	0.5	NV
Bis(2-chloroethyl)ether	0.5	0.5	5	NV
Bis(2-chloroisopropyl)ether	0.5	0.5	120	NV
Bis(2-ethylhexyl)phthalate	5	5	10	NV
Boron (Hot Water Soluble)*	1.5	1.5	NA	NA
Boron (total)	36	36	5000	NV
Bromodichloromethane	0.05	0.05	16	NV
Bromoform	0.05	0.05	25	NV
Bromomethane	0.05	0.05	0.89	NV
Cadmium	1	1.2	2.1	0.6
Carbon Tetrachloride	0.05	0.05	0.79	NV
Chlordane	0.05	0.05	0.06	0.007
Chloroaniline p-	0.5	0.5	10	NV
Chlorobenzene	0.05	0.05	30	NV
Chloroform	0.05	0.05	2.4	NV
Chlorophenol, 2-	0.1	0.1	8.9	NV
Chromium Total	67	70	50	26
Chromium VI	0.66	0.66	25	NV
Chrysene	0.34	2.8	0.1	0.34
Cobalt	22	22	3.8	50
Copper	62	92	69	16
Cyanide (CN-)	0.051	0.051	52	0.1
Dibenz[a h]anthracene	0.1	0.1	0.2	0.06
Dibromochloromethane	0.05	0.05	25	NV
Dichlorobenzene, 1,2-	0.05	0.05	3	NV
Dichlorobenzene, 1,3-	0.05	0.05	59	NV
Dichlorobenzene, 1,4-	0.05	0.05	1	NV
Dichlorobenzidine, 3,3'-	1	1	0.5	NV
Dichlorodifluoromethane	0.05	0.05	590	NV
DDD	0.05	0.05	1.8	0.008
DDE	0.05	0.05	10	0.005
DDT	0.078	1.4	0.05	0.007
Dichloroethane, 1,1-	0.05	0.05	5	NV
Dichloroethane, 1,2-	0.05	0.05	1.6	NV
Dichloroethylene, 1,1-	0.05	0.05	1.6	NV
Dichloroethylene, 1,2-cis-	0.05	0.05	1.6	NV
Dichloroethylene, 1,2-trans-	0.05	0.05	1.6	NV
Dichlorophenol, 2,4-	0.1	0.1	20	NV
Dichloropropane, 1,2-	0.05	0.05	5	NV
Dichloropropene,1,3-	0.05	0.05	0.5	NV
Dieldrin	0.05	0.05	0.35	0.002

Table 8	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment µg/g
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All types of Property Use	All Types of Property Use
Diethyl Phthalate	0.5	0.5	30	NV
Dimethylphthalate	0.5	0.5	30	NV
Dimethylphenol, 2,4-	0.2	0.2	59	NV
Dinitrophenol, 2,4-	2	2	10	NV
Dinitrotoluene, 2,4 & 2,6-	0.5	0.5	5	NV
Dioxane, 1,4	0.2	0.2	50	NV
Dioxin/Furan (TEQ)	0.000007	0.000007	0.000015	NV
Endosulfan	0.04	0.04	0.56	NV
Endrin	0.04	0.04	0.36	0.003
Ethylbenzene	0.05	0.05	2.4	NV
Ethylene dibromide	0.05	0.05	0.2	NV
Fluoranthene	0.69	0.69	0.41	0.75
Fluorene	0.19	0.19	120	0.19
Heptachlor	0.05	0.05	0.038	NV
Heptachlor Epoxide	0.05	0.05	0.038	0.005
Hexachlorobenzene	0.02	0.02	1	0.02
Hexachlorobutadiene	0.01	0.01	0.44	NV
Hexachlorocyclohexane Gamma-	0.01	0.01	0.95	NV
Hexachloroethane	0.01	0.01	2.1	NV
Hexane (n)	0.05	0.05	51	NV
Indeno[1 2 3-cd]pyrene	0.2	0.23	0.2	0.2
Lead	45	120	10	31
Mercury	0.2	0.27	0.29	0.2
Methoxychlor	0.05	0.05	0.3	NV
Methyl Ethyl Ketone	0.5	0.5	1800	NV
Methyl Isobutyl Ketone	0.5	0.5	640	NV
Methyl Mercury **	NV	NV	0.12	NV
Methyl tert-Butyl Ether (MTBE)	0.05	0.05	15	NV
Methylene Chloride	0.05	0.05	50	NV
Methylnaphthalene, 2-(1-) ***	0.05	0.59	3.2	NV
Molybdenum	2	2	70	NV
Naphthalene	0.05	0.09	11	NV
Nickel	37	82	100	16
Pentachlorophenol	0.1	0.1	30	NV
Petroleum Hydrocarbons F1****	17	25	420	NV
Petroleum Hydrocarbons F2	10	10	150	NV
Petroleum Hydrocarbons F3	240	240	500	NV
Petroleum Hydrocarbons F4	120	120	500	NV
Phenanthrene	0.56	0.69	1	0.56
Phenol	0.5	0.5	890	NV
Polychlorinated Biphenyls	0.3	0.3	0.2	0.07
Pyrene	0.49	1	4.1	0.49
Selenium	1.2	1.5	10	NV
Silver	0.5	0.5	1.2	0.5
Styrene	0.05	0.05	5.4	NV
Tetrachloroethane, 1,1,1,2-	0.05	0.05	1.1	NV
Tetrachloroethane, 1,1,2,2-	0.05	0.05	1	NV
Tetrachloroethylene	0.05	0.05	1.6	NV
Thallium	1	1	2	NV
Toluene	0.2	0.2	22	NV
Trichlorobenzene, 1,2,4-	0.05	0.05	70	NV
Trichloroethane, 1,1,1-	0.05	0.05	200	NV
Trichloroethane, 1,1,2-	0.05	0.05	4.7	NV
Trichloroethylene	0.05	0.05	1.6	NV
Trichlorofluoromethane	0.05	0.25	150	NV
Trichlorophenol, 2,4,5-	0.1	0.1	8.9	NV
Trichlorophenol, 2,4,6-	0.1	0.1	2	NV
Uranium	1.9	2.5	20	NV
Vanadium	86	86	6.2	NV
Vinyl Chloride	0.02	0.02	0.5	NV

Table 8	Soil (other than sediment) µg/g		Ground Water (µg/L)	Sediment µg/g
Contaminant	Agricultural or Other Property Use	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All types of Property Use	All Types of Property Use
Xylene Mixture	0.05	0.05	300	NV
Zinc	290	290	890	120
Electrical Conductivity (mS/cm)	0.7	0.7	NA	NA
Chloride	NA	NA	790000	NV
Sodium Adsorption Ratio	5	5	NA	NA
Sodium	NA	NA	490000	NV

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

TABLE 9 - Generic Site Condition Standards for Use within 30 m of a Water Body in a Non-Potable Ground Water Condition

Table 9	Soil (other than sediment) µg/g	Ground Water (µg/L)	Sediment µg/g
Contaminant	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Use	All Types of Property Use
Acenaphthene	0.072	600	NV
Acenaphthylene	0.093	1.4	NV
Acetone	0.5	100000	NV
Aldrin	0.05	3	0.002
Anthracene	0.22	1	0.22
Antimony	1.3	16000	NV
Arsenic	18	1500	6
Barium	220	23000	NV
Benzene	0.02	44	NV
Benz[a]anthracene	0.36	1.8	0.32
Benzo[a]pyrene	0.3	0.81	0.37
Benzo[b]fluoranthene	0.47	0.75	NV
Benzo[ghi]perylene	0.68	0.2	0.17
Benzo[k]fluoranthene	0.48	0.4	0.24
Beryllium	2.5	53	NV
Biphenyl 1,1'-	0.05	1700	NV
Bis(2-chloroethyl)ether	0.5	240000	NV
Bis(2-chloroisopropyl)ether	0.5	20000	NV
Bis(2-ethylhexyl)phthalate	5	30	NV
Boron (Hot Water Soluble)*	1.5	NA	NA
Boron (total)	36	36000	NV
Bromodichloromethane	0.05	67000	NV
Bromoform	0.05	380	NV
Bromomethane	0.05	5.6	NV
Cadmium	1.2	2.1	0.6
Carbon Tetrachloride	0.05	0.79	NV
Chlordane	0.05	0.06	0.007
Chloroaniline p-	0.5	320	NV
Chlorobenzene	0.05	500	NV
Chloroform	0.05	2.4	NV
Chlorophenol, 2-	0.1	2600	NV
Chromium Total	70	640	26
Chromium VI	0.66	110	NV
Chrysene	2.8	0.7	0.34
Cobalt	22	52	50
Copper	92	69	16
Cyanide (CN-)	0.051	52	0.1
Dibenz[a h]anthracene	0.1	0.4	0.06
Dibromochloromethane	0.05	65000	NV
Dichlorobenzene, 1,2-	0.05	4600	NV
Dichlorobenzene, 1,3-	0.05	7600	NV
Dichlorobenzene, 1,4-	0.05	8	NV
Dichlorobenzidine, 3,3'-	1	500	NV
Dichlorodifluoromethane	0.05	3500	NV
DDD	0.05	1.8	0.008
DDE	0.05	17	0.005
DDT	1.4	0.05	0.007
Dichloroethane, 1,1-	0.05	320	NV
Dichloroethane, 1,2-	0.05	1.6	NV
Dichloroethylene, 1,1-	0.05	1.6	NV
Dichloroethylene, 1,2-cis-	0.05	1.6	NV
Dichloroethylene, 1,2-trans-	0.05	1.6	NV
Dichlorophenol, 2,4-	0.1	3700	NV
Dichloropropane, 1,2-	0.05	16	NV
Dichloropropene,1,3-	0.05	5.2	NV
Dieldrin	0.05	0.56	0.002

Table 9	Soil (other than sediment) µg/g	Ground Water (µg/L)	Sediment µg/g
Contaminant	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Use	All Types of Property Use
Diethyl Phthalate	0.5	30	NV
Dimethylphthalate	0.5	30	NV
Dimethylphenol, 2,4-	0.2	31000	NV
Dinitrophenol, 2,4-	2	9000	NV
Dinitrotoluene, 2,4 & 2,6-	0.5	2300	NV
Dioxane, 1,4	0.2	1900000	NV
Dioxin/Furan (TEQ)	0.000007	0.0001	NV
Endosulfan	0.04	0.56	NV
Endrin	0.04	0.36	0.003
Ethylbenzene	0.05	1800	NV
Ethylene dibromide	0.05	0.25	NV
Fluoranthene	0.69	73	0.75
Fluorene	0.19	290	0.19
Heptachlor	0.05	0.038	NV
Heptachlor Epoxide	0.05	0.038	0.005
Hexachlorobenzene	0.02	3.1	0.02
Hexachlorobutadiene	0.01	0.44	NV
Hexachlorocyclohexane Gamma-	0.01	0.95	NV
Hexachloroethane	0.01	94	NV
Hexane (n)	0.05	51	NV
Indeno[1 2 3-cd]pyrene	0.23	0.2	0.2
Lead	120	20	31
Mercury	0.27	0.29	0.2
Methoxychlor	0.05	0.3	NV
Methyl Ethyl Ketone	0.5	470000	NV
Methyl Isobutyl Ketone	0.5	140000	NV
Methyl Mercury **	NV	0.12	NV
Methyl tert-Butyl Ether (MTBE)	0.05	190	NV
Methylene Chloride	0.05	610	NV
Methylnaphthalene, 2-(1-) ***	0.59	1500	NV
Molybdenum	2	7300	NV
Naphthalene	0.09	1400	NV
Nickel	82	390	16
Pentachlorophenol	0.1	50	NV
Petroleum Hydrocarbons F1****	25	420	NV
Petroleum Hydrocarbons F2	10	150	NV
Petroleum Hydrocarbons F3	240	500	NV
Petroleum Hydrocarbons F4	120	500	NV
Phenanthrene	0.69	380	0.56
Phenol	0.5	9600	NV
Polychlorinated Biphenyls	0.3	0.2	0.07
Pyrene	1	5.7	0.49
Selenium	1.5	50	NV
Silver	0.5	1.2	0.5
Styrene	0.05	1300	NV
Tetrachloroethane, 1,1,1,2-	0.05	3.3	NV
Tetrachloroethane, 1,1,2,2-	0.05	3.2	NV
Tetrachloroethylene	0.05	1.6	NV
Thallium	1	400	NV
Toluene	0.2	14000	NV
Trichlorobenzene, 1,2,4-	0.05	180	NV
Trichloroethane, 1,1,1-	0.05	640	NV
Trichloroethane, 1,1,2-	0.05	4.7	NV
Trichloroethylene	0.05	1.6	NV
Trichlorofluoromethane	0.25	2000	NV
Trichlorophenol, 2,4,5-	0.1	1300	NV
Trichlorophenol, 2,4,6-	0.1	180	NV
Uranium	2.5	330	NV
Vanadium	86	200	NV
Vinyl Chloride	0.02	0.5	NV

Table 9	Soil (other than sediment) µg/g	Ground Water (µg/L)	Sediment µg/g
Contaminant	Residential/ Parkland/Institutional/ Industrial/Commercial/ Community Property Use	All Types of Property Use	All Types of Property Use
Xylene Mixture	0.05	3300	NV
Zinc	290	890	120
Electrical Conductivity (mS/cm)	0.7	NA	NA
Chloride	NA	1800000	NV
Sodium Adsorption Ratio	5	NA	NA
Sodium	NA	1800000	NV

Notes

() Standard in bracket applies to medium and fine textured soils

N/V= No value derived. N/A = Not applicable

* The boron standards are for hot water soluble extract for all surface soils. For subsurface soils the standards are for total boron (mixed strong acid digest), since plant protection for soils below the root zone is not a significant concern.

**Analysis for methyl mercury only applies when mercury (total) standard is exceeded

*** The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2- methyl naphthalene , with the provision that if both are detected the sum of the two must not exceed the standard.

**** F1 fraction does not include BTEX; however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result.

Download of CCME Water Quality Guidelines
for the Protection of Aquatic Life
as of March 8, 2023
for listed Water License Parameters

Chemical Name	Chemical Groups	CASRN	Water Quality Guidelines for the Protection of Aquatic Life					
			Freshwater			Marine		
			Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date	Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date
Acenaphthene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	83-32-9	No data	5.8	1999	No data	Insufficient data	1999
Acenaphthylene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	208-96-8	No data	No data	No data	No data	No data	No data
Acridine	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	260-94-6	No data	4.4	1999	No data	Insufficient data	1999
Aluminium	Inorganic, Metals	7429-90-5	No data	Variable	1987	No data	No data	No data
Anthracene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	120-12-7	No data	0.012	1999	No data	Insufficient data	1999
Antimony	Inorganic, Metals	7440-36-0	No data	No data	No data	No data	No data	No data
Aroclor 1254	Organic, Polyaromatic compounds, Polychlorinated biphenyls	11097-69-1	No data	No data	No data	No data	No data	No data
Arsenic	Inorganic, Metals	7440-38-2	No data	5	1997	No data	12.5	1997
Barium	Inorganic, Metals	7440-39-3	No data	No data	No data	No data	No data	No data
Benz(a)anthracene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	56-55-3	No data	0.018	1999	No data	Insufficient data	1999
Benzo(a)pyrene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	50-32-8	No data	0.015	1999	No data	Insufficient data	1999
Benzo(k)fluoranthene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	207-08-9	No data	No data	No data	No data	No data	No data
Beryllium	Inorganic, Metals	7440-41-7	No data	No data	No data	No data	No data	No data
Boron	Inorganic, Metals	7440-42-8	29,000µg/L	1,500µg/L	2009	NRG	NRG	2009
Cadmium	Inorganic, Metals	7440-43-9	Equation	Equation	2014	NRG	0.12	2014
Calcium	Inorganic, Metals	7440-70-2	No data	No data	No data	No data	No data	No data
Chloride	Inorganic	16887-00-6	640,000 µg/L or 640 mg/L	120,000 µg/L or 120 mg/L	2011	NRG	NRG	2011
Chromium (total)	Inorganic, Metals	7440-47-3	No data	No data	No data	No data	No data	No data
Chromium, hexavalent (Cr(VI))	Inorganic, Metals	7440-47-3	No data	1	1997	No data	1.5	1997
Chromium, trivalent (Cr(III))	Inorganic, Metals	7440-47-3	No data	8.9	1997	No data	56	1997
Chrysene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	218-01-9	No data	Insufficient data	1999	No data	Insufficient data	1999
Cobalt	Inorganic, Metals	7440-48-4	No data	No data	No data	No data	No data	No data
Conductivity	Physical	No data	No data	No data	No data	No data	No data	No data
Copper	Inorganic, Metals	7440-50-8	No data	Equation	1987	No data	No data	No data
Dibenz(a,h)anthracene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	53-70-3	No data	No data	No data	No data	No data	No data

Chemical Name	Chemical Groups	CASRN	Water Quality Guidelines for the Protection of Aquatic Life					
			Freshwater			Marine		
			Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date	Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date
Fluoranthene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	206-44-0	No data	0.04	1999	No data	Insufficient data	1999
Fluorene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	86-73-7	No data	3	1999	No data	Insufficient data	1999
Indeno(1,2,3-c,d)pyrene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	193-39-5	No data	No data	No data	No data	No data	No data
Iron	Inorganic, Metals	7439-89-6	No data	300	1987	No data	No data	No data
Lead	Inorganic, Metals	7439-92-1	No data	Equation	1987	No data	No data	No data
Lithium	Inorganic, Metals	7439-93-2	No data	No data	No data	No data	No data	No data
Manganese	Inorganic, Metals	7439-96-5	Equation	Variable	2019	No data	No data	No data
Mercury	Inorganic, Metals	7439-97-6	No data	0.026	2003	No data	0.016	2003
2-Methylnaphthalene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	91-57-6	No data	No data	No data	No data	No data	No data
Molybdenum	Inorganic, Metals	7439-98-7	No data	73	1999	No data	No data	No data
Naphthalene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	91-20-3	No data	1.1	1999	No data	1.4	1999
Nickel	Inorganic, Metals	7440-02-0	No data	Equation	1987	No data	No data	No data
Nitrate + Nitrite	Inorganic, Inorganic nitrogen compounds	No data	No data	No data	No data	No data	No data	No data
pH	Inorganic, Acidity, alkalinity and ph	No data	No data	6.5 to 9.0	1987	No data	7.0 to 8.7 & Narrative	1996
Phenanthrene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	1985-01-08	No data	0.4	1999	No data	Insufficient data	1999
Phenols (mono- & dihydric)	Organic, Aromatic hydroxy compounds	108-95-2	No data	4	1999	No data	No data	No data
Polychlorinated biphenyls	Organic, Polyaromatic compounds, Polychlorinated biphenyls	1336-36-3	No data	0.005	1987	No data	0.01	1991
Polychlorinated dibenzo-p-dioxins/dibenzo furans	Organic, Polyaromatic compounds, Polychlorinated dioxins and furans	No data	No data	No data	No data	No data	No data	No data
Pyrene	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	129-00-0	No data	0.025	1999	No data	Insufficient data	1999
Quinoline	Organic, Polyaromatic compounds, Polycyclic aromatic hydrocarbons	91-22-5	No data	3.4	1999	No data	Insufficient data	1999
Selenium	Inorganic, Metals	7782-49-2	No data	1	1987	No data	No data	No data
Silver	Inorganic, Metals	7440-22-4	NRG	0.25	2015	7.5	NRG	2015
Sulphate	Inorganic, Inorganic sulphur compounds	18785-72-3	No data	No data	No data	No data	No data	No data
Suspended sediments	Physical, Turbidity, clarity and suspended solids, Total particulate matter	No data	No data	Narrative	1999	No data	Narrative	1999
Thallium	Inorganic, Metals	7440-28-0	No data	0.8	1999	No data	No data	No data
Tin	Inorganic, Metals	7440-31-5	No data	No data	No data	No data	No data	No data

Chemical Name	Chemical Groups	CASRN	Water Quality Guidelines for the Protection of Aquatic Life					
			Freshwater			Marine		
			Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date	Concentration (µg/L) Short Term	Concentration (µg/L) Long Term	Date
Total dissolved solids (salinity)	Physical, Turbidity, clarity and suspended solids	No data	No data	No data	No data	No data	No data	No data
Uranium	Inorganic, Metals	7440-61-1	33	15	2011	NRG	NRG	2011
Vanadium	Inorganic, Metals	7440-62-2	No data	No data	No data	No data	No data	No data
Zinc	Inorganic, Metals	7440-66-6	Equation	Equation	2018	Not assessed	Not assessed	2018

Appendix C

Analytical Results Tables

Location (AEC)	Date Sampled	3TM Northing	3TM Easting	Groundwater Depth (mbTOP)	Total Well Depth (mbTOP)	pH Range	Conductivity (uS/cm) Range	Turbidity (NTU) Range	Temperature (°C) Range	Notes
Monitoring Wells										
RBL-1 (AEC 1)	03-Aug-22	8295630	441147	1.12	1.58	7.86 - 8.34	0.436 - 0.466	777 - 1,000	3.36 - 4.11	Good condition
RBL-2 (AEC 1)	04-Aug-22	8295551	440943	1.34	1.47	n/a	n/a	n/a	n/a	Good condition
RBL-3 (AEC 1)	04-Aug-22	8295608	440901	0.87	1.43	7.15 - 7.98	0.441 - 0.477	46.5 - 1000	5.04 - 7.04	Good condition
AEC1-GW1 (AEC 1)	03-Aug-22	8295526	441063	1.54	1.82	6.97 - 7.07	1.09 - 1.10	122 - 139	8.77 - 9.0	Good condition, casing slightly bend. Replaced cap with J-plug
RBL-5 (AEC 2)	02-Aug-22	8292509	441662	Dry	0.86	n/a	n/a	n/a	n/a	Well was broken at grade. Repaired, however, depth/screen only 0.2 mbgs (maybe blocked). Dry, no sample collected.
RBL-6 (AEC 2)	02-Aug-22	8292566	441420	0.83	0.87	n/a	n/a	n/a	n/a	Good condition. Limited water volume
RBL-7 (AEC 2)	02-Aug-22	8292634	441384	1.24	1.44	6.42 - 7.93	0.001 - 0.597	171 - 315	4.56 - 8.79	Good condition. Limited water volume
FL-MW-6 (AEC 2)	02-Aug-22	8292485	441484	Dry	0.97	n/a	n/a	n/a	n/a	Casing lid bent. Well cap was stuck, lifted well when removing. Replaced cap. No lock. Dry, no sample collected.
FL-MW-7 (AEC 2)	02-Aug-22	8292468	441452	1.07	1.48	6.76 - 8.75	0.694 - 0.908	119 - 588	5.40 - 12.49	Good condition. Limited water volume
2-MW-8 (AEC 2)	02-Aug-22	8292499	441451	0.73	1.05	n/a	n/a	n/a	n/a	1" PVC with no well cap (nitrile glove used). No lock. Limited water volume
RBL-10 (AEC 3)	03-Aug-22	8296242	440493	Dry	1.50	n/a	n/a	n/a	n/a	Good condition. Dry, no sample collected.
RBL-11 (AEC 3)	03-Aug-22	8296265	440383	Dry	1.36	n/a	n/a	n/a	n/a	Good condition. Dry, no sample collected.
RBL-12 (AEC 3)	03-Aug-22	8296335	440450	Dry	1.35	n/a	n/a	n/a	n/a	Good condition. Dry, no sample collected.
RBL-14 (AEC 3)	03-Aug-22	8296449	440682	0.91	1.43	7.93 - 8.23	0.382 - 0.386	111 - 158	4.13 - 5.28	Good condition.
RBL-15 (AEC 3)	03-Aug-22	8296468	440635	Dry	1.44	n/a	n/a	n/a	n/a	Good condition. Dry, no sample collected.
Surface Water										
RBL-4 (AEC 1)	03-Aug-22	8295627	440884	n/a	n/a	n/a	n/a	n/a	n/a	None
RBL-8 (AEC 2)	02-Aug-22	8292688	441366	n/a	n/a	n/a	n/a	n/a	n/a	None
RBL-13 (AEC 3)	03-Aug-22	8296454	440478	n/a	n/a	n/a	n/a	n/a	n/a	None. Located on in McMaster River Valley
RBL-16 (AEC 3)	03-Aug-22	8296336	440340	n/a	n/a	n/a	n/a	n/a	n/a	None. Located on in McMaster River Valley

Notes:

All RBL monitoring wells were installed in 2019
 All coordinates are expressed in 3TM, Zone 15N, NAD83 datum.
 °C - degree celsius
 mbTOP - metres below top of pipe.
 n/a - not applicable
 NA - not available
 NTU - nephelometric turbidity unit
 uS/cm - microsiemens per centimeter

Table 2a Groundwater Sampling
Resolute Airport Landfills EMP: Resolute, Nunavut
BTEX, PHCs, Oil and Grease, Total Metals, Routine parameters, PAHs and Phenol Analysis

					Resolute Bay EMP									
					AEC 1 - Inactive Solid Waste LF									
					Duplicates									
Sample ID	Guideline	Reportable	Units	RBL-1	RBL-1	RBL-2	RBL-2	RBL-3	RBL-3	GW DUP 1	RPD (%)	AEC 1-GW1		
Laboratory ID	(1)	Detection		AZA424	AFW841	AZA426	AFW842	AZA427	AFW843	AFW910		AZA425		
Sampling Date		ug/L		3-Aug-2022	27-Aug-2021	4-Aug-2022	27-Aug-2021	4-Aug-2022	27-Aug-2021	27-Aug-2021		3-Aug-2022		
PARAMETERS														
BTEX														
Benzene	44 ug/L / 370 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40		
Toluene	18,000 ug/L / 2 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	1.1		
Ethylbenzene	2,300 ug/L / 90 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	<0.40		
m-Xylene & p-Xylene	NV	0.2	ug/L	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	-	<0.80		
o-Xylene	NV	0.4	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	-	0.55		
Total Xylenes	4,200 ug/L	0.89	ug/L	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	-	<0.89		
Petroleum Hydrocarbons														
F1 (C6-C10)	750 ug/L	25	ug/L	<100	<100	<100	<100	<100	<100	<100	-	120		
F1 (C6-C10) - BTEX	750 ug/L	25	ug/L	<100	<100	<100	<100	<100	<100	<100	-	120		
F2 (C10-C16)	150 ug/L	100	ug/L	<100	<100	<100	<100	160	370	170	-	190		
F3 (C16-C34)	500 ug/L	100	ug/L	<100	<100	<100	<100	<100	<100	<100	-	160		
F4 (C34-C50)	500 ug/L	200	ug/L	<200	<200	<200	<200	<200	<200	<200	-	<200		
Reached Baseline at C50														
Extractable Hydrocarbons														
(1)														
Oil And Grease	NV / 15mg/L (15,000 ug/L)	2000	ug/L	<2,000	<500	<2,000	<500	<2,000	<500	<500	-			
Total Metals														
(1)														
Aluminium	NV	3	ug/L	3,000	1,730	88	7.3	120	19.3	14.4	-	75		
Antimony	20,000 ug/L	0.6	ug/L	<0.60	<0.50	0.77	2.09	<0.60	<0.50	<0.50	-	<0.60		
Arsenic	1,900 ug/L	0.2	ug/L	1.2	0.58	1.9	0.67	0.61	0.48	0.37	-	3.9		
Barium	29,000 ug/L	10	ug/L	62	42.7	59	62.2	110	83.1	77.2	7	15		
Beryllium	67 ug/L	1	ug/L	<1.0	0.11	<1.0	<0.10	<1.0	<0.10	<0.10	-	<1.0		
Boron (Total)	45,000 ug/L	20	ug/L	39	<50	160	157	95	80	76	-	450		
Cadmium	2.7 ug/L	0.01	ug/L	0.28	0.094	0.071	0.145	0.046	<0.010	<0.010	-	0.160		
Chromium	810 ug/L	1	ug/L	5.4	3.9	<1.0	<1.0	1.2	<1.0	<1.0	-	1.0		
Chromium (VI)	140 ug/L	0.99	ug/L	<0.99	<0.99	<0.99	<0.99	<0.99	<0.99	<0.99	-	<0.99		
Cobalt	66 ug/L	0.3	ug/L	2.5	1.03	1.9	0.32	0.63	0.2	<0.20	-	4.6		
Copper	87 ug/L	1	ug/L	6.1	2.71	1.5	2.71	1.5	0.74	0.66	-	8.9		
Iron	NV	60	ug/L	4,200	1,970	1,800	25	760	376	271	32	3300		
Lead	25 ug/L / 1ug/L	0.2	ug/L	9.1	3.17	0.98	0.34	0.74	0.34	0.21	-	1.8		
Manganese	NV	4	ug/L	180	61.3	360	77	220	56.2	42.3	28	390		
Mercury	0.29 ug/L	0.0019	ug/L	0.086	0.0033	0.0032	0.003	0.0086	0.0084	0.005	-	0.034		
Molybdenum	9,200 ug/L	0.2	ug/L	0.7	<1.0	1.3	2.6	1.3	<1.0	<1.0	-	1.4		
Nickel	490 ug/L	0.5	ug/L	5.2	3.1	5.8	2.2	1.5	1.2	1.1	9	13		
Phosphorus	NV	100	ug/L	160 (2)	30	1,100	190	230	370	320	14	7,600 (2)		
Selenium	63 ug/L	0.2	ug/L	0.22	0.24	0.25	0.22	0.25	0.14	0.17	19	0.63		
Silver	1.5 ug/L	0.1	ug/L	<0.10	<0.020	<0.10	<0.020	<0.10	<0.020	<0.020	-	0.22		
Sulfur	NV	200	ug/L	2,800	4200	51,000	88,100	6,400	4,200	<3,000	-	3300		
Thallium	510 ug/L	0.2	ug/L	<0.20	0.051	0.4	0.011	<0.20	<0.010	<0.010	-	<0.20		
Titanium	NV	1	ug/L	110	6.8	2.9	<5.0	3.7	<5.0	<5.0	-	4.3		
Uranium	420 ug/L	0.1	ug/L	0.41	0.26	0.23	0.36	0.27	0.18	0.18	-	<0.10		
Vanadium	250 ug/L	1	ug/L	6.4	<5.0	<1.0	<5.0	1.1	<5.0	<5.0	-	2.6		
Zinc	1,100 ug/L	3	ug/L	27	12.7	16	43.5	8.9	<5.0	<5.0	-	17		
Routine Water														
(1)														
pH	NV / 6.0 - 9.0	N/A	pH	7.62	8.21	7.18	7.99	7.14	7.63	7.70	1	7.24		
Electrical Conductivity	NV	2,000	uS/cm	380	500	930	1100	420	470	450	-	1100		
Total Suspended Solids	NV / 50 mg/L	1.5	mg/L	490 (1)	1200 (1)	13 (1)	10	19 (1)	250 (1)	160 (1)	44	200 (1)		
Hardness	NV	0.5	mg/L	484	287	347	425	180	191	182	5	245		
Total Alkalinity	NV	1	mg/L	130	140	240	220	170	190	180	5	410		
Bicarbonate	NV	1	mg/L	160	170	290	270	200	230	220	4	500		
Carbonate	NV	1	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0		
Hydroxide	NV	1	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0		
Calcium	NV	0.5	mg/L	34	72	120	138	49	52	49	6	75		
Magnesium	NV	0.5	mg/L	11	26	18	20	13	15	14	3	12		
Potassium	NV	0.5	mg/L	1.4	2	18	17	4	5	4	12	23		
Sodium	2,300 mg/L	0.5	mg/L	27	44	42	54	18	22	22	4	50		
Chloride	2,300 mg/L	1	mg/L	36	68	43	63	24	32	32	0	67		
Sulphate (SO4)	NV	1	mg/L	8	12	200	240	23	11	9	16	<5.0 (1)		
Ionic Balance	NV	n/a	%	0.82		1.6		0.092				5		
Nutrients														
(1)														
Ammonia	NV	0.015	mg/L	<0.015	0.33	5.3	1.3	1.1	2.4	2.3	4	49		
Nitrate - N	NV	0.01	mg/L	1.4	2.1	<0.010	1.2	0.22	<0.010	<0.010	-	<0.010		
Nitrite - N	NV	0.01	mg/L	<0.010	<0.010	<0.010	0.028	0.32	<0.010	<0.010	-	<0.010		
Nitrate and Nitrite - N	NV	0.01	mg/L	1.4	2.1	<0.010	1.2	0.54	<0.010	<0.010	-	<0.010		
Polycyclic Aromatic Hydrocarbons														
(1)														
Calculated Parameters														
Benzo(a)pyrene (TPE)	NV	0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010		
Specific Parameters														
Acenaphthene	600 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10		
Acenaphthylene	1.8 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	<0.10		
Acridine	NV	0.04	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	-	<0.040		
Anthracene	2.4 ug/L	0.01	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010		
Benzo(a)anthracene	4.7 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	<0.0085		
Benzo(b)fluoranthene	0.75 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	<0.0085		
Benzo(k)fluoranthene	0.4 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	<0.0085		
Benzo(a,h,i)perylene	0.2 ug/L	0.05	ug/L	<0.0085	<0.050	<0.0085	<0.050	<0.0085	<0.050	<0.050	-	<0.0085		
Benzo(c)phenanthrene	NV	0.0075	ug/L	<0.050	<0.0075	<0.050	<0.0075	<0.050	<0.0075	<0.0075	-	<0.050		
Benzo(a)pyrene	0.81 ug/L	0.0085	ug/L	<0.0075	<0.0085	<0.0075	<0.0085	<0.0075	<0.0085	<0.0085	-	<0.0075		
Benzo(e)pyrene	NV	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050		
Chrysene	1 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	<0.0085		
Dibenzo(a,h)anthracene	0.52 ug/L	0.0075	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	-	<0.0075		
Fluoranthene	130 ug/L	0.1	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010		
Fluorene	400 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	0.054	0.071	<0.050	-	<0.050		
Indeno(1,2,3-c,d)pyrene	0.2 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	<0.0085		
1-Methylnaphthalene	1,800 ug/L	0.1	ug/L	0.23	<0.10	<0.10	<0.10	3.2	4.1	2.8	38	0.41		
2-Methylnaphthalene	1,800 ug/L	0.1	ug/L	0.34	<0.10	<0.10	<0.10	5.6	7.2	4.9	38	0.67		
Naphthalene	1,400 ug/L	0.1	ug/L	<0.10	<0.10	0.73	1.6	1.0	1.0	0.90	46	0.30		
Phenanthrene	580 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050		
Perylene	NV	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050		
Pyrene	68 ug/L	0.02	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	<0.020		
Quinoline	NV	0.2	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20		
Misc. Organics														
(1)														
Phenols	12,000 ug/L	1.5	ug/L	<1.5	<1.5	31	3.5	13	19	24	23	630		

Table 2a Groundwater Sampling
Resolute Airport Landfills EMP: Resolute, Nunavut
BTEX, PHCs, Oil and Grease, Total Metals, Routine parameters, PAHs and Phenol Analysis

					Resolute Bay EMP						
					AEC 2 - Historical Landfill						
											Duplicates
Sample ID	Guideline	Reportable	Units	RBL-6	RBL-7	RBL-7	2-MW-8	FL-MW-7	DUPA	RPD (%)	
Laboratory ID	(1)	Detection		AZA186	AZA187	AFW845	AZA188	AZA189	AZA190		
Sampling Date		ug/L		4-Aug-2022	4-Aug-2022	27-Aug-2021	4-Aug-2022	2-Aug-2022	2-Aug-2022		
PARAMETERS											
BTEX											
Benzene	44 ug/L / 370 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	0.77	1.6	1.6	0	
Toluene	18,000 ug/L / 2 ug/L	0.2	ug/L	0.63	<0.40	1.6	0.46	6.8	6.7	1	
Ethylbenzene	2,300 ug/L / 92 ug/L	0.2	ug/L	<0.40	<0.40	0.77	0.89	6.8	6.7	1	
m-Xylene & p-Xylene	NV	0.2	ug/L	<0.80	<0.80	3.2	11	30	29	3	
o-Xylene	NV	0.4	ug/L	<0.40	<0.40	1.6 (1)	34	77	75	3	
Total Xylenes	4,200 ug/L	0.89	ug/L	<0.89	<0.89	4.8	44	110	100	10	
Petroleum Hydrocarbons											
F1 (C6-C10)	750 ug/L	25	ug/L	<100	<100	<100	300	610	590	3	
F1 (C6-C10) - BTEX	750 ug/L	25	ug/L	<100	<100	<100	250	490	470	4	
F2 (C10-C16)	150 ug/L	100	ug/L	<100	240	<100	360	370	370	0	
F3 (C16-C34)	500 ug/L	100	ug/L	<100	<100	<100	270	280	290	4	
F4 (C34-C50)	500 ug/L	200	ug/L	<200	<200	<200	<200	<200	<200	-	
Reached Baseline at C50											
Extractable Hydrocarbons											
Oil And Grease	NV / 15mg/L (15,000 ug/L)	2000	ug/L		2,000	<500	40,000	7,700	6,500	-	
Total Metals											
Aluminium	NV	3	ug/L	1,000	520	31,400	750	180	300	50	
Antimony	20,000 ug/L	0.6	ug/L	<0.60	<0.60	<5.0	<0.60	<0.60	1.2	-	
Arsenic	1,900 ug/L	0.2	ug/L	1.9	0.56	11.8	1.5	5.4	5.7	5	
Barium	29,000 ug/L	10	ug/L	54	24	454	36	91	110	19	
Beryllium	67 ug/L	1	ug/L	<1.0	<1.0	2.4	<1.0	<1.0	<2.0	-	
Boron (Total)	45,000 ug/L	20	ug/L	<20	<20	<500	<20	45	54	18	
Cadmium	2.7 ug/L	0.01	ug/L	0.08	0.035	2.77	0.045	0.09	0.16	56	
Chromium	810 ug/L	1	ug/L	2.1	2.3	64	1.7	5.5	7.1	25	
Chromium (VI)	140 ug/L	0.99	ug/L		<0.99	<0.99	<0.99	<0.99	<0.99	-	
Cobalt	66 ug/L	0.3	ug/L	1.5	0.42	19.8	0.82	5.7	6.5	13	
Copper	87 ug/L	1	ug/L	3.1	1.7	61.4	2	3.1	5.2	-	
Iron	NV	60	ug/L	35,000	930	46,200	13,000	8,700	12,000	32	
Lead	25 ug/L / 1ug/L	0.2	ug/L	5.1	2.1	186	1.8	6.0	9.7	47	
Manganese	NV	4	ug/L	720	27	1,500	260	980	1,000	2	
Mercury	0.29 ug/L	0.0019	ug/L	-	0.0146	0.0065	0.031	0.114	0.069	49	
Molybdenum	9,200 ug/L	0.2	ug/L	1.9	0.99	<10	0.38	0.94	1	-	
Nickel	490 ug/L	0.5	ug/L	4.7	3.1	51	3	13	15	14	
Phosphorus	NV	100	ug/L		23	86	38	180	180	0	
Selenium	63 ug/L	0.2	ug/L	<0.20	0.45	2.7	0.3	0.73	1.2	-	
Silver	1.5 ug/L	0.1	ug/L	<0.10	1.2 (1)	0.48	<0.10	0.62	0.76	20	
Sulfur	NV	200	ug/L	1,900	11,000	<3,000	1,100	1,300	1,300	0	
Thallium	510 ug/L	0.2	ug/L	<0.20	<0.20	0.77	<0.20	<0.20	<0.40	-	
Titanium	NV	1	ug/L	32	16 (1)	696	22	57	99	54	
Uranium	420 ug/L	0.1	ug/L	0.15	1.2	4.8	<0.10	0.6	0.69	14	
Vanadium	250 ug/L	1	ug/L	2.9	2.1	80	2.6	6.2	10	47	
Zinc	1,100 ug/L	3	ug/L	20	64 (1)	421	93	14	170 (2)	-	
Routine Water											
pH	NV / 6.0 - 9.0	N/A	pH		8.17	8.13	7.64	7.30	7.33	0	
Electrical Conductivity	NV	2,000	uS/cm		520	620	290	820	790	-	
Total Suspended Solids	NV / 50 mg/L	1.5	mg/L		550 (1)	1300 (1)		47 (1)	57 (1)	-	
Hardness	NV	0.5	mg/L	245	210	6,010	160	464	527	13	
Total Alkalinity	NV	1	mg/L		170	190	120	380	370	3	
Bicarbonate	NV	1	mg/L		210	230	150	470	450	4	
Carbonate	NV	1	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	-	
Hydroxide	NV	1	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0	-	
Calcium	NV	0.5	mg/L		44	1,380	20	120	120	0	
Magnesium	NV	0.5	mg/L		16	626	7	21	21	0	
Potassium	NV	0.5	mg/L		4	10	3.3	6.7	5.8	14	
Sodium	2,300 mg/L	0.5	mg/L		41	43	26	19	19	0	
Chloride	2,300 mg/L	1	mg/L		43	56	18	39	36	8	
Sulphate (SO4)	NV	1	mg/L		36	45	1	<7.0 (1)	<5.0 (1)	-	
Ionic Balance	NV	n/a	%		1.4		0.22	0.51	3.8	-	
Nutrients											
Ammonia	NV	0.015	mg/L	0.15	<0.015	0.16	2.6	1.5	1.5	0	
Nitrate - N	NV	0.01	mg/L		0.46	0.47	0.098	<0.050	<0.010	-	
Nitrite - N	NV	0.01	mg/L		<0.010	<0.010	<0.010	<0.010	<0.010	-	
Nitrate and Nitrite - N	NV	0.01	mg/L		0.46	0.47	0.098	<0.050 (1)	<0.010	-	
Polycyclic Aromatic Hydrocarbons											
Calculated Paramters											
Benzo(a)pyrene (TPE)	NV	0.010	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	
Specific Parameters											
Acenaphthene	600 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
Acenaphthylene	1.8 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
Acridine	NV	0.04	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	-	
Anthracene	2.4 ug/L	0.01	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	
Benzo(a)anthracene	4.7 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	
Benzo(b)fluoranthene	0.75 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	
Benzo(k)fluoranthene	0.4 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	
Benzo(g,h,i)perylene	0.2 ug/L	0.05	ug/L	<0.0085	0.013	<0.050	<0.0085	<0.0085	<0.0085	-	
Benzo(c)phenanthrene	NV	0.0075	ug/L	<0.050	<0.050	<0.0075	<0.050	<0.050	<0.050	-	
Benzo(a)pyrene	0.81 ug/L	0.0085	ug/L	<0.0075	<0.0075	<0.0085	<0.0075	<0.0075	<0.0075	-	
Benzo(e)pyrene	NV	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	
Chrysene	1 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	
Dibenzo(a,h)anthracene	0.52 ug/L	0.0075	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	-	
Fluoranthene	130 ug/L	0.1	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	
Fluorene	400 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	
Indeno(1,2,3-c,d)pyrene	0.2 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-	
1-Methylnaphthalene	1,800 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
2-Methylnaphthalene	1,800 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
Naphthalene	1,400 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	-	
Phenanthrene	580 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	
Perylene	NV	0.05	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	
Pyrene	68 ug/L	0.02	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	-	
Quinoline	NV	0.2	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	
Misc. Organics											
Phenols	12,000 ug/L	1.5	ug/L	-	-	<1.5	-	-	-	-	

	RDL exceeds guideline value
	Guideline Exceedance

Guideline 1 Ontario Ministry of the Environment 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011). Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition

Maximum Allowable Effluent Discharge Concentration as per Water Licence No. 1BR-RBL1929

COMPARATIVE GUIDELINE USED IS SHOWN IN BOLD IN TABLE

Notes:

NV - No value

RDL - Reportable detection limit

RPD - Relative percent difference calculated as (abs(C1-C2)/average(C1+C2))*100

- indicates RPD not calculated. RPD cannot be calculated if one or more of the analytical results are less than detection limits or within 5 times the detection limits.

BOLD - RPD value greater than 40%

Table 2a Groundwater Sampling
Resolute Airport Landfills EMP: Resolute, Nunavut
BTEX, PHCs, Oil and Grease, Total Metals, Routine parameters, PAHs and Phenol Analysis

Resolute Bay EMP											
AEC 3 - Former Vehicle and Metal Storage Area								Blanks			
Sample ID Laboratory ID Sampling Date	Guideline (1)	Reportable Detection ug/L	Units	RBL-10 AFW848 27-Aug-2021	RBL-14 AZA455 3-Aug-2022	DUP B AZA456 3-Aug-2022	RPD (%)	RBL-14 AFW850 27-Aug-2021	FIELD BLANK AZA192 4-Aug-2022	FIELD BLANK AFW911 27-Aug-2021	TRIP BLANK AZA193 4-Aug-2022
PARAMETERS											
BTEX											
Benzene	44 ug/L / 370 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40
Toluene	18,000 ug/L / 2 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	2,300 ug/L / 90 ug/L	0.2	ug/L	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40
m-Xylene & p-Xylene	NV	0.2	ug/L	<0.80	<0.80	<0.80	-	<0.80	<0.80	<0.80	<0.80
o-Xylene	NV	0.4	ug/L	<0.40	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40
Total Xylenes	4,200 ug/L	0.89	ug/L	<0.89	<0.89	<0.89	-	<0.89	<0.89	<0.89	<0.89
Petroleum Hydrocarbons	(1)										
F1 (C6-C10)	750 ug/L	25	ug/L	<100	<100	<100	-	<100	<100	<100	<100
F1 (C6-C10) - BTEX	750 ug/L	25	ug/L	<100	<100	<100	-	<100	<100	<100	<100
F2 (C10-C16)	150 ug/L	100	ug/L	<100	<100	<100	-	<100	<100	<100	<100
F3 (C16-C34)	500 ug/L	100	ug/L	<100	<100	<100	-	<100	<100	<100	<100
F4 (C34-C50)	500 ug/L	200	ug/L	<200	<200	<200	-	<200	<200	<200	<200
Reached Baseline at C50											
Extractable Hydrocarbons	(1)										
Oil And Grease	NV / 15mg/L (15,000 ug/L)	2000	ug/L	<1300	<2,000	<2,000	-	<500	-	<500	-
Total Metals	(1)										
Aluminium	NV	3	ug/L	271	21,000	10,000	71	3,110	-	4.4	-
Antimony	20,000 ug/L	0.6	ug/L	<0.50	<12	<1.2	-	<0.50	-	<0.50	-
Arsenic	1,900 ug/L	0.2	ug/L	0.62	14	7	67	1.62	-	<0.50	-
Barium	29,000 ug/L	10	ug/L	72.1	210	190	10	32.3	-	<0.50	-
Beryllium	67 ug/L	1	ug/L	<0.10	<20	<2.0	-	0.19	-	<0.50	-
Boron (Total)	45,000 ug/L	20	ug/L	203	48	34	-	<50	-	<0.50	-
Cadmium	2.7 ug/L	0.01	ug/L	0.034	1.8	1.8	0	0.11	-	<0.50	-
Chromium	810 ug/L	1	ug/L	<1.0	40	20	67	6	-	<0.50	-
Chromium (VI)	140 ug/L	0.99	ug/L	<0.99	<0.99	<0.99	-	<5 (2)	-	<0.50	-
Cobalt	66 ug/L	0.3	ug/L	0.21	20	11	58	1.84	-	<0.50	-
Copper	87 ug/L	1	ug/L	1.15	47	25	61	4.43	-	<0.50	-
Iron	NV	60	ug/L	310	39,000	16,000	84	4,040	-	<0.50	-
Lead	25 ug/L / 1ug/L	0.2	ug/L	0.49	93	55	51	7.82	-	<0.50	-
Manganese	NV	4	ug/L	13.7	1,400	1,300	7	127	-	<0.50	-
Mercury	0.29 ug/L	0.0019	ug/L	0.0023	0.0047	<0.0019	-	0.0041	-	<0.50	-
Molybdenum	9,200 ug/L	0.2	ug/L	<1.0	<4.0	0.62	-	<1.0	-	<0.50	-
Nickel	490 ug/L	0.5	ug/L	1.7	54	27	67	5.3	-	<0.50	-
Phosphorus	NV	100	ug/L	15	1,000	720	33	110	-	<0.50	-
Selenium	63 ug/L	0.2	ug/L	0.85	<4.0	0.66	-	1.36	-	<0.50	-
Silver	1.5 ug/L	0.1	ug/L	<0.020	<2.0	<0.20	-	0.024	-	<0.50	-
Sulfur	NV	200	ug/L	67,700	2,500	2,100	17	<3,000	-	<0.50	-
Thallium	510 ug/L	0.2	ug/L	<0.010	<4.0	<0.40	67	0.027	-	<0.50	-
Titanium	NV	1	ug/L	12.6	560	280	-	83.7	-	<0.50	-
Uranium	420 ug/L	0.1	ug/L	2.02	<2.0	1.1	-	0.47	-	<0.50	-
Vanadium	250 ug/L	1	ug/L	<5.0	67	32	71	7.7	-	<0.50	-
Zinc	1,100 ug/L	3	ug/L	<5.0	1,500	240	145	19	-	<5.0	-
Routine Water	(1)										
pH	NV / 6.0 - 9.0	N/A	pH	7.92	7.82	7.67	2	8.13	-	4.4	-
Electrical Conductivity	NV	2,000	uS/cm	350	3000	350	0	340	-	<0.50	-
Total Suspended Solids	NV / 50 mg/L	1.5	mg/L	20	170 (1)	110 (1)	-	560 (1)	-	<0.50	-
Hardness	NV	0.5	mg/L	938	2,120	2,230	5	279	-	<0.50	-
Total Alkalinity	NV	1	mg/L	390	170	170	0	160	-	<0.50	-
Bicarbonate	NV	1	mg/L	480	210	210	0	200	-	<0.50	-
Carbonate	NV	1	mg/L	<1.0	<1.0	<1.0	-	<1.0	-	<0.50	-
Hydroxide	NV	1	mg/L	<1.0	<1.0	<1.0	-	<1.0	-	<0.50	-
Calcium	NV	0.5	mg/L	217	47	48	2	73	-	<0.50	-
Magnesium	NV	0.5	mg/L	96	13	13	0	23	-	<0.50	-
Potassium	NV	0.5	mg/L	10	0.54	0.59	9	2	-	<0.50	-
Sodium	2,300 mg/L	0.5	mg/L	269	7.4	7.5	1	9	-	<0.50	-
Chloride	2,300 mg/L	1	mg/L	630	9.3	9.1	2	11	-	<0.50	-
Sulphate (SO4)	NV	1	mg/L	190	2.8	2.1	29	3	-	<0.50	-
Ionic Balance	NV	n/a	%		0.91	0.15	-		-	<5.0	-
Nutrients	(1)										
Ammonia	NV	0.015	mg/L	1.2	0.071	0.069	-	0.49	-	4.4	-
Nitrate - N	NV	0.01	mg/L	1.6	0.19	0.18	5	0.25	-	<0.50	-
Nitrite - N	NV	0.01	mg/L	<0.010	<0.010	<0.010	-	<0.010	-	<0.50	-
Nitrate and Nitrite - N	NV	0.01	mg/L	1.6	0.19	0.18	5	0.25	-	<5.0	-
Polycyclic Aromatic Hydrocarbons	(1)										
Calculated Parameters											
Benzo(a)pyrene (TPE)	NV	0.010	ug/L	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Specific Parameters											
Acenaphthene	600 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	1.8 ug/L	0.1	ug/L	<0.10	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10
Acridine	NV	0.04	ug/L	<0.040	<0.040	<0.040	-	<0.040	<0.040	<0.040	<0.040
Anthracene	2.4 ug/L	0.01	ug/L	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Benzo(a)anthracene	4.7 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(b)fluoranthene	0.75 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(k)fluoranthene	0.4 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(g,h,i)perylene	0.2 ug/L	0.05	ug/L	<0.050	<0.0085	<0.0085	-	<0.050	<0.0085	<0.050	<0.0085
Benzo(c)phenanthrene	NV	0.0075	ug/L	<0.0075	<0.050	<0.050	-	<0.0075	<0.050	<0.0075	<0.050
Benzo(a)pyrene	0.81 ug/L	0.0085	ug/L	<0.0085	<0.0075	<0.0075	-	<0.0075	<0.0075	<0.0085	<0.0075
Benzo(e)pyrene	NV	0.05	ug/L	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Chrysene	1 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085
Dibenz(a,h)anthracene	0.52 ug/L	0.0075	ug/L	<0.0075	<0.0075	<0.0075	-	<0.0075	<0.0075	<0.0075	<0.0075
Fluoranthene	130 ug/L	0.1	ug/L	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010
Fluorene	400 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	0.2 ug/L	0.0085	ug/L	<0.0085	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085
1-Methylnaphthalene	1,800 ug/L	0.1	ug/L	<0.10	0.23	0.27	16	<0.10	<0.10	<0.10	<0.10
2-Methylnaphthalene	1,800 ug/L	0.1	ug/L	<0.10	0.42	0.49	15	<0.10	<0.10	<0.10	<0.10
Naphthalene	1,400 ug/L	0.1	ug/L	<0.10	<0.10	0.1	-	<0.10	<0.10	<0.10	<0.10
Phenanthrene	580 ug/L	0.05	ug/L	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Perylene	NV	0.05	ug/L	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050
Pyrene	68 ug/L	0.02	ug/L	<0.020	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020
Quinoline	NV	0.2	ug/L	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20
Misc. Organics	(1)										
Phenols	12,000 ug/L	1.5	ug/L	3.6	<1.5	<1.5	-	<1.5	-	<1.5	-

	RDL exceeds guideline value
	Guideline Exceedance

Guideline 1 Ontario Ministry of the Environment 2011 Soil, Groundwater, and Sediment Standards for use under Part X.V.1 of the Environmental Protection Act (MECP, 2011). Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Condition

Maximum Allowable Effluent Discharge Concentration as per Water Licence No. 1BR-RBL1929

COMPARATIVE GUIDELINE USED IS SHOWN IN BOLD IN TABLE

Notes:

NV - No value

RDL - Reportable detection limit

RPD - Relative percent difference calculated as (abs(C1-C2)/average(C1+C2))*100

"-" indicates RPD not calculated. RPD cannot be calculated if one or more of the analytical results are less than detection limits or within 5 times the detection limits.

BOLD - RPD value greater than 40%

PARAMETERS				Resolute Bay EMP								
				AEC 1 - Inactive Solid Waste Landfill				AEC 2 - Historical Landfill				
				Duplicates			RPD (%)	RBL-4		RBL-8		RBL-8
Sample ID Laboratory ID Sampling Date	Guideline (1)	Reportable Detection ug/L	Units	RBL-4 AZA428 3-Aug-2022	DUP C AZA429 3-Aug-2022	RPD (%)		RBL-4 AFW844 27-Aug-2021	RBL-8 AZA191 2-Aug-2022	AFW846 27-Aug-2021	FIELD DUP 2 AFW847 27-Aug-2021	RPD (%)
BTEX												
Benzene	0.37mg/L (370 ug/L)	0.2	ug/L	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	-
Toluene	0.002 mg/L (2 ug/L)	0.2	ug/L	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	-
Ethylbenzene	0.090 mg/L (90 ug/L)	0.2	ug/L	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	-
m-Xylene & p-Xylene	NV	0.2	ug/L	<0.80	<0.80	-	<0.80	<0.80	<0.80	<0.80	<0.80	-
o-Xylene	NV	0.4	ug/L	<0.40	<0.40	-	<0.40	<0.40	<0.40	<0.40	<0.40	-
Total Xylenes	3.9 mg/L (3900 ug/L)	0.89	ug/L	<0.89	<0.89	-	<0.89	<0.89	<0.89	<0.89	<0.89	-
Petroleum Hydrocarbons												
(1)												
F1 (C6-C10)	NV	100	ug/L	<100	<100	-	<100	<100	<100	<100	<100	-
F1 (C6-C10) - BTEX	NV	100	ug/L	<100	<100	-	<100	<100	<100	<100	<100	-
F2 (C10-C16)	NV	100	ug/L	<100	<100	-	<100	320	<100	<100	<100	-
F3 (C16-C34)	NV	100	ug/L	<100	<100	-	<100	260	<100	<100	<100	-
F4 (C34-C50)	NV	200	ug/L	<200	<200	-	<200	<200	<200	<200	<200	-
Reached Baseline at C50												
Extractable Hydrocarbons												
(1)												
Oil And Grease	15mg/L (15,000 ug/L)	2000	ug/L	<2,000	<2,000	-	<500	2,500	<500	500	<500	-
Total Metals												
(1)												
Aluminium	0.1 mg/L (100 ug/L)	3	ug/L	51	7.8	-	13.1	180	7	6.1	<6.1	-
Antimony	NV	0.6	ug/L	<0.60	<0.60	-	<0.50	<0.60	<0.50	<0.50	<0.50	-
Arsenic	0.005 mg/L (5 ug/L)	0.2	ug/L	0.36	0.26	-	0.26	0.9	0.21	0.23	0.23	9
Barium	NV	10	ug/L	84	82	2	72.9	140	121	121	121	0
Beryllium	NV	1	ug/L	<1.0	<1.0	-	<0.10	<1.0	<0.10	<0.10	<0.10	-
Boron (Total)	1.5 mg/L (1500 ug/L)	20	ug/L	59	72	-	56	110	74	69	69	-
Cadmium	0.00033 mg/L (0.33 ug/L)	0.01	ug/L	0.1	0.054	60	0.033	0.048	0.013	0.014	0.014	-
Chromium	NV	1	ug/L	2.5	1.8	-	1.5	<1.0	<1.0	<1.0	<1.0	-
Chromium (VI)	0.001 mg/L (1 ug/L)	0.99	ug/L	1.6	1.5	-	1.3	<0.99	<0.99	<0.99	<0.99	-
Cobalt	NV	0.3	ug/L	<0.30	<0.30	-	<0.20	<0.30	<0.20	<0.20	<0.20	-
Copper	0.004 mg/L (4 ug/L)	1	ug/L	2.2	1.7	-	1.72	1.3	0.7	0.59	-	-
Iron	0.3 mg/L (300 ug/L)	60	ug/L	80	<60	-	49	2,200	26	27	27	4
Lead	0.007mg/L (7 ug/L) / 0.001 mg/L (1 ug/L)	0.2	ug/L	0.93	0.36	-	0.49	4.7	<0.20	<0.20	<0.20	-
Manganese	0.520 mg/L (520 ug/L)	4	ug/L	<4.0	<4.0	-	2.3	40	1.8	2.1	<2.1	-
Mercury	0.000026 mg/L (0.026 ug/L)	0.0019	ug/L	0.0025	0.0029	-	0.0022	0.0103	<0.0019	0.0023	<0.0023	-
Molybdenum	0.073 mg/L (73 ug/L)	0.2	ug/L	0.92	1.2	-	1	0.67	<1.0	<1.0	<1.0	-
Nickel	0.150 mg/L (150 ug/L)	0.5	ug/L	0.62	0.61	-	<1.0	1.3	<1.0	<1.0	<1.0	-
Phosphorus	NV	100	ug/L	100	6.6	-	90	70	3	3.4	<3.4	-
Selenium	0.001 mg/L (1 ug/L)	0.2	ug/L	<0.20	0.2	-	0.27	<0.20	0.21	0.25	<0.25	17
Silver	0.00025 mg/L (0.25 ug/L)	0.1	ug/L	<0.10	<0.10	-	<0.020	<0.10	<0.020	<0.020	<0.020	-
Sulfur	NV	200	ug/L	5,800	5,700	2	5,500	5,900	7,700	9,200	<9,200	-
Thallium	0.0008 mg/L (0.8 ug/L)	0.2	ug/L	<0.20	<0.20	-	<0.010	<0.20	<0.010	<0.010	<0.010	-
Titanium	NV	1	ug/L	1.1	<1.0	-	<5.0	6	<5.0	<5.0	<5.0	-
Uranium	0.015 mg/L (15ug/L)	0.1	ug/L	0.27	0.33	-	0.31	0.36	0.34	0.34	<0.34	-
Vanadium	NV	1	ug/L	<1.0	<1.0	-	<5.0	1	<5.0	<5.0	<5.0	-
Zinc	0.01 mg/L (10 ug/L)	3	ug/L	17	8.1	-	7.6	4.7	<5.0	<5.0	<5.0	-
Routine Water												
(1)												
pH	6.5 - 9.0 / 6.9 - 9.0	N/A	pH	7.76	7.80	1	8.11	8.00	8.10	8.06	8.06	0
Electrical Conductivity	NV	2,000	uS/cm	360	370	-	380	620	690	680	680	-
Total Suspended Solids	50 mg/L	1.5	mg/L	18	19	5	9	160 (1)	0.61	<0.40	<0.40	-
Hardness	NV	0.5	mg/L	134	132	2	144	276	285	286	0	-
Total Alkalinity	NV	1	mg/L	120	120	0	120	230	250	250	0	-
Bicarbonate	NV	1	mg/L	140	150	7	150	280	300	300	0	-
Carbonate	NV	1	mg/L	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	-
Hydroxide	NV	1	mg/L	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	-
Calcium	NV	0.5	mg/L	35	35	0	36	69	80	80	80	1
Magnesium	NV	0.5	mg/L	12	11	9	13	18	21	21	0	-
Potassium	NV	0.5	mg/L	1.9	1.9	-	2	2	2	2	2	-
Sodium	NV	0.5	mg/L	21	21	0	22	35	37	37	1	-
Chloride	120 mg/L	1	mg/L	32	31	3	33	56	62	63	2	-
Sulphate (SO4)	NV	1	mg/L	19	19	0	16	18	24	24	0	-
Ionic Balance	NV	n/a	%	0.073	1.6	-		0.2				-
Nutrients												
(1)												
Ammonia	0.0231 mg/L	0.015	mg/L	<0.015	<0.015	-	0.33	0.053	0.76	0.15	0.15	334
Nitrate - N	13 mg/L	0.01	mg/L	0.87	0.86	1	1.2	<0.050	0.038	0.034	0.034	-
Nitrite - N	0.197 mg/L	0.01	mg/L	<0.010	<0.010	-	0.019	<0.010	<0.010	<0.010	<0.010	-
Nitrate and Nitrite - N	NV	0.01	mg/L	0.87	0.86	1	1.3	<0.050 (1)	0.038	0.034	0.034	-
Polycyclic Aromatic Hydrocarbons												
(2)												
Calculated Parameters												
Benz[a]pyrene (TPE)	NV	0.010	ug/L	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	-
Specific Parameters												
Acenaphthene	0.0058 mg/L (5.8 ug/L)	0.1	ug/L	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	-
Acenaphthylene	NV	0.1	ug/L	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	-
Acridine	0.0044 mg/L (4.4 ug/L)	0.04	ug/L	<0.040	<0.040	-	<0.10	<0.040	<0.10	<0.10	<0.10	-
Anthracene	0.000012 mg/L (0.012 ug/L)	0.01	ug/L	<0.010	<0.010	-	<0.040	<0.010	<0.040	<0.040	<0.040	-
Benz[a]anthracene	0.000018 mg/L (0.018 ug/L)	0.0085	ug/L	<0.0085	<0.0085	-	<0.010	<0.0085	<0.010	<0.010	<0.010	-
Benz[b]fluoranthene	NV	0.0085	ug/L	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-
Benz[k]fluoranthene	NV	0.0085	ug/L	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-
Benz[ghi]perylene	NV	0.05	ug/L	<0.0085	<0.0085	-	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	-
Benz[c]phenanthrene	NV	0.0075	ug/L	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	-
Benz[a]pyrene	0.000015 mg/L (0.015 ug/L)	0.0085	ug/L	<0.0075	<0.0075	-	<0.0085	<0.0075	<0.0085	<0.0085	<0.0085	-
Benz[e]pyrene	NV	0.05	ug/L	<0.050	<0.050	-	<0.0075	<0.050	<0.0075	<0.0075	<0.0075	-
Chrysene	NV	0.0085	ug/L	<0.0085	<0.0085	-	<0.050	<0.0085	<0.050	<0.050	<0.050	-
Dibenzo[a,h]anthracene	NV	0.0075	ug/L	<0.0075	<0.0075	-	<0.0085	<0.0075	<0.0085	<0.0085	<0.0085	-
Fluoranthene	0.00004 mg/L (0.04 ug/L)	0.1	ug/L	<0.010	<0.010	-	<0.0075	<0.010	<0.0075	<0.0075	<0.0075	-
Fluorene	0.003 mg/L (3 ug/L)	0.05	ug/L	<0.050	<0.050	-	<0.010	<0.050	<0.010	<0.010	<0.010	-
Indeno[1,2,3-c,d]pyrene	NV	0.0085	ug/L	<0.0085	<0.0085	-	<0.050	<0.0085	<0.050	<0.050	<0.050	-
1-Methylnaphthalene	NV	0.1	ug/L	<0.10	<0.10	-	<0.0085	<0.10	<0.0085	<0.0085	<0.0085	-
2-Methylnaphthalene	NV	0.1	ug/L	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	-
Naphthalene	0.0011 mg/L (1.1 ug/L)	0.1	ug/L	<0.10	<0.10	-	<0.10	<0.10	<0.10	<0.10	<0.10	-
Phenanthrene	0.0004 mg/L (0.4 ug/L)	0.05	ug/L	<0.050	<0.050	-	<0.10	<0.050	<0.10	<0.10	<0.10	-
Pyrene	NV	0.05	ug/L	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	-
Pyrene	0.000025 mg/L (0.025 ug/L)	0.02	ug/L	<0.020	<0.020	-	<0.020	<0.020	<0.020	<0.020	<0.020	-
Quinoline	0.0034 mg/L (3.4 ug/L)	0.2	ug/L	<0.20	<0.20	-	<0.020	<0.20	<0.020	<0.020	<0.020	-
Misc. Organics												
(1)												
Phenols	0.004 mg/L (4 ug/L)	1.5	ug/L	<1.5	<1.5	-	<0.20	-	<0.20	<0.20	<0.20	-

RDL exceeds guideline value
Guideline Exceedance

Guideline 1 CCME Water Quality for the Protection of Aquatic Life, Freshwater Pathway (Marine Pathway excluded)
Maximum Allowable Concentration (MAC) (Derived) Concentration in per Water Licence No. 188-RBL1929

COMPARATIVE GUIDELINE USED IS SHOWN IN BOLD IN TABLE

Notes:

NV - No value

RDL - Reportable detection limit

RPD - Relative percent difference calculated as (abs

				Resolute Bay EMP			
				AEC 3 - Former Vehicle and Metal Storage Area			
Sample ID	Guideline	Reportable	Units	RBL-13	RBL-13	RBL-16	RBL-16
Laboratory ID	(1)	Detection		AD46458	AD46459	AD46459	AD46459
Sampling Date		ug/L		3-Aug-2022	27-Aug-2021	3-Aug-2022	27-Aug-2021
PARAMETERS							
BTEX							
Benzene	0.37mg/L (370 ug/L)	0.2	ug/L	<0.40	<0.40	<0.40	<0.40
Toluene	0.002 mg/L (2 ug/L)	0.2	ug/L	<0.40	<0.40	<0.40	<0.40
Ethylbenzene	0.090 mg/L (90 ug/L)	0.2	ug/L	<0.40	<0.40	<0.40	<0.40
m-Xylene & p-Xylene	NV	0.2	ug/L	<0.80	<0.80	<0.80	<0.80
o-Xylene	NV	0.4	ug/L	<0.40	<0.40	<0.40	<0.40
Total Xylenes	3.9 mg/L (3900 ug/L)	0.89	ug/L	<0.89	<0.89	<0.89	<0.89
Petroleum Hydrocarbons							
F1 (C6-C10)	NV	100	ug/L	<100	<100	<100	<100
F1 (C6-C10) - BTEX	NV	100	ug/L	<100	<100	<100	<100
F2 (C10-C16)	NV	100	ug/L	<100	<100	<100	<100
F3 (C16-C34)	NV	100	ug/L	<100	<100	<100	<100
F4 (C34-C50)	NV	200	ug/L	<200	<200	<200	<200
Reached Baseline at C50							
Extractable Hydrocarbons							
Oil And Grease	15mg/L (15,000 ug/L)	2000	ug/L	<2,000	<500	<2,000	<500
Total Metals							
Aluminum	0.1 mg/L (100 ug/L)	3	ug/L	10	399	34	147
Antimony	NV	0.6	ug/L	<0.60	<0.50	<0.60	<0.50
Arsenic	0.005 mg/L (5 ug/L)	0.2	ug/L	<0.20	0.27	<0.20	0.18
Barium	NV	10	ug/L	<10	17.2	<10	15.5
Beryllium	NV	1	ug/L	<1.0	<0.10	<1.0	<0.10
Boron (Total)	1.5 mg/L (1500 ug/L)	20	ug/L	21	115	23	131
Calcium	0.00033 mg/L (0.33 ug/L)	0.01	ug/L	<0.020	0.018	<0.020	0.016
Chromium	NV	1	ug/L	<1.0	1	<1.0	<1.0
Chromium (VI)	0.001 mg/L (1 ug/L)	0.99	ug/L	<0.99	<0.99	<0.99	<0.99
Cobalt	NV	0.3	ug/L	<0.30	0.23	<0.30	<0.20
Copper	0.004 mg/L (4 ug/L)	1	ug/L	<1.0	0.86	<1.0	1.87
Iron	0.3 mg/L (300 ug/L)	60	ug/L	<60	507	72	177
Lead	0.007mg/L (7 ug/L) / 0.001 mg/L (1 ug/L)	0.2	ug/L	<0.20	0.51	<0.20	0.51
Manganese	0.520 mg/L (520 ug/L)	4	ug/L	<4.0	12.3	<4.0	5.3
Mercury	0.000026 mg/L (0.026 ug/L)	0.0019	ug/L	<0.0019	<0.0019	<0.0019	<0.0019
Molybdenum	0.073 mg/L (73 ug/L)	0.2	ug/L	<0.20	<1.0	<0.20	<1.0
Nickel	0.150 mg/L (150 ug/L)	0.5	ug/L	<0.50	<1.0	<0.50	<1.0
Phosphorus	NV	100	ug/L	<100	18	<100	4.2
Selenium	0.001 mg/L (1 ug/L)	0.2	ug/L	<0.20	0.1	<0.20	<0.10
Silver	0.00025 mg/L (0.25 ug/L)	0.1	ug/L	<0.10	<0.020	<0.10	<0.020
Sulfur	NV	200	ug/L	6200	16,200	6,300	20,700
Thallium	0.0008 mg/L (0.8 ug/L)	0.2	ug/L	<0.20	<0.010	<0.20	<0.010
Titanium	NV	1	ug/L	<1.0	11.9	1.4	<5.0
Uranium	0.015 mg/L (15ug/L)	0.1	ug/L	0.22	0.55	0.24	0.63
Vanadium	NV	1	ug/L	<1.0	<5.0	<1.0	<5.0
Zinc	0.01 mg/L (10 ug/L)	3	ug/L	<3.0	<5.0	<3.0	<5.0
Routine Water							
pH	6.5 - 9.0 / 6.9 - 9.0	N/A	pH	7.47	8.15	7.48	8.22
Electrical Conductivity	NV	2,000	uS/cm	230	680	230	750
Total Suspended Solids	50 mg/L	1.5	mg/L	0.45	46	6	18
Hardness	NV	0.5	mg/L	105	253	107	220
Total Alkalinity	NV	1	mg/L	83	130	86	140
Bicarbonate	NV	1	mg/L	100	160	100	180
Carbonate	NV	1	mg/L	<1.0	<1.0	<1.0	<1.0
Hydroxide	NV	1	mg/L	<1.0	<1.0	<1.0	<1.0
Calcium	NV	0.5	mg/L	34	64	33	55
Magnesium	NV	0.5	mg/L	4.9	23	4.8	20
Potassium	NV	0.5	mg/L	0.6	3	0.6	4
Sodium	NV	0.5	mg/L	5.2	64	5.4	75
Chloride	120 mg/L	1	mg/L	6.3	100	6.4	120
Sulphate (SO4)	NV	1	mg/L	20	52	20	60
Ionic Balance	NV	n/a	%	1.3		0.95	
Nutrients							
Ammonia	0.0231 mg/L	0.015	mg/L	<0.015	0.53	<0.015	0.85
Nitrate - N	13 mg/L	0.01	mg/L	0.27	0.071	0.26	0.014
Nitrite - N	0.197 mg/L	0.01	mg/L	<0.010	<0.010	<0.010	<0.010
Nitrate and Nitrite - N	NV	0.01	mg/L	0.27	0.071	0.26	0.014
Polycyclic Aromatic Hydrocarbons							
Calculated Parameters							
Benz(a)pyrene (TP)	NV	0.010	ug/L	<0.010	<0.010	<0.010	<0.010
Specific Parameters							
Acenaphthene	0.0058 mg/L (5.8 ug/L)	0.1	ug/L	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	NV	0.1	ug/L	<0.10	<0.10	<0.10	<0.10
Acridine	0.0044 mg/L (4.4 ug/L)	0.04	ug/L	<0.040	<0.10	<0.040	<0.10
Anthracene	0.000012 mg/L (0.012 ug/L)	0.01	ug/L	<0.010	<0.040	<0.010	<0.040
Benzo(a)anthracene	0.000018 mg/L (0.018 ug/L)	0.0085	ug/L	<0.0085	<0.010	<0.0085	<0.010
Benzo(b)fluoranthene	NV	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(k)fluoranthene	NV	0.0085	ug/L	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(g,h,i)perylene	NV	0.05	ug/L	<0.0085	<0.0085	<0.0085	<0.0085
Benzo(j)phenanthrene	NV	0.0075	ug/L	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	0.000015 mg/L (0.015 ug/L)	0.0085	ug/L	<0.0075	<0.0085	<0.0075	<0.0085
Benzo(e)pyrene	NV	0.05	ug/L	<0.050	<0.0075	<0.050	<0.0075
Chrysene	NV	0.0085	ug/L	<0.0085	<0.050	<0.0085	<0.050
Dibenzo(a,h)anthracene	NV	0.0075	ug/L	<0.0075	<0.0085	<0.0075	<0.0085
Fluoranthene	0.00004 mg/L (0.04 ug/L)	0.1	ug/L	<0.010	<0.0075	<0.010	<0.0075
Fluorene	0.003 mg/L (3 ug/L)	0.05	ug/L	<0.050	<0.010	<0.050	<0.010
Indeno(1,2,3-c,d)pyrene	NV	0.0085	ug/L	<0.0085	<0.050	<0.0085	<0.050
1-Methylnaphthalene	NV	0.1	ug/L	<0.10	<0.0085	<0.10	<0.0085
2-Methylnaphthalene	NV	0.1	ug/L	<0.10	<0.10	<0.10	<0.10
Naphthalene	0.0011 mg/L (1.1 ug/L)	0.1	ug/L	<0.10	<0.10	<0.10	<0.10
Phenanthrene	0.0004 mg/L (0.4 ug/L)	0.05	ug/L	<0.050	<0.050	<0.050	<0.050
Perylene	NV	0.05	ug/L	<0.050	<0.050	<0.050	<0.050
Pyrene	0.000025 mg/L (0.025 ug/L)	0.02	ug/L	<0.020	<0.050	<0.020	<0.050
Quinoline	0.0034 mg/L (3.4 ug/L)	0.2	ug/L	<0.20	<0.020	<0.20	<0.020
Misc. Organics							
Phenols	0.004 mg/L (4 ug/L)	1.5	ug/L	<1.5	<0.20	<1.5	<0.20

RDL exceeds guideline value
Guideline Exceedance

Guideline 1 CME Water Quality for the Protection of Aquatic Life, Freshwater Pathway (Marine Pathway excluded)
Maximum Allowable Effluent Discharge Concentrations as per Water Licence No. 18R-R6L19.29

COMPARATIVE GUIDELINE USED IS SHOWN IN BOLD IN TABLE

Notes:

NV - No value

RDL - Reportable detection limit

RPD - Relative percent difference calculated as (abs(C1-C2)/average(C1+C2))*100

"-" Indicates RPD not calculated. RPD cannot be calculated if one or more of the analytical results are less than detection limits or within 5 times the detection limits.

BOLD - RPD value greater than 40%

Appendix D

Field Notes

- Spring Inspection = July 14, 2022
- As part of Monitoring Pgm = Aug 4, 2022

AEC1 : Inactive Solid Waste LF

TABLE 1: GENERAL AEC 1 VISUAL INSPECTION MATRIX

Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report (2021)	Current Observations (2022)
Settlement	✓		Not observed	Not observed
Erosion	✓		Not observed	Not observed
Frost Action	✓		Not observed	Not observed
Animal Burrows		✓	Not observed	Not observed
Vegetation	✓		Acceptable - No vegetation cap, some isolated trees	SAME , Acceptable / Isolated
Staining		✓	Not observed	Not observed
Vegetation Stress	✓		Not observed	Not observed
Seepage Points	✓		Acceptable / Occasional pooling @ toe of LF along south side near sewage lagoon	SAME , Acceptable / Occasional
Exposed Debris		✓	Not observed	Not observed
Condition of Monitoring Instruments		✓	Acceptable - Minor repairs, sand/bentonite added to base of RBL-3 casing	Acceptable - AEC1-GWL casing slight bent. J-plug added
Grades/ Topography	✓		Acceptable as per LF design	SAME
Distance to downgradient surface water bodies	✓		Occasional; SW mapped as per previous.	SAME
Distance to freshwater/marine habitat and habitat usage	✓		Acceptable → set back from marine discharge	SAME
Terrestrial Habitat		✓	Acceptable - Cdn geese/scar observed near SW ponds (200m S of RBL-2)	Not observed
Land Uses		✓	Acceptable - Industrial (non operational, open, unrestricted Airport property)	Acceptable
Debris		✓	Not observed	Not observed

TABLE 1: SITE SPECIFIC AEC 1 RISKS VISUAL INSPECTION MATRIX

Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report	Current Observations
Ensuring landfill cover thickness	✓		Acceptable - as per LF design	Acceptable
Snow cover, including measured depth	✓		Not observed	Not observed
Sun exposure	✓		No sig. weather related conditions ↓	Acceptable ↓
Surface temperature	✓			
Wind effects	✓			
Surface Drainage	✓		Acceptable as per LF design Drainage via swale system	Acceptable
Sewage Lagoon Overflow		✓	Acceptable as per LF design no overflow	- SAME
potential percolation into landfill cap	✓		Acceptable - no pooling	- SAME - dry soils
Ensuring a sufficiently high degree of saturation of the barrier layer below the active zone	✓		Acceptable	Acceptable
Runoff Diversion	✓		Acceptable - swales/drainage operating as per LF design	Acceptable - SAME

- Spring Inspection = July 14, 2022
- As part of Monitoring Pgm = Aug 4, 2022

AEC 2: Historical LF

TABLE 4: GENERAL AEC 2 VISUAL INSPECTION MATRIX

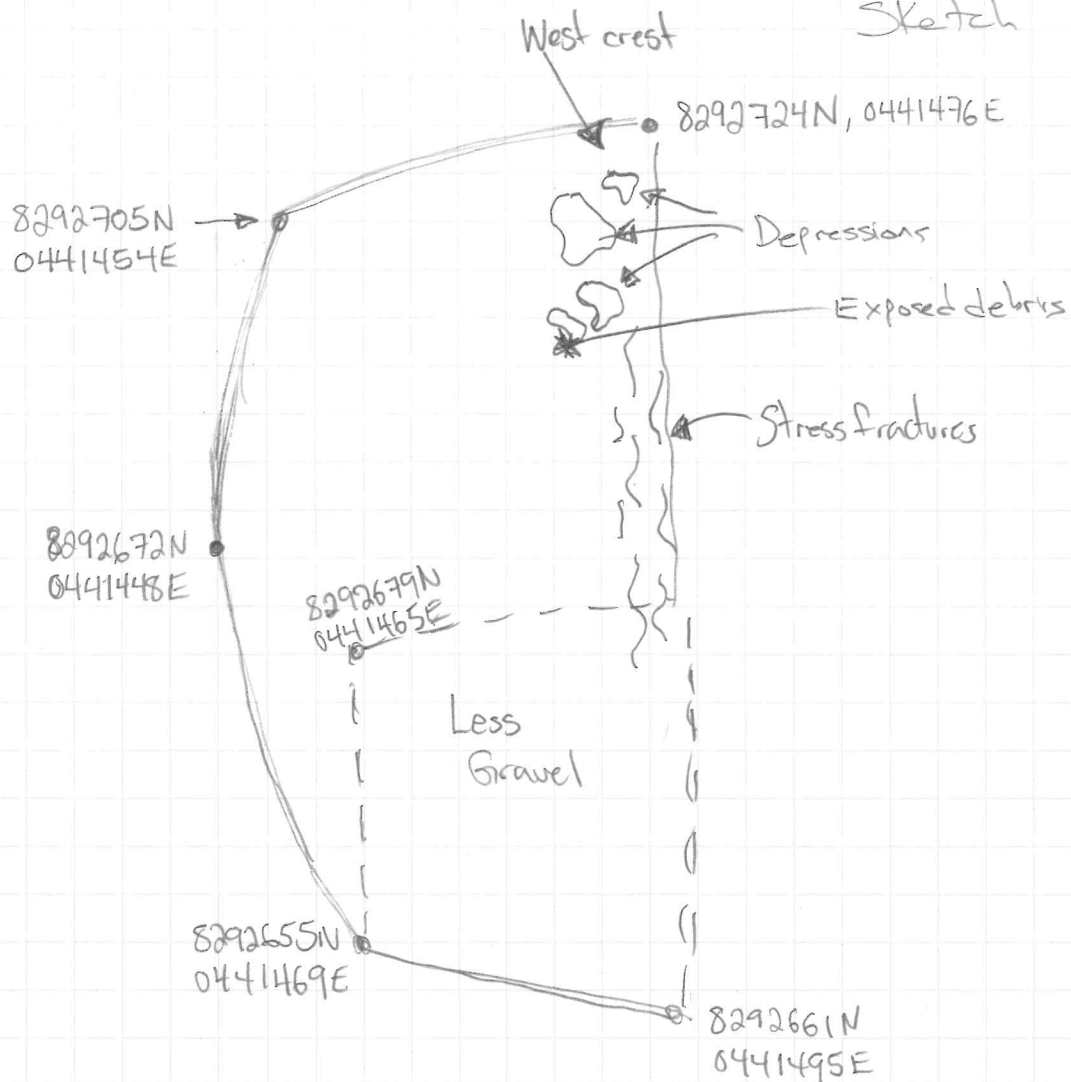
Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report (2021)	Current Observations (2022)
Settlement	✓		Acceptable - Isolated stress fractures/cracking West edge	Acceptable/Isolated - Stress cracks, cracking, depressions, exposed debris noted on West crest ↳ See attached site sketch
Erosion	✓		↓	
Frost Action	✓		Not observed	Not observed
Animal Burrows		✓	Not observed	Not observed
Vegetation	✓		Acceptable/Isolated at toe	SAME
Staining		✓	Not observed	Not observed
Vegetation Stress	✓		Not observed	Not observed
Seepage Points	✓		Acceptable	Not observed
Exposed Debris		✓	Acceptable - Isolated domestic debris on cap, likely windblown from surrounding	Acceptable → Isolated, minor debris on surface crest near disturbed area
Condition of Monitoring Instruments		✓	Acceptable - minor repairs to RBL-6	Marginal → RBL-5 broke @ surface (repaired but very shallow). Liked won't produce water. FL-AW-6 PVC pipe
Grades/ Topography	✓		Acceptable as per LF design	Acceptable/Isolated - patch of una- less gravel on West slope
Distance to downgradient surface water bodies	✓		Occasional - no SW @ toe small ponds as previously mapped	SAME - no new SW
Distance to freshwater/marine habitat and habitat usage	✓		Acceptable - set back from marine discharge	SAME
Terrestrial Habitat		✓	Acceptable - Arctic fox - Grease Iscat	None observed
Land Uses		✓	Industrial (non operational open, unrestricted Airport property)	SAME
Debris		✓	None observed	See exposed debris

TABLE 5: AEC 2 SITE SPECIFIC RISKS VISUAL INSPECTION MATRIX

Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report	Current Observations
Permafrost Degradation	✓		None observed	None observed
Snow cover duration	✓		None observed	None observed
Sun exposure	✓		Acceptable - No sig. weather related conditions	SAME
Surface temperature	✓		↓	↓
Wind	✓			
Surface water drainage and potential percolation into landfill cap	✓		Acceptable - swale/drainage system operating as designed	SAME
Runoff Diversion	✓		↓	↓
Permafrost Degradation	✓		None observed	None observed
Snow cover duration	✓			

Aug 4/22

AEC 2: Historical Landfill → Disturbed Area (West side) Sketch



- Spring Inspection = July 14, 2022
- As part of Monitoring Pgm = Aug 4, 2022

AEC 3: Former Vehicle & Waste
Metal Storage Area

TABLE 8: GENERAL AEC 3 VISUAL INSPECTION MATRIX

Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report	Current Observations
Settlement	✓		Acceptable, isolated, slope failure (natural) 15 m length along N. edge of EX1 remedial area	SAME - no change
Erosion	✓		Not observed	Not observed
Frost Action	✓		↓	Not observed
Animal Burrows		✓		Not observed
Vegetation	✓			Not observed
Staining		✓		Acceptable, isolated; two burn areas noted. Camp fires?
Vegetation Stress	✓			Not observed
Seepage Points	✓		Acceptable - no pooling in remedial areas. Occasional pooling south as per prev.	Acceptable, no pooling on site
Exposed Debris		✓	Not observed	Not observed
Condition of Monitoring Instruments		✓	Acceptable - minor repairs to casing have RBL-10	Acceptable - no issues noted
Grades/ Topography	✓		Acceptable as per design	SAME
Distance to downgradient surface water bodies	✓		Acceptable - no flow	SAME
Distance to freshwater/marine habitat and habitat usage	✓		↓ to valley stream	↓
Terrestrial Habitat		✓	Acceptable - Polar bear noted in valley	Acceptable - no wild life observed
Land Uses		✓	Acceptable - wild lands	Acceptable - Isolated - two burn areas due to camp fires
Debris		✓	Not observed	Not observed

TABLE 5: AEC 3 SITE SPECIFIC RISKS VISUAL INSPECTION MATRIX

Observation Parameter	Operational Feature	Maintenance Feature	Observations from Previous Report	Current Observations
Permafrost Degradation	✓		Not observed	Not observed
Snow cover duration	✓		Acceptable - no sig weather related conditions	SAME
Sun exposure	✓		↓	↓
Surface temperature	✓			
Wind	✓			
Surface water drainage and potential percolation into landfill cap	✓		Acceptable as per design no pooling on-site (North side of access road)	Acceptable - no pooling North/South side of access road
Runoff Diversion	✓		Not observed	Not observed
Permafrost Degradation	✓			
Snow cover duration	✓			

AEC 1
RBL-1

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

All bottles
collected

Site Name: _____ Landfill Name: AEC 1
Date: Aug 3/22 Time: 10:50
Weather: Overcast 6°C
Monitoring Well ID: RBL-1 UTM Coordinates: 8295632 N 0441146 E
Sample #: _____ Duplicate #: _____
Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
Name(s) of Sampler(s): KV
Ponded Water, Snow Depth, etc.: None
Well Condition/Repair Requirements: Good
Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): 2" (Pipe Diameter)
Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle App
Well Stickup (Ground to Top of Pipe) (m): 0.52m
Depth to Water (From Top of Pipe) (m): 1.12m
Calculated Static Water Level (mbgs): _____
Well Refusal Depth (m): 1.58m (Measure Refusal After Sampling)
Thickness of Water Column (m): 0.46 Water Volume (L): 2.875L (Calculated)
Free Product Thickness (mm): nil Sludge/Silt: ☒ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow
Water Quality Parameter Equipment: Horiba Calibration Details: _____
Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ < Recharge Rate ☐ > Recharge Rate
Total Volume Purged (L): ~2L (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity mS/cm	Turbidity (NTU)	Temperature (°C)
<u>Aug 3/22 10:30</u>	<u>8.34</u>	<u>0.436</u>	<u>1000</u>	<u>4.11</u>
<u>10:36</u>	<u>7.86</u>	<u>0.456</u>	<u>1000</u>	<u>3.46</u>
<u>10:40</u>	<u>7.79</u>	<u>0.466</u>	<u>777</u>	<u>3.36</u>
Final Time:	Final Values:			

Clear? ☐ Y ☒ N
PHC Sheen? ☐ Y ☒ N
Free Product/PHC Globules? ☐ Y ☒ N

Colour: light brown turbid → to clearish
PHC Odour? ☐ Y ☒ N
Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
Close Up/Wide Angle/Panoramic: _____ Direction: _____
Scale Indicated? ☐ Y ☐ N Line of Sight: _____

AECI-GW1

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

All bottles
collected

Site Name: _____ Landfill Name: AECI
 Date: Aug 3/22 Time: 1700
 Weather: Overcast
 Monitoring Well ID: AECI-GW1 UTM Coordinates: 8295526 N 0441063 E
 Sample #: _____ Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good, slight bend, Replaced cap w/ J-plug
 Lock Make/Model/Condition/Replaced: No lock

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): 2" (Pipe Diameter)
 Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle
 Well Stickup (Ground to Top of Pipe) (m): 0.98m
 Depth to Water (From Top of Pipe) (m): 1.54m
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): 1.822m (Measure Refusal After Sampling)
 Thickness of Water Column (m): 0.282m Water Volume (L): 1.73L (Calculated)
 Free Product Thickness (mm): N/A Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow
 Water Quality Parameter Equipment: Horiba Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): ~2L (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity mS (μ S/cm)	Turbidity (NTU)	Temperature (°C)
<u>Aug 3/22 17:15</u>	<u>7.07</u>	<u>1.16</u>	<u>139</u>	<u>9.0</u>
<u>17:23</u>	<u>7.01</u>	<u>1.10</u>	<u>122</u>	<u>8.77</u>
<u>17:30</u>	<u>6.97</u>	<u>1.09</u>	<u>127</u>	<u>8.90</u>
Final Time:	Final Values:			

Clear? ☒ Y ☐ N Colour: - Clear to light grey
 PHC Sheen? ☐ Y ☒ N PHC Odour? ☐ Y ☐ N
 Free Product/PHC Globules? ☐ Y ☒ N Other Odour? Sewage

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-2

All bottles
collected
- good recharge

Site Name: _____ Landfill Name: AEC 1
Date: Aug 4/22 Time: 1000
Weather: Sunny 10°C
Monitoring Well ID: RBL-2 UTM Coordinates: 6295553 N 0440941 E
Sample #: _____ Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
Name(s) of Sampler(s): KV
Ponded Water, Snow Depth, etc.: No
Well Condition/Repair Requirements: Good
Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): — Diameter (cm): 2" (Pipe Diameter)
Depth to Top of Screen (mbgs): — Screen Length (m): —

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☐ Other Eagle Oppa
Well Stickup (Ground to Top of Pipe) (m): 0.67m
Depth to Water (From Top of Pipe) (m): 1.342m
Calculated Static Water Level (mbgs): _____
Well Refusal Depth (m): 1.476m (Measure Refusal After Sampling)
Thickness of Water Column (m): 0.128m Water Volume (L): 0.8L (Calculated)
Free Product Thickness (mm): N/A Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow
Water Quality Parameter Equipment: _____ Calibration Details: _____
Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
Total Volume Purged (L): 1L (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
* Not enough water to record field parameters				
Final Time:	Final Values:			

Clear? ☒ Y ☐ N Colour: Clear
PHC Sheen? ☐ Y ☒ N PHC Odour? ☐ Y ☒ N
Free Product/PHC Globules? ☐ Y ☒ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
Close Up/Wide Angle/Panoramic: _____ Direction: _____
Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-3

All bottles collected
→ Good recharge

Site Name: _____ Landfill Name: AEC I
Date: Aug 4/07 Time: 1030
Weather: Sunny 10°C
Monitoring Well ID: RBL-3 UTM Coordinates: 8295612 N 040900 E
Sample #: _____ Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
Name(s) of Sampler(s): KV
Ponded Water, Snow Depth, etc.: No
Well Condition/Repair Requirements: Good
Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): 2" (Pipe Diameter)
Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Open
Well Stickup (Ground to Top of Pipe) (m): 0.66m
Depth to Water (From Top of Pipe) (m): 0.867m
Calculated Static Water Level (mbgs): _____
Well Refusal Depth (m): 1.434m (Measure Refusal After Sampling)
Thickness of Water Column (m): 0.567m Water Volume (L): 3.54L (Calculated)
Free Product Thickness (mm): N/A Sludge/Silt: ☐ Y ☒ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow
Water Quality Parameter Equipment: Horiba Calibration Details: _____
Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ Recharge Rate ☐ > Recharge Rate
Total Volume Purged (L): 3L (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity mS (µS/cm)	Turbidity (NTU)	Temperature (°C)
<u>Aug 4 1045</u>	<u>7.98</u>	<u>0.441</u>	<u>1000</u>	<u>7.04</u>
<u>1050</u>	<u>7.61</u>	<u>0.460</u>	<u>1000</u>	<u>5.81</u>
<u>1100</u>	<u>7.21</u>	<u>0.477</u>	<u>46.5</u>	<u>5.04</u>
<u>1102</u>	<u>7.15</u>	<u>0.466</u>	<u>47.7</u>	<u>5.99</u>
Final Time:	Final Values:			

Clear? ☐ Y ☒ N Colour: light brown → clear
PHC Sheen? ☐ Y ☒ N PHC Odour? ☐ Y ☒ N
Free Product/PHC Globules? ☐ Y ☒ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
Close Up/Wide Angle/Panoramic: _____ Direction: _____
Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL 4
(SW)
DUPC

Site Name: _____ Landfill Name: AEC 1
 Date: AUG 3/22 Time: 1745
 Weather: Partly Cloudy SUC
 Monitoring Well ID: RBL-4 UTM Coordinates: 8295627 N 0440884 E
 Sample #: _____ Duplicate #: DUPC
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: NO
 Well Condition/Repair Requirements: _____
 Lock Make/Model/Condition/Replaced: _____

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): _____ (Pipe Diameter)
 Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☐ Interface Probe ☐ Water Level Tape ☐ Other _____
 Well Stickup (Ground to Top of Pipe) (m): _____
 Depth to Water (From Top of Pipe) (m): _____
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): _____ (Measure Refusal After Sampling)
 Thickness of Water Column (m): _____ Water Volume (L): _____ (Calculated)
 Free Product Thickness (mm): _____ Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____
 Water Quality Parameter Equipment: _____ Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time: _____	Final Values: _____			

Clear? ☐ Y ☐ N Colour: _____
 PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N
 Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-5
(2.7)

Site Name:

Landfill Name:

Date: Aug 2 / 22

Time: 1100

Weather: Overcast 7°C

Monitoring Well ID: RBL-5

UTM Coordinates: 8292511 N 0441661 E

Sample #:

Duplicate #:

Bottles Filled (by Parameter Type): ☐ PHC F1

☐ Metals

☐ PHC F2-F4

☐ PCB

Preservatives Used for PHC Fraction(s): ☐ Methanol

☐ Sodium Bisulfate

☐ Other: _____

☐ None

Name(s) of Sampler(s):

Ponded Water, Snow Depth, etc.: No

Well Condition/Repair Requirements:

Well was broke @ grade, repaired, Depth/Screen only ~0.2mbgs

Lock Make/Model/Condition/Replaced:

Good, Crown C lock

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ~0.2mbgs

Diameter (cm): 2"

(Pipe Diameter)

Depth to Top of Screen (mbgs):

Screen Length (m):

Field Measurements

Measurement Method: ☒ Interface Probe

☐ Water Level Tape

☐ Other

Eagle - oppm

Well Stickup (Ground to Top of Pipe) (m): 0.60m

Depth to Water (From Top of Pipe) (m): n/a

Calculated Static Water Level (mbgs):

Well Refusal Depth (m): 0.855m

(Measure Refusal After Sampling)

Thickness of Water Column (m):

Water Volume (L):

(Calculated)

Free Product Thickness (mm):

Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique:

Water Quality Parameter Equipment:

Calibration Details:

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N

Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L):

(Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (μ S/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N

Colour:

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour?

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s):

Washes/Rinses:

Photographic Records

Photo Numbers/IDs:

Close Up/Wide Angle/Panoramic:

Direction:

Scale Indicated? ☐ Y ☐ N

Line of Sight:

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

FL-MW-6
(dry)

Site Name: _____

Landfill Name: AEC 2

Date: Aug 2/22

Time: 1400

Weather: Overcast 7°C

Monitoring Well ID: FL-MW-6

UTM Coordinates: 8292485 N 0441484 E

Sample #: _____

Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1

☐ Metals

☐ PHC F2-F4

☐ PCB

Preservatives Used for PHC Fraction(s): ☐ Methanol

☐ Sodium Bisulfate

☐ Other: _____

☐ None

Name(s) of Sampler(s): KV

Ponded Water, Snow Depth, etc.: No

Well Condition/Repair Requirements: Well cap was stuck, lifted well when removing, Replaced cap

Lock Make/Model/Condition/Replaced: No lock, Casing lid bent too

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ?

Diameter (cm): 2" (Pipe Diameter)

Depth to Top of Screen (mbgs): ?

Screen Length (m): ?

Field Measurements

Measurement Method: ☒ Interface Probe

☐ Water Level Tape

☐ Other Flagle - Oppm

Well Stickup (Ground to Top of Pipe) (m): ~0.90m

Depth to Water (From Top of Pipe) (m): -0.965m

Calculated Static Water Level (mbgs): _____

Well Refusal Depth (m): -0.965m

(Measure Refusal After Sampling)

Thickness of Water Column (m): N/A

Water Volume (L): _____

(Calculated)

Free Product Thickness (mm): N/A

Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____

Water Quality Parameter Equipment: _____

Calibration Details: _____

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N

Purge Rate: ☐ $<$ Recharge Rate ☐ $>$ Recharge Rate

Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (μ S/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N

Colour: _____

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s): _____

Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____

Close Up/Wide Angle/Panoramic: _____

Direction: _____

Scale Indicated? ☐ Y ☐ N

Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-6
(very little
to no water)

Collected only: Aug
• BTEX F1-F4
• Metals (total)
• 1/4 Nutrients bottle

Site Name: _____
Date: Aug 2 / 22

Landfill Name: AEC-2
Time: 1500

Weather: _____
Monitoring Well ID: RBL-6 UTM Coordinates: 8292570 N 0441419 E

Sample #: _____ Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None

Name(s) of Sampler(s): KV

Ponded Water, Snow Depth, etc.: No

Well Condition/Repair Requirements: Good

Lock Make/Model/Condition/Replaced: Yes Crown 102/40

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ? Diameter (cm): 2" (Pipe Diameter)
Depth to Top of Screen (mbgs): ? Screen Length (m): ?

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Oppm

Well Stickup (Ground to Top of Pipe) (m): ~0.75m

Depth to Water (From Top of Pipe) (m): 0.825m

Calculated Static Water Level (mbgs): 0.825m

Well Refusal Depth (m): 0.870m (Measure Refusal After Sampling)

Thickness of Water Column (m): 0.045 Water Volume (L): 0.28L (Calculated)

Free Product Thickness (mm): n/a Sludge/Silt: ☐ Y ☐ N

No sample collected

Purging Information Summary

Purging/Sampling Equipment/Technique: Low Flow

Water Quality Parameter Equipment: _____ Calibration Details: _____

Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Not enough water for field parameters				
Final Time:	Final Values:			

Clear? ☐ Y ☐ N

Colour: _____

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____

Close Up/Wide Angle/Panoramic: _____ Direction: _____

Scale Indicated? ☐ Y ☐ N Line of Sight: _____

RBL-7

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

All samples collected Aug 2
→ Limited large routine filled

Site Name: _____ Landfill Name: AEC 2
 Date: Aug 2/22 Time: 1830
 Weather: Overcast 6°C
 Monitoring Well ID: RBL-7 UTM Coordinates: 8292638 N 0441382 E
 Sample #: _____ Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good
 Lock Make/Model/Condition/Replaced: Crown / 102-40 / Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): 2" (Pipe Diameter)
 Depth to Top of Screen (mbgs): ? Screen Length (m): ?

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Oppm
 Well Stickup (Ground to Top of Pipe) (m): 0.52m
 Depth to Water (From Top of Pipe) (m): 1.24m
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): 1.435m (Measure Refusal After Sampling)
 Thickness of Water Column (m): 0.095m Water Volume (L): ~1.22L (Calculated)
 Free Product Thickness (mm): _____ Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow
 Water Quality Parameter Equipment: Horiba Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Battery Died with out *

Time (Note Dates if Multiple Days Required)	pH	Conductivity mS (µS/cm)	Turbidity (NTU)	Temperature (°C)
<u>Aug 3, 2022 8:50AM</u>	_____	_____	_____	_____
<u>9:15AM</u>	<u>6.42</u>	<u>0.001</u>	<u>315</u>	<u>8.79</u>
<u>9:30</u>	<u>7.84</u>	<u>0.591</u>	<u>294</u>	<u>4.56</u>
<u>9:37</u>	<u>7.93</u>	<u>0.597</u>	<u>171</u>	<u>5.08</u>
Final Time:	Final Values:			

Clear? ☒ Y ☐ N Colour: Clean
 PHC Sheen? ☐ Y ☒ N PHC Odour? ☐ Y ☒ N
 Free Product/PHC Globules? ☐ Y ☒ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

2-MW-8

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

Collected all
except: Aug 4
Lg Routine bottle
1/3 1/61/615
Amber

Site Name: _____ Landfill Name: AEC 2
Date: Aug 2/22 Time: 1145

Weather: Overcast 7°C

Monitoring Well ID: 2-MW-8 UTM Coordinates: 8292499 N 0441451 E

Sample #: _____ Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None

Name(s) of Sampler(s): KU

Ponded Water, Snow Depth, etc.: no

Well Condition/Repair Requirements: 1" cap needed

Lock Make/Model/Condition/Replaced: No lock, no cap (nitrile glove used), Mini bailer stuck in, but removed

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ? Diameter (cm): 1" (Pipe Diameter)
Depth to Top of Screen (mbgs): ? Screen Length (m): ?

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☐ Other Eagle Oppm

Well Stickup (Ground to Top of Pipe) (m): ~0.70m

Depth to Water (From Top of Pipe) (m): 0.725m

Calculated Static Water Level (mbgs): _____

Well Refusal Depth (m): 1.048m (Measure Refusal After Sampling)

Thickness of Water Column (m): 0.323 Water Volume (L): ~2L (Calculated)

Free Product Thickness (mm): n/a Sludge/Silt: ☒ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low flow

Water Quality Parameter Equipment: Floris Calibration Details: _____

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☒ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (μ S/cm)	Turbidity (NTU)	Temperature (°C)
<u>Aug 2/22 5:05</u>				
<u>Not enough water/recharge for field purging</u>				
Final Time: _____	Final Values: _____			

Clear? ☐ Y ☐ N

Colour: _____

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☒ N Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____

Close Up/Wide Angle/Panoramic: _____ Direction: _____

Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

FL-MW-7 ✓
(DUPA) ✓
All

Site Name:

Landfill Name:

Date:

Time:

Weather:

Monitoring Well ID:

UTM Coordinates:

Sample #:

Duplicate #:

Bottles Filled (by Parameter Type):

☒ PHC F1

☒ Metals

☒ PHC F2-F4

☐ PCB

Preservatives Used for PHC Fraction(s):

☐ Methanol

☐ Sodium Bisulfate

☒ Other:

☐ None

As per licence

Name(s) of Sampler(s):

Ponded Water, Snow Depth, etc.:

Well Condition/Repair Requirements:

Lock Make/Model/Condition/Replaced:

Pre-Measured Data (From Well Log)

Depth of Well (mbgs):

Diameter (cm):

(Pipe Diameter)

Depth to Top of Screen (mbgs):

Screen Length (m):

Field Measurements

Measurement Method:

☒ Interface Probe

☐ Water Level Tape

☐ Other

Eagle App

Well Stickup (Ground to Top of Pipe) (m):

Depth to Water (From Top of Pipe) (m):

Calculated Static Water Level (mbgs):

Well Refusal Depth (m):

(Measure Refusal After Sampling)

Thickness of Water Column (m):

Water Volume (L):

(Calculated)

Free Product Thickness (mm):

Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique:

Water Quality Parameter Equipment:

Calibration Details:

Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N

Purge Rate:

☒ < Recharge Rate

☐ > Recharge Rate

Total Volume Purged (L):

(Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity mS (µS/cm)	Turbidity (NTU)	Temperature (°C)
Aug 2/22 3:45	6.85	0.033	333	14.68°C
Aug 2/22 3:52	8.75	0.694	320	12.39
Aug 2/22 3:55	7.95	0.724	180	12.49
4:08	6.76	0.908	580	5.55
4:15	6.77	0.837	119	5.40
Final Time:	Final Values:			

Clear? ☐ Y ☒ N

Colour:

light brown

PHC Sheen? ☐ Y ☒ N

PHC Odour? ☒ Y ☐ N

Free Product/PHC Globules? ☐ Y ☒ N

Other Odour?

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s):

Washes/Rinses:

Photographic Records

Photo Numbers/IDs:

Close Up/Wide Angle/Panoramic:

Direction:

Scale Indicated? ☐ Y ☐ N

Line of Sight:

6 glass bottles
- BTEX F1
- F2-F4
- 2 Hg
- O&G
- Ammonia

5 plastic bottles
- Nutrients
- Cr6
- 2 Metals
- 2 blank smelt
- 1 lg Routine

Aug 2

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-8 (SW)

All samples collected Aug 2

Site Name:

Landfill Name:

Date:

Time:

Weather:

Monitoring Well ID:

UTM Coordinates:

Sample #:

Duplicate #:

Bottles Filled (by Parameter Type): ☐ PHC F1

☐ Metals

☐ PHC F2-F4

☐ PCB

Preservatives Used for PHC Fraction(s): ☐ Methanol

☐ Sodium Bisulfate

☐ Other: _____

☐ None

Name(s) of Sampler(s):

Ponded Water, Snow Depth, etc.:

Well Condition/Repair Requirements:

Lock Make/Model/Condition/Replaced:

Pre-Measured Data (From Well Log)

Depth of Well (mbgs):

Diameter (cm):

(Pipe Diameter)

Depth to Top of Screen (mbgs):

Screen Length (m):

Field Measurements

Measurement Method: ☐ Interface Probe

☐ Water Level Tape

☐ Other _____

Well Stickup (Ground to Top of Pipe) (m):

Depth to Water (From Top of Pipe) (m):

Calculated Static Water Level (mbgs):

Well Refusal Depth (m):

(Measure Refusal After Sampling)

Thickness of Water Column (m):

Water Volume (L):

(Calculated)

Free Product Thickness (mm):

Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique:

Water Quality Parameter Equipment:

Calibration Details:

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N

Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L):

(Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N

Colour:

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour?

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s):

Washes/Rinses:

Photographic Records

Photo Numbers/IDs:

Close Up/Wide Angle/Panoramic:

Direction:

Scale Indicated? ☐ Y ☐ N

Line of Sight:

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-10
(dry)

Site Name: _____ Landfill Name: AEC3
 Date: Aug 3/22 Time: 1330
 Weather: Overcast 5°C
 Monitoring Well ID: RBL-10 UTM Coordinates: 8296243N 0440491E
 Sample #: _____ Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good
 Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): 211 (Pipe Diameter)
 Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Opem
 Well Stickup (Ground to Top of Pipe) (m): 0.52m
 Depth to Water (From Top of Pipe) (m): _____
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): 1.495m (Measure Refusal After Sampling)
 Thickness of Water Column (m): _____ Water Volume (L): _____ (Calculated)
 Free Product Thickness (mm): N/A Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____
 Water Quality Parameter Equipment: _____ Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N Colour: _____
 PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N
 Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-11
(dry)

Site Name: _____ Landfill Name: AEC 3
 Date: Aug 3/22 Time: 1400
 Weather: Overcast
 Monitoring Well ID: RBL-11 UTM Coordinates: 8296268 N 0440383 E
 Sample #: _____ Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good
 Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): — Diameter (cm): 2" (Pipe Diameter)
 Depth to Top of Screen (mbgs): — Screen Length (m): —

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Oppm
 Well Stickup (Ground to Top of Pipe) (m): 0.65m
 Depth to Water (From Top of Pipe) (m): —
 Calculated Static Water Level (mbgs): —
 Well Refusal Depth (m): 1.364m (Measure Refusal After Sampling)
 Thickness of Water Column (m): — Water Volume (L): — (Calculated)
 Free Product Thickness (mm): N/A Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____
 Water Quality Parameter Equipment: _____ Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time: _____	Final Values: _____			

Clear? ☐ Y ☐ N Colour: _____
 PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N
 Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-12
(dry)

Site Name: _____ Landfill Name: AEC 3
 Date: Aug 3/22 Time: 1345
 Weather: Overcast 5°C
 Monitoring Well ID: RBL-12 UTM Coordinates: 8296338 N 0440448 E
 Sample #: 1 Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good
 Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ✓ Diameter (cm): 2" (Pipe Diameter)
 Depth to Top of Screen (mbgs): ✓ Screen Length (m): _____

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Open
 Well Stickup (Ground to Top of Pipe) (m): 0.55m
 Depth to Water (From Top of Pipe) (m): _____
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): 1.345m (Measure Refusal After Sampling)
 Thickness of Water Column (m): _____ Water Volume (L): _____ (Calculated)
 Free Product Thickness (mm): n/a Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____
 Water Quality Parameter Equipment: _____ Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time: _____	Final Values: _____			

Clear? ☐ Y ☐ N Colour: _____
 PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N
 Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-13
(SW)

Site Name: _____ Landfill Name: AEC 3

Date: Aug 3/22 Time: 1500

Weather: Overcast 5°C

Monitoring Well ID: RBL-13 UTM Coordinates: 296454 N 0440478 E

Sample #: _____ Duplicate #: _____

Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB

Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None

Name(s) of Sampler(s): KV

Ponded Water, Snow Depth, etc.: None

Well Condition/Repair Requirements: _____

Lock Make/Model/Condition/Replaced: _____

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): _____ Diameter (cm): _____ (Pipe Diameter)

Depth to Top of Screen (mbgs): _____ Screen Length (m): _____

Field Measurements

Measurement Method: ☐ Interface Probe ☐ Water Level Tape ☐ Other _____

Well Stickup (Ground to Top of Pipe) (m): _____

Depth to Water (From Top of Pipe) (m): _____

Calculated Static Water Level (mbgs): _____

Well Refusal Depth (m): _____ (Measure Refusal After Sampling)

Thickness of Water Column (m): _____ Water Volume (L): _____ (Calculated)

Free Product Thickness (mm): _____ Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____

Water Quality Parameter Equipment: _____ Calibration Details: _____

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (μ S/cm)	Turbidity (NTU)	Temperature (°C)
Final Time: _____	Final Values: _____			

Clear? ☐ Y ☐ N Colour: _____

PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____

Close Up/Wide Angle/Panoramic: _____ Direction: _____

Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-14
(DUP B)

Site Name: _____ Landfill Name: AEC 3
 Date: Aug 3/22 Time: 1115
 Weather: Overcast 6°C
 Monitoring Well ID: RBL-14 UTM Coordinates: 8296450 N 0440681 E
 Sample #: 8 Duplicate #: _____
 Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
 Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
 Name(s) of Sampler(s): KV
 Ponded Water, Snow Depth, etc.: No
 Well Condition/Repair Requirements: Good
 Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): Diameter (cm): 2 1/2 (Pipe Diameter)
 Depth to Top of Screen (mbgs): Screen Length (m):

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle Open
 Well Stickup (Ground to Top of Pipe) (m): 0.51m
 Depth to Water (From Top of Pipe) (m): 0.914m
 Calculated Static Water Level (mbgs): _____
 Well Refusal Depth (m): 1.434m (Measure Refusal After Sampling)
 Thickness of Water Column (m): 0.52m Water Volume (L): 3.25L (Calculated)
 Free Product Thickness (mm): _____ Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: Low Flow
 Water Quality Parameter Equipment: Horiba Calibration Details: _____
 Maintained Purge Rate at ≤ 100 mL/min: ☒ Y ☐ N Purge Rate: ☒ < Recharge Rate ☐ > Recharge Rate
 Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (µS/cm)	Turbidity (NTU)	Temperature (°C)
<u>Aug 3/22 11:30 AM</u>	<u>8.23</u>	<u>0.386</u>	<u>158</u>	<u>5.28</u>
<u>11:40 AM</u>	<u>7.93</u>	<u>0.382</u>	<u>111</u>	<u>4.13</u>
Final Time: _____	Final Values: _____			

Clear? ☒ Y ☐ N Colour: Clean
 PHC Sheen? ☐ Y ☒ N PHC Odour? ☐ Y ☒ N
 Free Product/PHC Globules? ☐ Y ☒ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☒ Y ☐ N Decon Required? ☐ Y ☐ N
 Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
 Close Up/Wide Angle/Panoramic: _____ Direction: _____
 Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

AEC3
RBL-15
(dry)

Site Name: _____ Landfill Name: AEC3
Date: Aug 3/27 Time: 1100
Weather: Overcast 6°C
Monitoring Well ID: RBL-15 UTM Coordinates: 8296470N 0410633E
Sample #: _____ Duplicate #: _____
Bottles Filled (by Parameter Type): ☐ PHC F1 ☐ Metals ☐ PHC F2-F4 ☐ PCB
Preservatives Used for PHC Fraction(s): ☐ Methanol ☐ Sodium Bisulfate ☐ Other: _____ ☐ None
Name(s) of Sampler(s): KU
Ponded Water, Snow Depth, etc.: No
Well Condition/Repair Requirements: Good
Lock Make/Model/Condition/Replaced: Good

Pre-Measured Data (From Well Log)

Depth of Well (mbgs): ? Diameter (cm): 2" (Pipe Diameter)
Depth to Top of Screen (mbgs): ? Screen Length (m): ?

Field Measurements

Measurement Method: ☒ Interface Probe ☐ Water Level Tape ☒ Other Eagle App
Well Stickup (Ground to Top of Pipe) (m): 0.56m
Depth to Water (From Top of Pipe) (m): _____
Calculated Static Water Level (mbgs): _____
Well Refusal Depth (m): 1.443m (Measure Refusal After Sampling)
Thickness of Water Column (m): _____ Water Volume (L): _____ (Calculated)
Free Product Thickness (mm): n/a Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique: _____
Water Quality Parameter Equipment: _____ Calibration Details: _____
Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate
Total Volume Purged (L): _____ (Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N Colour: _____
PHC Sheen? ☐ Y ☐ N PHC Odour? ☐ Y ☐ N
Free Product/PHC Globules? ☐ Y ☐ N Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N Decon Required? ☐ Y ☐ N
Type of Decontamination Fluid(s): _____ # Washes/Rinses: _____

Photographic Records

Photo Numbers/IDs: _____
Close Up/Wide Angle/Panoramic: _____ Direction: _____
Scale Indicated? ☐ Y ☐ N Line of Sight: _____

ANNEX J3: Monitoring Well Sampling Log (Complete All Fields)

RBL-16
(SW)

Site Name:

Landfill Name:

Date:

Time:

Weather:

Monitoring Well ID:

UTM Coordinates:

N 0440340 E

Sample #:

Duplicate #:

Bottles Filled (by Parameter Type): ☐ PHC F1

☐ Metals

☐ PHC F2-F4

☐ PCB

Preservatives Used for PHC Fraction(s): ☐ Methanol

☐ Sodium Bisulfate

☐ Other: _____

☐ None

Name(s) of Sampler(s):

Ponded Water, Snow Depth, etc.:

Well Condition/Repair Requirements:

Lock Make/Model/Condition/Replaced:

Pre-Measured Data (From Well Log)

Depth of Well (mbgs):

Diameter (cm):

(Pipe Diameter)

Depth to Top of Screen (mbgs):

Screen Length (m):

Field Measurements

Measurement Method: ☐ Interface Probe

☐ Water Level Tape

☐ Other _____

Well Stickup (Ground to Top of Pipe) (m):

Depth to Water (From Top of Pipe) (m):

Calculated Static Water Level (mbgs):

Well Refusal Depth (m):

(Measure Refusal After Sampling)

Thickness of Water Column (m):

Water Volume (L):

(Calculated)

Free Product Thickness (mm):

Sludge/Silt: ☐ Y ☐ N

Purging Information Summary

Purging/Sampling Equipment/Technique:

Water Quality Parameter Equipment:

Calibration Details:

Maintained Purge Rate at ≤ 100 mL/min: ☐ Y ☐ N

Purge Rate: ☐ < Recharge Rate ☐ > Recharge Rate

Total Volume Purged (L):

(Total Volume Over Multiple Events, if Applicable)

Time (Note Dates if Multiple Days Required)	pH	Conductivity (uS/cm)	Turbidity (NTU)	Temperature (°C)
Final Time:	Final Values:			

Clear? ☐ Y ☐ N

Colour:

PHC Sheen? ☐ Y ☐ N

PHC Odour? ☐ Y ☐ N

Free Product/PHC Globules? ☐ Y ☐ N

Other Odour? _____

Decontamination of Sampling Equipment

All Equipment Dedicated/Single Use? ☐ Y ☐ N

Decon Required? ☐ Y ☐ N

Type of Decontamination Fluid(s):

Washes/Rinses:

Photographic Records

Photo Numbers/IDs:

Close Up/Wide Angle/Panoramic:

Direction:

Scale Indicated? ☐ Y ☐ N

Line of Sight:

Appendix E

Laboratory Certificates of Analyses, Chain of Custody Forms and Lab Letter of Approval for DOJV's QA/QC program

Your P.O. #: P2022-14
 Your Project #: Resolute Landfills GW/SW
 Site#: P2022-14
 Your C.O.C. #: 669184-01-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
 151 HOLLAND AVENUE
 SUITE 200
 OTTAWA, ON
 CANADA K1Y 0Y2

Report Date: 2022/08/16
 Report #: R3216554
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258047

Received: 2022/08/05, 16:30

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH (1)	5	N/A	2022/08/10	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID (1)	8	N/A	2022/08/15	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	8	N/A	2022/08/15		Auto Calc
Cadmium - low level CCME (Total) (1)	1	N/A	2022/08/12		Auto Calc
Cadmium - low level CCME (Total) (1)	1	N/A	2022/08/13		Auto Calc
Cadmium - low level CCME (Total) (1)	4	N/A	2022/08/14		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	5	N/A	2022/08/10	AB SOP-00020	SM23-4500-Cl/SO4-E m
Total Hexavalent Chromium (1)	5	N/A	2022/08/11	AB SOP-00063	SM 23 3500-Cr B m
Conductivity @25C (1)	5	N/A	2022/08/10	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons (F2-F4 in water) (1, 2)	8	2022/08/12	2022/08/12	AB SOP-00037	CCME PHC-CWS m
Hardness (1)	5	N/A	2022/08/11		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	6	N/A	2022/08/12	BBY WI-00033	Auto Calc
Mercury (Total) by CV (1)	5	2022/08/10	2022/08/10	AB SOP-00084	BCMOE BCLM Oct2013 m
Elements by ICP-Dissolved-Lab Filtered (1, 4)	5	N/A	2022/08/10	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Total (1)	6	2022/08/12	2022/08/12	AB SOP-00014 / AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Total (1)	1	2022/08/12	2022/08/12	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	5	2022/08/12	2022/08/13	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	5	N/A	2022/08/11		Auto Calc
Sum of cations, anions (1)	5	N/A	2022/08/11		Auto Calc
Ammonia-N (Total) (1)	1	N/A	2022/08/11	AB SOP-00007	SM 23 4500 NH3 A G m
Ammonia-N (Total) (1)	5	N/A	2022/08/13	AB SOP-00007	SM 23 4500 NH3 A G m
Nitrate and Nitrite (1)	5	N/A	2022/08/11		Auto Calc
NO ₂ (N); NO ₂ (N) + NO ₃ (N) in Water (1)	4	N/A	2022/08/10	AB SOP-00091	SM 23 4500 NO3m
NO ₂ (N); NO ₂ (N) + NO ₃ (N) in Water (1)	1	N/A	2022/08/11	AB SOP-00091	SM 23 4500 NO3m
Nitrate (as N) (1)	5	2022/08/09	2022/08/11		Auto Calc
Oil and Grease by IR (1)	5	2022/08/12	2022/08/15	CAL SOP-00096	SM 23 5520C m
Benzo[a]pyrene Equivalency (1, 5)	8	N/A	2022/08/13		Auto Calc



Your P.O. #: P2022-14
 Your Project #: Resolute Landfills GW/SW
 Site#: P2022-14
 Your C.O.C. #: 669184-01-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
 151 HOLLAND AVENUE
 SUITE 200
 OTTAWA, ON
 CANADA K1Y 0Y2

Report Date: 2022/08/16
 Report #: R3216554
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258047

Received: 2022/08/05, 16:30

Sample Matrix: Water
 # Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
PAH in Water by GC/MS (1)	8	2022/08/12	2022/08/13	AB SOP-00037 / AB SOP-00003	EPA 3510C/8270E m
pH @25°C (1, 6)	5	N/A	2022/08/10	AB SOP-00005	SM 23 4500-H+B m
Total Dissolved Solids (Calculated) (1)	5	N/A	2022/08/11		Auto Calc
Total Phosphorus (1)	5	2022/08/11	2022/08/15	AB SOP-00024	SM 23 4500-P A,B,F m
Total Suspended Solids (NFR, low) (1)	4	N/A	2022/08/09	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8

(2) Silica gel clean up employed.

(3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).

(4) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.

(5) B[a]P TPE is calculated using 1/2 of the RDL for non detect results as per Alberta Environment instructions. This protocol may not apply in other jurisdictions.



Your P.O. #: P2022-14
Your Project #: Resolute Landfills GW/SW
Site#: P2022-14
Your C.O.C. #: 669184-01-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
151 HOLLAND AVENUE
SUITE 200
OTTAWA, ON
CANADA K1Y 0Y2

Report Date: 2022/08/16
Report #: R3216554
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258047

Received: 2022/08/05, 16:30

(6) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (780) 577-7100

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

AT1 BTEX AND F1-F4 IN WATER (WATER)

Bureau Veritas ID		AZA186	AZA187	AZA188	AZA189	AZA190	AZA191		
Sampling Date		2022/08/04 13:00	2022/08/02 09:00	2022/08/04 14:00	2022/08/02 10:00	2022/08/02 10:00	2022/08/02 13:00		
COC Number		669184-01-01	669184-01-01	669184-01-01	669184-01-01	669184-01-01	669184-01-01		
	UNITS	RBL-6	RBL-7	2-MW-8	FL-MW-7	DUPA	RBL-8	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	0.24	3.6	3.7	3.7	0.32	0.10	A676412
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	<0.10	0.27	0.28	0.29	0.26	0.10	A676412
F4 (C34-C50 Hydrocarbons)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A676412
Volatiles									
Benzene	ug/L	<0.40	<0.40	0.77	1.6	1.6	<0.40	0.40	A677043
Toluene	ug/L	0.63	<0.40	0.46	6.8	6.7	<0.40	0.40	A677043
Ethylbenzene	ug/L	<0.40	<0.40	0.89	6.8	6.7	<0.40	0.40	A677043
m & p-Xylene	ug/L	<0.80	<0.80	11	30	29	<0.80	0.80	A677043
o-Xylene	ug/L	<0.40	<0.40	34	77	75	<0.40	0.40	A677043
Xylenes (Total)	ug/L	<0.89	<0.89	44	110	100	<0.89	0.89	A674709
F1 (C6-C10) - BTEX	ug/L	<100	<100	250	490	470	<100	100	A674709
F1 (C6-C10)	ug/L	<100	<100	300	610	590	<100	100	A677043
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	102	102	102	103	102	101		A677043
4-Bromofluorobenzene (sur.)	%	99	100	97	97	97	98		A677043
D4-1,2-Dichloroethane (sur.)	%	100	99	100	100	102	100		A677043
O-TERPHENYL (sur.)	%	98	101	99	94	98	98		A676412
RDL = Reportable Detection Limit									



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

AT1 BTEX AND F1-F4 IN WATER (WATER)

Bureau Veritas ID		AZA192	AZA193		
Sampling Date		2022/08/04 14:00	2022/08/04 14:30		
COC Number		669184-01-01	669184-01-01		
	UNITS	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Ext. Pet. Hydrocarbon					
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	0.10	A676412
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	<0.10	0.10	A676412
F4 (C34-C50 Hydrocarbons)	mg/L	<0.20	<0.20	0.20	A676412
Volatiles					
Benzene	ug/L	<0.40	<0.40	0.40	A677043
Toluene	ug/L	<0.40	<0.40	0.40	A677043
Ethylbenzene	ug/L	<0.40	<0.40	0.40	A677043
m & p-Xylene	ug/L	<0.80	<0.80	0.80	A677043
o-Xylene	ug/L	<0.40	<0.40	0.40	A677043
Xylenes (Total)	ug/L	<0.89	<0.89	0.89	A674709
F1 (C6-C10) - BTEX	ug/L	<100	<100	100	A674709
F1 (C6-C10)	ug/L	<100	<100	100	A677043
Surrogate Recovery (%)					
1,4-Difluorobenzene (sur.)	%	102	103		A677043
4-Bromofluorobenzene (sur.)	%	99	99		A677043
D4-1,2-Dichloroethane (sur.)	%	99	100		A677043
O-TERPHENYL (sur.)	%	98	98		A676412
RDL = Reportable Detection Limit					

**ROUTINE WATER -LAB FILTERED (WATER)**

Bureau Veritas ID		AZA187	AZA188		AZA189			AZA190		
Sampling Date		2022/08/02 09:00	2022/08/04 14:00		2022/08/02 10:00			2022/08/02 10:00		
COC Number		669184-01-01	669184-01-01		669184-01-01			669184-01-01		
	UNITS	RBL-7	2-MW-8	RDL	FL-MW-7	RDL	QC Batch	DUPA	RDL	QC Batch

Calculated Parameters										
Anion Sum	meq/L	5.5	3.0	N/A	8.7	N/A	A674655	8.3	N/A	A674655
Cation Sum	meq/L	5.3	3.0	N/A	8.8	N/A	A674655	9.0	N/A	A674655
Hardness (CaCO ₃)	mg/L	170	79	0.50	380	0.50	A674635	390	0.50	A674635
Ion Balance (% Difference)	%	1.4	0.22	N/A	0.51	N/A	A674642	3.8	N/A	A674642
Nitrate (N)	mg/L	0.46	0.098	0.010	<0.050	0.050	A674672	<0.010	0.010	A674672
Nitrate (NO ₃)	mg/L	2.0	0.43	0.044	<0.22	0.22	A674663	<0.044	0.044	A674663
Nitrite (NO ₂)	mg/L	<0.033	<0.033	0.033	<0.033	0.033	A674663	<0.033	0.033	A674663
Calculated Total Dissolved Solids	mg/L	290	150	10	440	10	A674680	430	10	A674680

Misc. Inorganics										
Conductivity	uS/cm	520	290	2.0	820	2.0	A676064	790	2.0	A676064
pH	pH	8.17	7.64	N/A	7.30	N/A	A676062	7.33	N/A	A676062

Anions										
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	A676060	<1.0	1.0	A676060
Alkalinity (Total as CaCO ₃)	mg/L	170	120	1.0	380	1.0	A676060	370	1.0	A676060
Bicarbonate (HCO ₃)	mg/L	210	150	1.0	470	1.0	A676060	450	1.0	A676060
Carbonate (CO ₃)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	A676060	<1.0	1.0	A676060
Hydroxide (OH)	mg/L	<1.0	<1.0	1.0	<1.0	1.0	A676060	<1.0	1.0	A676060
Chloride (Cl)	mg/L	43	18	1.0	39	1.0	A675973	36	1.0	A675973
Sulphate (SO ₄)	mg/L	36	1.0	1.0	<7.0 (1)	7.0	A675973	<5.0 (1)	5.0	A675973

Nutrients										
Nitrite (N)	mg/L	<0.010	<0.010	0.010	<0.010	0.010	A676215	<0.010	0.010	A676191
Nitrate plus Nitrite (N)	mg/L	0.46	0.098	0.010	<0.050 (1)	0.050	A676215	<0.010	0.010	A676191

Lab Filtered Elements										
Dissolved Calcium (Ca)	mg/L	44	20	0.30	120	0.30	A676323	120	0.30	A676323
Dissolved Iron (Fe)	mg/L	<0.060	<0.060	0.060	4.5	0.060	A676323	4.8	0.060	A676323
Dissolved Magnesium (Mg)	mg/L	16	7.3	0.20	21	0.20	A676323	21	0.20	A676323
Dissolved Manganese (Mn)	mg/L	<0.0040	0.16	0.0040	0.77	0.0040	A676323	0.77	0.0040	A676323
Dissolved Potassium (K)	mg/L	4.1	3.3	0.30	6.7	0.30	A676323	5.8	0.30	A676323
Dissolved Sodium (Na)	mg/L	41	26	0.50	19	0.50	A676323	19	0.50	A676323

RDL = Reportable Detection Limit

N/A = Not Applicable

(1) Detection limits raised due to matrix interference.



ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		AZA191		
Sampling Date		2022/08/02 13:00		
COC Number		669184-01-01		
	UNITS	RBL-8	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	6.5	N/A	A674655
Cation Sum	meq/L	6.5	N/A	A674655
Hardness (CaCO ₃)	mg/L	250	0.50	A674635
Ion Balance (% Difference)	%	0.20	N/A	A674642
Nitrate (N)	mg/L	<0.050	0.050	A674672
Nitrate (NO ₃)	mg/L	<0.22	0.22	A674663
Nitrite (NO ₂)	mg/L	<0.033	0.033	A674663
Calculated Total Dissolved Solids	mg/L	330	10	A674680
Misc. Inorganics				
Conductivity	uS/cm	620	2.0	A676064
pH	pH	8.00	N/A	A676062
Anions				
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	1.0	A676060
Alkalinity (Total as CaCO ₃)	mg/L	230	1.0	A676060
Bicarbonate (HCO ₃)	mg/L	280	1.0	A676060
Carbonate (CO ₃)	mg/L	<1.0	1.0	A676060
Hydroxide (OH)	mg/L	<1.0	1.0	A676060
Chloride (Cl)	mg/L	56	1.0	A675973
Sulphate (SO ₄)	mg/L	18	1.0	A675973
Nutrients				
Nitrite (N)	mg/L	<0.010	0.010	A676215
Nitrate plus Nitrite (N)	mg/L	<0.050 (1)	0.050	A676215
Lab Filtered Elements				
Dissolved Calcium (Ca)	mg/L	69	0.30	A676323
Dissolved Iron (Fe)	mg/L	0.17	0.060	A676323
Dissolved Magnesium (Mg)	mg/L	18	0.20	A676323
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	A676323
Dissolved Potassium (K)	mg/L	2.4	0.30	A676323
Dissolved Sodium (Na)	mg/L	35	0.50	A676323
RDL = Reportable Detection Limit				
N/A = Not Applicable				
(1) Detection limits raised due to matrix interference.				



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA187			AZA188		AZA189		
Sampling Date		2022/08/02 09:00			2022/08/04 14:00		2022/08/02 10:00		
COC Number		669184-01-01			669184-01-01		669184-01-01		
	UNITS	RBL-7	RDL	QC Batch	2-MW-8	QC Batch	FL-MW-7	RDL	QC Batch
Elements									
Total Cadmium (Cd)	ug/L	0.035	0.020	A673712	0.045	A673712	0.090	0.020	A673712
Total Mercury (Hg)	ug/L	0.0146	0.0019	A675290	0.031	A675290	0.114	0.019	A675290
Total Aluminum (Al)	mg/L	0.52 (1)	0.0030	A678186	0.75	A678469	1.8	0.0030	A678186
Total Antimony (Sb)	mg/L	<0.00060	0.00060	A678186	<0.00060	A678469	<0.00060	0.00060	A678186
Total Arsenic (As)	mg/L	0.00056	0.00020	A678186	0.0015	A678469	0.0054	0.00020	A678186
Total Barium (Ba)	mg/L	0.024	0.010	A678195	0.036	A678476	0.091	0.010	A678195
Total Beryllium (Be)	mg/L	<0.0010	0.0010	A678186	<0.0010	A678469	<0.0010	0.0010	A678186
Total Boron (B)	mg/L	<0.020	0.020	A678195	<0.020	A678476	0.045	0.020	A678195
Total Calcium (Ca)	mg/L	53	0.30	A678195	41	A678476	140	0.30	A678195
Total Chromium (Cr)	mg/L	0.0023	0.0010	A678186	0.0017	A678469	0.0055	0.0010	A678186
Total Cobalt (Co)	mg/L	0.00042	0.00030	A678186	0.00082	A678469	0.0057	0.00030	A678186
Total Copper (Cu)	mg/L	0.0017	0.0010	A678186	0.0020	A678469	0.0031	0.0010	A678186
Total Iron (Fe)	mg/L	0.93 (1)	0.060	A678195	13	A678476	8.7	0.060	A678195
Total Lead (Pb)	mg/L	0.0021	0.00020	A678186	0.0018	A678469	0.0060	0.00020	A678186
Total Lithium (Li)	mg/L	<0.020	0.020	A678195	<0.020	A678476	<0.020	0.020	A678195
Total Magnesium (Mg)	mg/L	19	0.20	A678195	14	A678476	28	0.20	A678195
Total Manganese (Mn)	mg/L	0.027	0.0040	A678195	0.26	A678476	0.98	0.0040	A678195
Total Molybdenum (Mo)	mg/L	0.00099	0.00020	A678186	0.00038	A678469	0.00094	0.00020	A678186
Total Nickel (Ni)	mg/L	0.0031	0.00050	A678186	0.0030	A678469	0.013	0.00050	A678186
Total Phosphorus (P)	mg/L	<0.10	0.10	A678195	<0.10	A678476	0.22	0.10	A678195
Total Potassium (K)	mg/L	8.6	0.30	A678195	3.9	A678476	9.3	0.30	A678195
Total Selenium (Se)	mg/L	0.00045	0.00020	A678186	0.00030	A678469	0.00073	0.00020	A678186
Total Silicon (Si)	mg/L	3.4	0.10	A678195	4.3	A678476	8.8	0.10	A678195
Total Silver (Ag)	mg/L	0.0012 (1)	0.00010	A678186	<0.00010	A678469	0.00062	0.00010	A678186
Total Sodium (Na)	mg/L	33	0.50	A678195	25	A678476	21	0.50	A678195
Total Strontium (Sr)	mg/L	0.19	0.020	A678195	0.17	A678476	0.50	0.020	A678195
Total Sulphur (S)	mg/L	11	0.20	A678195	1.1	A678476	1.3	0.20	A678195
Total Thallium (Tl)	mg/L	<0.00020	0.00020	A678186	<0.00020	A678469	<0.00020	0.00020	A678186
Total Tin (Sn)	mg/L	<0.0010	0.0010	A678186	<0.0010	A678469	<0.0010	0.0010	A678186
Total Titanium (Ti)	mg/L	0.016 (1)	0.0010	A678186	0.022	A678469	0.057	0.0010	A678186
Total Uranium (U)	mg/L	0.0012	0.00010	A678186	<0.00010	A678469	0.00060	0.00010	A678186
RDL = Reportable Detection Limit									
(1) Duplicate exceeds acceptance criteria due to sample matrix. Reanalysis yields similar results.									



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA187			AZA188		AZA189		
Sampling Date		2022/08/02 09:00			2022/08/04 14:00		2022/08/02 10:00		
COC Number		669184-01-01			669184-01-01		669184-01-01		
	UNITS	RBL-7	RDL	QC Batch	2-MW-8	QC Batch	FL-MW-7	RDL	QC Batch
Total Vanadium (V)	mg/L	0.0021	0.0010	A678186	0.0026	A678469	0.0062	0.0010	A678186
Total Zinc (Zn)	mg/L	0.064 (1)	0.0030	A678186	0.093	A678469	0.014	0.0030	A678186

RDL = Reportable Detection Limit

(1) Duplicate exceeds acceptance criteria due to sample matrix. Reanalysis yields similar results.



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA190			AZA191		
Sampling Date		2022/08/02 10:00			2022/08/02 13:00		
COC Number		669184-01-01			669184-01-01		
	UNITS	DUPA	RDL	QC Batch	RBL-8	RDL	QC Batch
Elements							
Total Cadmium (Cd)	ug/L	0.16	0.040	A673712	0.048	0.020	A673712
Total Mercury (Hg)	ug/L	0.069	0.019	A675290	0.0103	0.0019	A675290
Total Aluminum (Al)	mg/L	3.0	0.0060	A678469	0.18	0.0030	A678186
Total Antimony (Sb)	mg/L	<0.0012	0.0012	A678469	<0.00060	0.00060	A678186
Total Arsenic (As)	mg/L	0.0057	0.00040	A678469	0.00090	0.00020	A678186
Total Barium (Ba)	mg/L	0.11	0.010	A678476	0.14	0.010	A678195
Total Beryllium (Be)	mg/L	<0.0020	0.0020	A678469	<0.0010	0.0010	A678186
Total Boron (B)	mg/L	0.054	0.020	A678476	0.11	0.020	A678195
Total Calcium (Ca)	mg/L	160	0.30	A678476	77	0.30	A678195
Total Chromium (Cr)	mg/L	0.0071	0.0020	A678469	<0.0010	0.0010	A678186
Total Cobalt (Co)	mg/L	0.0065	0.00060	A678469	<0.00030	0.00030	A678186
Total Copper (Cu)	mg/L	0.0052	0.0020	A678469	0.0013	0.0010	A678186
Total Iron (Fe)	mg/L	12	0.060	A678476	2.2	0.060	A678195
Total Lead (Pb)	mg/L	0.0097	0.00040	A678469	0.0047	0.00020	A678186
Total Lithium (Li)	mg/L	<0.020	0.020	A678476	<0.020	0.020	A678195
Total Magnesium (Mg)	mg/L	33	0.20	A678476	20	0.20	A678195
Total Manganese (Mn)	mg/L	1.0	0.0040	A678476	0.040	0.0040	A678195
Total Molybdenum (Mo)	mg/L	0.0010	0.00040	A678469	0.00067	0.00020	A678186
Total Nickel (Ni)	mg/L	0.015	0.0010	A678469	0.0013	0.00050	A678186
Total Phosphorus (P)	mg/L	0.29	0.10	A678476	<0.10	0.10	A678195
Total Potassium (K)	mg/L	9.4	0.30	A678476	2.5	0.30	A678195
Total Selenium (Se)	mg/L	0.0012	0.00040	A678469	<0.00020	0.00020	A678186
Total Silicon (Si)	mg/L	15	0.10	A678476	1.9	0.10	A678195
Total Silver (Ag)	mg/L	0.00076	0.00020	A678469	<0.00010	0.00010	A678186
Total Sodium (Na)	mg/L	20	0.50	A678476	34	0.50	A678195
Total Strontium (Sr)	mg/L	0.53	0.020	A678476	0.31	0.020	A678195
Total Sulphur (S)	mg/L	1.3	0.20	A678476	5.9	0.20	A678195
Total Thallium (Tl)	mg/L	<0.00040	0.00040	A678469	<0.00020	0.00020	A678186
Total Tin (Sn)	mg/L	<0.0020	0.0020	A678469	<0.0010	0.0010	A678186
Total Titanium (Ti)	mg/L	0.099	0.0020	A678469	0.0060	0.0010	A678186
Total Uranium (U)	mg/L	0.00069	0.00020	A678469	0.00036	0.00010	A678186
Total Vanadium (V)	mg/L	0.010	0.0020	A678469	0.0010	0.0010	A678186
RDL = Reportable Detection Limit							



REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA190			AZA191		
Sampling Date		2022/08/02 10:00			2022/08/02 13:00		
COC Number		669184-01-01			669184-01-01		
	UNITS	DUPA	RDL	QC Batch	RBL-8	RDL	QC Batch
Total Zinc (Zn)	mg/L	0.17 (1)	0.0060	A678469	0.0047	0.0030	A678186
RDL = Reportable Detection Limit							
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.							



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Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS (CCME/AT1) - TOTAL

Bureau Veritas ID		AZA186		
Sampling Date		2022/08/04 13:00		
COC Number		669184-01-01		
	UNITS	RBL-6	RDL	QC Batch
Elements				
Total Cadmium (Cd)	ug/L	0.080	0.020	A673712
Total Aluminum (Al)	mg/L	1.0	0.0030	A678186
Total Antimony (Sb)	mg/L	<0.00060	0.00060	A678186
Total Arsenic (As)	mg/L	0.0019	0.00020	A678186
Total Barium (Ba)	mg/L	0.054	0.010	A678195
Total Beryllium (Be)	mg/L	<0.0010	0.0010	A678186
Total Boron (B)	mg/L	<0.020	0.020	A678195
Total Calcium (Ca)	mg/L	56	0.30	A678195
Total Chromium (Cr)	mg/L	0.0021	0.0010	A678186
Total Cobalt (Co)	mg/L	0.0015	0.00030	A678186
Total Copper (Cu)	mg/L	0.0031	0.0010	A678186
Total Iron (Fe)	mg/L	35	0.060	A678195
Total Lead (Pb)	mg/L	0.0051	0.00020	A678186
Total Lithium (Li)	mg/L	<0.020	0.020	A678195
Total Magnesium (Mg)	mg/L	25	0.20	A678195
Total Manganese (Mn)	mg/L	0.72	0.0040	A678195
Total Molybdenum (Mo)	mg/L	0.0019	0.00020	A678186
Total Nickel (Ni)	mg/L	0.0047	0.00050	A678186
Total Phosphorus (P)	mg/L	<0.10	0.10	A678195
Total Potassium (K)	mg/L	5.7	0.30	A678195
Total Selenium (Se)	mg/L	<0.00020	0.00020	A678186
Total Silicon (Si)	mg/L	3.5	0.10	A678195
Total Silver (Ag)	mg/L	<0.00010	0.00010	A678186
Total Sodium (Na)	mg/L	13	0.50	A678195
Total Strontium (Sr)	mg/L	0.14	0.020	A678195
Total Sulphur (S)	mg/L	1.9	0.20	A678195
Total Thallium (Tl)	mg/L	<0.00020	0.00020	A678186
Total Tin (Sn)	mg/L	<0.0010	0.0010	A678186
Total Titanium (Ti)	mg/L	0.032	0.0010	A678186
Total Uranium (U)	mg/L	0.00015	0.00010	A678186
Total Vanadium (V)	mg/L	0.0029	0.0010	A678186
Total Zinc (Zn)	mg/L	0.020	0.0030	A678186
RDL = Reportable Detection Limit				



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Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AZA186			AZA187			AZA188		
Sampling Date		2022/08/04 13:00			2022/08/02 09:00			2022/08/04 14:00		
COC Number		669184-01-01			669184-01-01			669184-01-01		
	UNITS	RBL-6	RDL	QC Batch	RBL-7	RDL	QC Batch	2-MW-8	RDL	QC Batch
Calculated Parameters										
Total Hardness (CaCO ₃)	mg/L	245	0.50	A675930	210	0.50	A675930	160	0.50	A675930
Misc. Inorganics										
Total Suspended Solids	mg/L				550 (1)	0.60	A674766			
Metals										
Total Hex. Chromium (Cr 6+)	mg/L				<0.00099	0.00099	A675309	<0.00099	0.00099	A675309
Nutrients										
Total Ammonia (N)	mg/L	0.15	0.015	A676970	<0.015	0.015	A678530	2.6	0.075	A678530
Total Phosphorus (P)	mg/L				0.023	0.0030	A676799	0.038	0.0030	A676799
Misc. Organics										
Oil and grease	mg/L				<2.0	2.0	A674486	40 (1)	8.0	A674486
RDL = Reportable Detection Limit										
(1) Detection limit raised based on sample volume used for analysis.										

Bureau Veritas ID		AZA189	AZA190	AZA191		
Sampling Date		2022/08/02 10:00	2022/08/02 10:00	2022/08/02 13:00		
COC Number		669184-01-01	669184-01-01	669184-01-01		
	UNITS	FL-MW-7	DUPA	RBL-8	RDL	QC Batch
Calculated Parameters						
Total Hardness (CaCO ₃)	mg/L	464	527	276	0.50	A675930
Misc. Inorganics						
Total Suspended Solids	mg/L	47 (1)	57 (1)	160 (1)	1.2	A674766
Metals						
Total Hex. Chromium (Cr 6+)	mg/L	<0.00099	<0.00099	<0.00099	0.00099	A675309
Nutrients						
Total Ammonia (N)	mg/L	1.5	1.5	0.053	0.015	A678530
Total Phosphorus (P)	mg/L	0.18	0.18	0.070	0.0030	A676799
Misc. Organics						
Oil and grease	mg/L	7.7	6.5	2.5	2.0	A674486
RDL = Reportable Detection Limit						
(1) Detection limit raised based on sample volume used for analysis.						



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Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

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Sampler Initials: KV

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		AZA186	AZA187	AZA188	AZA189	AZA190		
Sampling Date		2022/08/04 13:00	2022/08/02 09:00	2022/08/04 14:00	2022/08/02 10:00	2022/08/02 10:00		
COC Number		669184-01-01	669184-01-01	669184-01-01	669184-01-01	669184-01-01		
	UNITS	RBL-6	RBL-7	2-MW-8	FL-MW-7	DUPA	RDL	QC Batch

Polycyclic Aromatics								
B[a]P TPE Total Potency Equivalents	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A673546
Acenaphthene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A676415
Acenaphthylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A676415
Acridine	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	A676415
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A676415
Benzo(a)anthracene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(b&j)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(k)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(g,h,i)perylene	ug/L	<0.0085	0.013	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(c)phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A676415
Benzo(a)pyrene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A676415
Benzo(e)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A676415
Chrysene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A676415
Dibenz(a,h)anthracene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A676415
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A676415
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A676415
Indeno(1,2,3-cd)pyrene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A676415
1-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A676415
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A676415
Naphthalene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A676415
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A676415
Perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A676415
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A676415
Quinoline	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A676415

Surrogate Recovery (%)								
D10-ANTHRACENE (sur.)	%	125	116	127	128	107		A676415
D8-ACENAPHTHYLENE (sur.)	%	108	100	112	106	95		A676415
D8-NAPHTHALENE (sur.)	%	88	89	87	84	84		A676415
TERPHENYL-D14 (sur.)	%	159 (1)	152 (1)	183 (1)	175 (1)	137 (1)		A676415

RDL = Reportable Detection Limit

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		AZA191	AZA192	AZA193		
Sampling Date		2022/08/02 13:00	2022/08/04 14:00	2022/08/04 14:30		
COC Number		669184-01-01	669184-01-01	669184-01-01		
	UNITS	RBL-8	FIELD BLANK	TRIP BLANK	RDL	QC Batch
Polycyclic Aromatics						
B[a]P TPE Total Potency Equivalents	ug/L	<0.010	<0.010	<0.010	0.010	A673546
Acenaphthene	ug/L	<0.10	<0.10	<0.10	0.10	A676415
Acenaphthylene	ug/L	<0.10	<0.10	<0.10	0.10	A676415
Acridine	ug/L	<0.040	<0.040	<0.040	0.040	A676415
Anthracene	ug/L	<0.010	<0.010	<0.010	0.010	A676415
Benzo(a)anthracene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(b&j)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(k)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(g,h,i)perylene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
Benzo(c)phenanthrene	ug/L	<0.050	<0.050	<0.050	0.050	A676415
Benzo(a)pyrene	ug/L	<0.0075	<0.0075	<0.0075	0.0075	A676415
Benzo(e)pyrene	ug/L	<0.050	<0.050	<0.050	0.050	A676415
Chrysene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
Dibenz(a,h)anthracene	ug/L	<0.0075	<0.0075	<0.0075	0.0075	A676415
Fluoranthene	ug/L	<0.010	<0.010	<0.010	0.010	A676415
Fluorene	ug/L	<0.050	<0.050	<0.050	0.050	A676415
Indeno(1,2,3-cd)pyrene	ug/L	<0.0085	<0.0085	<0.0085	0.0085	A676415
1-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	0.10	A676415
2-Methylnaphthalene	ug/L	<0.10	<0.10	<0.10	0.10	A676415
Naphthalene	ug/L	<0.10	<0.10	<0.10	0.10	A676415
Phenanthrene	ug/L	<0.050	<0.050	<0.050	0.050	A676415
Perylene	ug/L	<0.050	<0.050	<0.050	0.050	A676415
Pyrene	ug/L	<0.020	<0.020	<0.020	0.020	A676415
Quinoline	ug/L	<0.20	<0.20	<0.20	0.20	A676415
Surrogate Recovery (%)						
D10-ANTHRACENE (sur.)	%	130	126	111		A676415
D8-ACENAPHTHYLENE (sur.)	%	118	129	99		A676415
D8-NAPHTHALENE (sur.)	%	102	116	86		A676415
TERPHENYL-D14 (sur.)	%	196 (1)	189 (1)	156 (1)		A676415
RDL = Reportable Detection Limit						
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.						



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
Package 2	5.0°C
Package 3	3.3°C
Package 4	3.0°C
Package 5	3.7°C

TSS could not be completed on sample 2-MW-8 due to limited volume.

Sample AZA187 [RBL-7] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA188 [2-MW-8] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA189 [FL-MW-7] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA190 [DUPA] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA191 [RBL-8] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

REGULATED METALS + HG (CCME/AT1) - HGT-V Comments

Sample AZA188 [2-MW-8] Mercury (Total) by CV: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA189 [FL-MW-7] Mercury (Total) by CV: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA190 [DUPA] Mercury (Total) by CV: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA190 [DUPA] Elements by ICPMS - Total: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.



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Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674486	MAV	Spiked Blank	Oil and grease	2022/08/15		87	%	70 - 130
A674486	MAV	Method Blank	Oil and grease	2022/08/15	<2.0		mg/L	
A674766	HE1	Matrix Spike [AZA191-01]	Total Suspended Solids	2022/08/09		NC	%	80 - 120
A674766	HE1	Spiked Blank	Total Suspended Solids	2022/08/09		91	%	80 - 120
A674766	HE1	Method Blank	Total Suspended Solids	2022/08/09	<0.40		mg/L	
A674766	HE1	RPD [AZA190-01]	Total Suspended Solids	2022/08/09	17		%	20
A675290	JAB	Matrix Spike	Total Mercury (Hg)	2022/08/10		98	%	80 - 120
A675290	JAB	Spiked Blank	Total Mercury (Hg)	2022/08/10		102	%	80 - 120
A675290	JAB	Method Blank	Total Mercury (Hg)	2022/08/10	<0.0019		ug/L	
A675290	JAB	RPD	Total Mercury (Hg)	2022/08/10	NC		%	20
A675309	FM0	Matrix Spike	Total Hex. Chromium (Cr 6+)	2022/08/11		102	%	80 - 120
A675309	FM0	Spiked Blank	Total Hex. Chromium (Cr 6+)	2022/08/11		105	%	80 - 120
A675309	FM0	Method Blank	Total Hex. Chromium (Cr 6+)	2022/08/11	<0.00099		mg/L	
A675309	FM0	RPD	Total Hex. Chromium (Cr 6+)	2022/08/11	NC		%	20
A675973	CTU	Matrix Spike	Chloride (Cl)	2022/08/10		107	%	80 - 120
			Sulphate (SO4)	2022/08/10		108	%	80 - 120
A675973	CTU	Spiked Blank	Chloride (Cl)	2022/08/10		105	%	80 - 120
			Sulphate (SO4)	2022/08/10		97	%	80 - 120
A675973	CTU	Method Blank	Chloride (Cl)	2022/08/10	<1.0		mg/L	
			Sulphate (SO4)	2022/08/10	<1.0		mg/L	
A675973	CTU	RPD	Chloride (Cl)	2022/08/10	8.0		%	20
			Sulphate (SO4)	2022/08/10	NC		%	20
A676060	JLD	Spiked Blank	Alkalinity (Total as CaCO3)	2022/08/10		101	%	80 - 120
A676060	JLD	Method Blank	Alkalinity (PP as CaCO3)	2022/08/10	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2022/08/10	<1.0		mg/L	
			Bicarbonate (HCO3)	2022/08/10	<1.0		mg/L	
			Carbonate (CO3)	2022/08/10	<1.0		mg/L	
			Hydroxide (OH)	2022/08/10	<1.0		mg/L	
A676060	JLD	RPD	Alkalinity (PP as CaCO3)	2022/08/10	NC		%	20
			Alkalinity (Total as CaCO3)	2022/08/10	0.43		%	20
			Bicarbonate (HCO3)	2022/08/10	0.43		%	20
			Carbonate (CO3)	2022/08/10	NC		%	20
			Hydroxide (OH)	2022/08/10	NC		%	20
A676062	JLD	Spiked Blank	pH	2022/08/10		100	%	97 - 103
A676062	JLD	RPD	pH	2022/08/10	0.66		%	N/A
A676064	JLD	Spiked Blank	Conductivity	2022/08/10		102	%	90 - 110
A676064	JLD	Method Blank	Conductivity	2022/08/10	<2.0		uS/cm	
A676064	JLD	RPD	Conductivity	2022/08/10	1.6		%	10
A676191	ACR	Matrix Spike	Nitrite (N)	2022/08/10		93	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/10		102	%	80 - 120
A676191	ACR	Spiked Blank	Nitrite (N)	2022/08/11		98	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/11		104	%	80 - 120
A676191	ACR	Method Blank	Nitrite (N)	2022/08/10	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2022/08/10	<0.010		mg/L	
A676191	ACR	RPD	Nitrite (N)	2022/08/10	NC		%	20
			Nitrate plus Nitrite (N)	2022/08/10	11		%	20
A676215	ACR	Matrix Spike	Nitrite (N)	2022/08/10		97	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/10		109	%	80 - 120
A676215	ACR	Spiked Blank	Nitrite (N)	2022/08/11		98	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/11		99	%	80 - 120
A676215	ACR	Method Blank	Nitrite (N)	2022/08/10	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2022/08/10	<0.010		mg/L	
A676215	ACR	RPD	Nitrite (N)	2022/08/10	NC		%	20



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Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A676323	MPU	Matrix Spike	Nitrate plus Nitrite (N)	2022/08/10	NC		%	20
			Dissolved Calcium (Ca)	2022/08/10		98	%	80 - 120
			Dissolved Iron (Fe)	2022/08/10		99	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/10		97	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/10		99	%	80 - 120
			Dissolved Potassium (K)	2022/08/10		101	%	80 - 120
A676323	MPU	Spiked Blank	Dissolved Sodium (Na)	2022/08/10		96	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/10		101	%	80 - 120
			Dissolved Iron (Fe)	2022/08/10		103	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/10		100	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/10		103	%	80 - 120
			Dissolved Potassium (K)	2022/08/10		104	%	80 - 120
A676323	MPU	Method Blank	Dissolved Sodium (Na)	2022/08/10		100	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/11	<0.30		mg/L	
			Dissolved Iron (Fe)	2022/08/11	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2022/08/11	<0.20		mg/L	
			Dissolved Manganese (Mn)	2022/08/11	<0.0040		mg/L	
			Dissolved Potassium (K)	2022/08/11	<0.30		mg/L	
A676323	MPU	RPD	Dissolved Sodium (Na)	2022/08/11	<0.50		mg/L	
			Dissolved Calcium (Ca)	2022/08/10	0.50		%	20
			Dissolved Iron (Fe)	2022/08/10	NC		%	20
			Dissolved Magnesium (Mg)	2022/08/10	0.57		%	20
			Dissolved Manganese (Mn)	2022/08/10	NC		%	20
			Dissolved Potassium (K)	2022/08/10	3.5		%	20
A676412	VP4	Matrix Spike	Dissolved Sodium (Na)	2022/08/10	0.23		%	20
			O-TERPHENYL (sur.)	2022/08/12		98	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/12		103	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/12		109	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/12		101	%	60 - 140
A676412	VP4	Spiked Blank	O-TERPHENYL (sur.)	2022/08/12		123	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/12		106	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/12		126	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/12		126	%	60 - 140
			O-TERPHENYL (sur.)	2022/08/12		107	%	60 - 140
A676412	VP4	Method Blank	F2 (C10-C16 Hydrocarbons)	2022/08/12	<0.10		mg/L	
			F3 (C16-C34 Hydrocarbons)	2022/08/12	<0.10		mg/L	
			F4 (C34-C50 Hydrocarbons)	2022/08/12	<0.20		mg/L	
			O-TERPHENYL (sur.)	2022/08/12		107	%	60 - 140
A676415	NK3	Spiked Blank	D10-ANTHRACENE (sur.)	2022/08/13		119	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/13		103	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/13		91	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/13		135 (1)	%	50 - 130
			Acenaphthene	2022/08/13		88	%	50 - 130
			Acenaphthylene	2022/08/13		93	%	50 - 130
			Acridine	2022/08/13		96	%	50 - 130
			Anthracene	2022/08/13		103	%	50 - 130
			Benzo(a)anthracene	2022/08/13		108	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/13		102	%	50 - 130
			Benzo(k)fluoranthene	2022/08/13		101	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/13		98	%	50 - 130
			Benzo(c)phenanthrene	2022/08/13		109	%	50 - 130
			Benzo(a)pyrene	2022/08/13		94	%	50 - 130
			Benzo(e)pyrene	2022/08/13		98	%	50 - 130
			Chrysene	2022/08/13		105	%	50 - 130



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A676415	NK3	Method Blank	Dibenz(a,h)anthracene	2022/08/13		91	%	50 - 130
			Fluoranthene	2022/08/13		113	%	50 - 130
			Fluorene	2022/08/13		90	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/13		97	%	50 - 130
			1-Methylnaphthalene	2022/08/13		74	%	50 - 130
			2-Methylnaphthalene	2022/08/13		92	%	50 - 130
			Naphthalene	2022/08/13		95	%	50 - 130
			Phenanthrene	2022/08/13		98	%	50 - 130
			Perylene	2022/08/13		98	%	50 - 130
			Pyrene	2022/08/13		108	%	50 - 130
			Quinoline	2022/08/13		88	%	50 - 130
			D10-ANTHRACENE (sur.)	2022/08/13		125	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/13		110	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/13		90	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/13		160 (1)	%	50 - 130
			Acenaphthene	2022/08/13	<0.10		ug/L	
			Acenaphthylene	2022/08/13	<0.10		ug/L	
			Acridine	2022/08/13	<0.040		ug/L	
			Anthracene	2022/08/13	<0.010		ug/L	
			Benzo(a)anthracene	2022/08/13	<0.0085		ug/L	
			Benzo(b&j)fluoranthene	2022/08/13	<0.0085		ug/L	
			Benzo(k)fluoranthene	2022/08/13	<0.0085		ug/L	
			Benzo(g,h,i)perylene	2022/08/13	<0.0085		ug/L	
			Benzo(c)phenanthrene	2022/08/13	<0.050		ug/L	
			Benzo(a)pyrene	2022/08/13	<0.0075		ug/L	
			Benzo(e)pyrene	2022/08/13	<0.050		ug/L	
			Chrysene	2022/08/13	<0.0085		ug/L	
			Dibenz(a,h)anthracene	2022/08/13	<0.0075		ug/L	
			Fluoranthene	2022/08/13	<0.010		ug/L	
			Fluorene	2022/08/13	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2022/08/13	<0.0085		ug/L	
			1-Methylnaphthalene	2022/08/13	<0.10		ug/L	
			2-Methylnaphthalene	2022/08/13	<0.10		ug/L	
			Naphthalene	2022/08/13	<0.10		ug/L	
			Phenanthrene	2022/08/13	<0.050		ug/L	
			Perylene	2022/08/13	<0.050		ug/L	
			Pyrene	2022/08/13	<0.020		ug/L	
			Quinoline	2022/08/13	<0.20		ug/L	
A676799	MAP	Matrix Spike	Total Phosphorus (P)	2022/08/11		112	%	80 - 120
A676799	MAP	QC Standard	Total Phosphorus (P)	2022/08/11		97	%	80 - 120
A676799	MAP	Spiked Blank	Total Phosphorus (P)	2022/08/11		100	%	80 - 120
A676799	MAP	Method Blank	Total Phosphorus (P)	2022/08/11	<0.0030		mg/L	
A676799	MAP	RPD	Total Phosphorus (P)	2022/08/11	8.7		%	20
A676970	ACR	Matrix Spike	Total Ammonia (N)	2022/08/11		105	%	80 - 120
A676970	ACR	Spiked Blank	Total Ammonia (N)	2022/08/11		102	%	80 - 120
A676970	ACR	Method Blank	Total Ammonia (N)	2022/08/11	<0.015		mg/L	
A676970	ACR	RPD	Total Ammonia (N)	2022/08/11	NC		%	20
A677043	DO1	Matrix Spike [AZA187-08]	1,4-Difluorobenzene (sur.)	2022/08/15		96	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/15		100	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/15		100	%	50 - 140
			Benzene	2022/08/15		92	%	50 - 140
			Toluene	2022/08/15		86	%	50 - 140
			Ethylbenzene	2022/08/15		83	%	50 - 140



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A677043	DO1	Spiked Blank	m & p-Xylene	2022/08/15		89	%	50 - 140
			o-Xylene	2022/08/15		92	%	50 - 140
			F1 (C6-C10)	2022/08/15		106	%	60 - 140
			1,4-Difluorobenzene (sur.)	2022/08/15		96	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/15		99	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/15		99	%	50 - 140
			Benzene	2022/08/15		92	%	60 - 130
			Toluene	2022/08/15		87	%	60 - 130
			Ethylbenzene	2022/08/15		91	%	60 - 130
			m & p-Xylene	2022/08/15		91	%	60 - 130
A677043	DO1	Method Blank	o-Xylene	2022/08/15		92	%	60 - 130
			F1 (C6-C10)	2022/08/15		108	%	60 - 140
			1,4-Difluorobenzene (sur.)	2022/08/15		102	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/15		99	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/15		101	%	50 - 140
			Benzene	2022/08/15	<0.40		ug/L	
			Toluene	2022/08/15	<0.40		ug/L	
			Ethylbenzene	2022/08/15	<0.40		ug/L	
			m & p-Xylene	2022/08/15	<0.80		ug/L	
			o-Xylene	2022/08/15	<0.40		ug/L	
A677043	DO1	RPD [AZA186-04]	F1 (C6-C10)	2022/08/15	<100		ug/L	
			Benzene	2022/08/15	NC		%	30
			Toluene	2022/08/15	4.7		%	30
			Ethylbenzene	2022/08/15	NC		%	30
			m & p-Xylene	2022/08/15	NC		%	30
			o-Xylene	2022/08/15	NC		%	30
			F1 (C6-C10)	2022/08/15	NC		%	30
A678186	RY3	Matrix Spike	Total Aluminum (Al)	2022/08/13		112	%	80 - 120
			Total Antimony (Sb)	2022/08/13		103	%	80 - 120
			Total Arsenic (As)	2022/08/13		96	%	80 - 120
			Total Beryllium (Be)	2022/08/13		95	%	80 - 120
			Total Chromium (Cr)	2022/08/13		98	%	80 - 120
			Total Cobalt (Co)	2022/08/13		97	%	80 - 120
			Total Copper (Cu)	2022/08/13		97	%	80 - 120
			Total Lead (Pb)	2022/08/13		102	%	80 - 120
			Total Molybdenum (Mo)	2022/08/13		102	%	80 - 120
			Total Nickel (Ni)	2022/08/13		97	%	80 - 120
			Total Selenium (Se)	2022/08/13		102	%	80 - 120
			Total Silver (Ag)	2022/08/13		101	%	80 - 120
			Total Thallium (Tl)	2022/08/13		75 (1)	%	80 - 120
			Total Tin (Sn)	2022/08/13		101	%	80 - 120
			Total Titanium (Ti)	2022/08/13		95	%	80 - 120
			Total Uranium (U)	2022/08/13		102	%	80 - 120
			Total Vanadium (V)	2022/08/13		100	%	80 - 120
			Total Zinc (Zn)	2022/08/13		86	%	80 - 120
A678186	RY3	Spiked Blank	Total Aluminum (Al)	2022/08/13		105	%	80 - 120
			Total Antimony (Sb)	2022/08/13		106	%	80 - 120
			Total Arsenic (As)	2022/08/13		101	%	80 - 120
			Total Beryllium (Be)	2022/08/13		92	%	80 - 120
			Total Chromium (Cr)	2022/08/13		101	%	80 - 120
			Total Cobalt (Co)	2022/08/13		101	%	80 - 120
			Total Copper (Cu)	2022/08/13		102	%	80 - 120
			Total Lead (Pb)	2022/08/13		105	%	80 - 120



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A678186	RY3	Method Blank	Total Molybdenum (Mo)	2022/08/13		101	%	80 - 120
			Total Nickel (Ni)	2022/08/13		101	%	80 - 120
			Total Selenium (Se)	2022/08/13		104	%	80 - 120
			Total Silver (Ag)	2022/08/13		103	%	80 - 120
			Total Thallium (Tl)	2022/08/13		105	%	80 - 120
			Total Tin (Sn)	2022/08/13		102	%	80 - 120
			Total Titanium (Ti)	2022/08/13		99	%	80 - 120
			Total Uranium (U)	2022/08/13		102	%	80 - 120
			Total Vanadium (V)	2022/08/13		101	%	80 - 120
			Total Zinc (Zn)	2022/08/13		101	%	80 - 120
			Total Aluminum (Al)	2022/08/13	<0.0030		mg/L	
			Total Antimony (Sb)	2022/08/13	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/13	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/13	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/13	<0.0010		mg/L	
			Total Cobalt (Co)	2022/08/13	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/13	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/13	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/13	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/13	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/13	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/13	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/13	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/13	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/13	<0.0010		mg/L	
			Total Uranium (U)	2022/08/13	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/13	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/13	<0.0030		mg/L	
A678186	RY3	RPD [AZA187-03]	Total Aluminum (Al)	2022/08/13	23 (1)		%	20
			Total Antimony (Sb)	2022/08/13	NC		%	20
			Total Arsenic (As)	2022/08/13	NC		%	20
			Total Beryllium (Be)	2022/08/13	NC		%	20
			Total Chromium (Cr)	2022/08/13	NC		%	20
			Total Cobalt (Co)	2022/08/13	14		%	20
			Total Copper (Cu)	2022/08/13	14		%	20
			Total Lead (Pb)	2022/08/13	2.3		%	20
			Total Molybdenum (Mo)	2022/08/13	7.5		%	20
			Total Nickel (Ni)	2022/08/13	12		%	20
			Total Selenium (Se)	2022/08/13	4.5		%	20
			Total Silver (Ag)	2022/08/13	41 (1)		%	20
			Total Thallium (Tl)	2022/08/13	NC		%	20
			Total Tin (Sn)	2022/08/13	NC		%	20
			Total Titanium (Ti)	2022/08/13	23 (1)		%	20
			Total Uranium (U)	2022/08/13	2.2		%	20
			Total Vanadium (V)	2022/08/13	5.3		%	20
			Total Zinc (Zn)	2022/08/13	45 (1)		%	20
A678195	MPU	Matrix Spike	Total Barium (Ba)	2022/08/12		107	%	80 - 120
			Total Boron (B)	2022/08/12		108	%	80 - 120
			Total Calcium (Ca)	2022/08/12		102	%	80 - 120
			Total Iron (Fe)	2022/08/12		NC	%	80 - 120
			Total Lithium (Li)	2022/08/12		104	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		105	%	80 - 120
			Total Manganese (Mn)	2022/08/12		113	%	80 - 120



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A678195	MPU	Spiked Blank	Total Phosphorus (P)	2022/08/12		104	%	80 - 120
			Total Potassium (K)	2022/08/12		111	%	80 - 120
			Total Silicon (Si)	2022/08/12		140 (1)	%	80 - 120
			Total Sodium (Na)	2022/08/12		102	%	80 - 120
			Total Strontium (Sr)	2022/08/12		102	%	80 - 120
			Total Sulphur (S)	2022/08/12		108	%	80 - 120
			Total Barium (Ba)	2022/08/12		105	%	80 - 120
			Total Boron (B)	2022/08/12		104	%	80 - 120
			Total Calcium (Ca)	2022/08/12		99	%	80 - 120
			Total Iron (Fe)	2022/08/12		111	%	80 - 120
			Total Lithium (Li)	2022/08/12		101	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		103	%	80 - 120
			Total Manganese (Mn)	2022/08/12		109	%	80 - 120
			Total Phosphorus (P)	2022/08/12		102	%	80 - 120
			Total Potassium (K)	2022/08/12		108	%	80 - 120
			Total Silicon (Si)	2022/08/12		112	%	80 - 120
A678195	MPU	Method Blank	Total Sodium (Na)	2022/08/12		99	%	80 - 120
			Total Strontium (Sr)	2022/08/12		100	%	80 - 120
			Total Sulphur (S)	2022/08/12		105	%	80 - 120
			Total Barium (Ba)	2022/08/12	<0.010		mg/L	
			Total Boron (B)	2022/08/12	<0.020		mg/L	
			Total Calcium (Ca)	2022/08/12	<0.30		mg/L	
			Total Iron (Fe)	2022/08/12	<0.060		mg/L	
			Total Lithium (Li)	2022/08/12	<0.020		mg/L	
			Total Magnesium (Mg)	2022/08/12	<0.20		mg/L	
			Total Manganese (Mn)	2022/08/12	<0.0040		mg/L	
			Total Phosphorus (P)	2022/08/12	<0.10		mg/L	
			Total Potassium (K)	2022/08/12	<0.30		mg/L	
			Total Silicon (Si)	2022/08/12	<0.10		mg/L	
			Total Sodium (Na)	2022/08/12	<0.50		mg/L	
			Total Strontium (Sr)	2022/08/12	<0.020		mg/L	
			Total Sulphur (S)	2022/08/12	<0.20		mg/L	
A678195	MPU	RPD [AZA187-03]	Total Barium (Ba)	2022/08/12	0		%	20
			Total Boron (B)	2022/08/12	NC		%	20
			Total Calcium (Ca)	2022/08/12	0.41		%	20
			Total Iron (Fe)	2022/08/12	21 (1)		%	20
			Total Lithium (Li)	2022/08/12	NC		%	20
			Total Magnesium (Mg)	2022/08/12	0.28		%	20
			Total Manganese (Mn)	2022/08/12	3.4		%	20
			Total Phosphorus (P)	2022/08/12	NC		%	20
			Total Potassium (K)	2022/08/12	0.12		%	20
			Total Silicon (Si)	2022/08/12	17		%	20
			Total Sodium (Na)	2022/08/12	0.38		%	20
			Total Strontium (Sr)	2022/08/12	0.31		%	20
			Total Sulphur (S)	2022/08/12	0.32		%	20
A678469	RY3	Matrix Spike	Total Aluminum (Al)	2022/08/12		102	%	80 - 120
			Total Antimony (Sb)	2022/08/12		101	%	80 - 120
			Total Arsenic (As)	2022/08/12		95	%	80 - 120
			Total Beryllium (Be)	2022/08/12		105	%	80 - 120
			Total Chromium (Cr)	2022/08/12		97	%	80 - 120
			Total Cobalt (Co)	2022/08/12		95	%	80 - 120
			Total Copper (Cu)	2022/08/12		92	%	80 - 120
			Total Lead (Pb)	2022/08/12		103	%	80 - 120



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A678469	RY3	Spiked Blank	Total Molybdenum (Mo)	2022/08/12		100	%	80 - 120
			Total Nickel (Ni)	2022/08/12		94	%	80 - 120
			Total Selenium (Se)	2022/08/12		99	%	80 - 120
			Total Silver (Ag)	2022/08/12		115	%	80 - 120
			Total Thallium (Tl)	2022/08/12		105	%	80 - 120
			Total Tin (Sn)	2022/08/12		100	%	80 - 120
			Total Titanium (Ti)	2022/08/12		102	%	80 - 120
			Total Uranium (U)	2022/08/12		101	%	80 - 120
			Total Vanadium (V)	2022/08/12		100	%	80 - 120
			Total Zinc (Zn)	2022/08/12		97 (2)	%	80 - 120
			Total Aluminum (Al)	2022/08/12		100	%	80 - 120
			Total Antimony (Sb)	2022/08/12		101	%	80 - 120
			Total Arsenic (As)	2022/08/12		96	%	80 - 120
			Total Beryllium (Be)	2022/08/12		102	%	80 - 120
			Total Chromium (Cr)	2022/08/12		97	%	80 - 120
			Total Cobalt (Co)	2022/08/12		97	%	80 - 120
			Total Copper (Cu)	2022/08/12		96	%	80 - 120
			Total Lead (Pb)	2022/08/12		102	%	80 - 120
			Total Molybdenum (Mo)	2022/08/12		98	%	80 - 120
			Total Nickel (Ni)	2022/08/12		97	%	80 - 120
			Total Selenium (Se)	2022/08/12		100	%	80 - 120
			Total Silver (Ag)	2022/08/12		115	%	80 - 120
			Total Thallium (Tl)	2022/08/12		101	%	80 - 120
			Total Tin (Sn)	2022/08/12		98	%	80 - 120
			Total Titanium (Ti)	2022/08/12		102	%	80 - 120
			Total Uranium (U)	2022/08/12		98	%	80 - 120
			Total Vanadium (V)	2022/08/12		100	%	80 - 120
			Total Zinc (Zn)	2022/08/12		98	%	80 - 120
A678469	RY3	Method Blank	Total Aluminum (Al)	2022/08/12	<0.0030		mg/L	
			Total Antimony (Sb)	2022/08/12	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/12	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/12	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/12	<0.0010		mg/L	
			Total Cobalt (Co)	2022/08/12	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/12	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/12	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/12	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/12	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/12	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/12	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/12	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/12	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/12	<0.0010		mg/L	
			Total Uranium (U)	2022/08/12	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/12	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/12	<0.0030		mg/L	
A678469	RY3	RPD [AZA190-03]	Total Aluminum (Al)	2022/08/12	2.2		%	20
			Total Antimony (Sb)	2022/08/12	NC		%	20
			Total Arsenic (As)	2022/08/12	6.9		%	20
			Total Beryllium (Be)	2022/08/12	NC		%	20
			Total Chromium (Cr)	2022/08/12	9.1		%	20
			Total Cobalt (Co)	2022/08/12	2.8		%	20
			Total Copper (Cu)	2022/08/12	4.6		%	20



**BUREAU
VERITAS**

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A678476	MPU	Matrix Spike	Total Lead (Pb)	2022/08/12	3.8		%	20
			Total Molybdenum (Mo)	2022/08/12	5.0		%	20
			Total Nickel (Ni)	2022/08/12	0.75		%	20
			Total Selenium (Se)	2022/08/12	19		%	20
			Total Silver (Ag)	2022/08/12	17		%	20
			Total Thallium (Tl)	2022/08/12	NC		%	20
			Total Tin (Sn)	2022/08/12	NC		%	20
			Total Titanium (Ti)	2022/08/12	3.4		%	20
			Total Uranium (U)	2022/08/12	8.8		%	20
			Total Vanadium (V)	2022/08/12	0.54		%	20
			Total Zinc (Zn)	2022/08/12	56 (1)		%	20
			Total Barium (Ba)	2022/08/12		99	%	80 - 120
			Total Boron (B)	2022/08/12		106	%	80 - 120
			Total Calcium (Ca)	2022/08/12		NC	%	80 - 120
			Total Iron (Fe)	2022/08/12		NC	%	80 - 120
			Total Lithium (Li)	2022/08/12		101	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		NC	%	80 - 120
			Total Manganese (Mn)	2022/08/12		NC	%	80 - 120
			Total Phosphorus (P)	2022/08/12		107	%	80 - 120
			Total Potassium (K)	2022/08/12		108	%	80 - 120
A678476	MPU	Spiked Blank	Total Silicon (Si)	2022/08/12		NC	%	80 - 120
			Total Strontium (Sr)	2022/08/12		NC	%	80 - 120
			Total Sulphur (S)	2022/08/12		NC	%	80 - 120
			Total Barium (Ba)	2022/08/12		107	%	80 - 120
			Total Boron (B)	2022/08/12		107	%	80 - 120
			Total Calcium (Ca)	2022/08/12		100	%	80 - 120
			Total Iron (Fe)	2022/08/12		111	%	80 - 120
			Total Lithium (Li)	2022/08/12		103	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		105	%	80 - 120
			Total Manganese (Mn)	2022/08/12		110	%	80 - 120
A678476	MPU	Method Blank	Total Phosphorus (P)	2022/08/12		103	%	80 - 120
			Total Potassium (K)	2022/08/12		110	%	80 - 120
			Total Silicon (Si)	2022/08/12		108	%	80 - 120
			Total Sodium (Na)	2022/08/12		102	%	80 - 120
			Total Strontium (Sr)	2022/08/12		101	%	80 - 120
			Total Sulphur (S)	2022/08/12		105	%	80 - 120
			Total Barium (Ba)	2022/08/12	<0.010		mg/L	
			Total Boron (B)	2022/08/12	<0.020		mg/L	
			Total Calcium (Ca)	2022/08/12	<0.30		mg/L	
			Total Iron (Fe)	2022/08/12	<0.060		mg/L	
A678476	MPU	RPD [AZA190-03]	Total Lithium (Li)	2022/08/12	<0.020		mg/L	
			Total Magnesium (Mg)	2022/08/12	<0.20		mg/L	
			Total Manganese (Mn)	2022/08/12	<0.0040		mg/L	
			Total Phosphorus (P)	2022/08/12	<0.10		mg/L	
			Total Potassium (K)	2022/08/12	<0.30		mg/L	
			Total Silicon (Si)	2022/08/12	<0.10		mg/L	
			Total Sodium (Na)	2022/08/12	<0.50		mg/L	
			Total Strontium (Sr)	2022/08/12	<0.020		mg/L	
			Total Sulphur (S)	2022/08/12	<0.20		mg/L	
			Total Barium (Ba)	2022/08/12	1.1		%	20
A678476	MPU	RPD [AZA190-03]	Total Boron (B)	2022/08/12	1.7		%	20
			Total Calcium (Ca)	2022/08/12	2.2		%	20
			Total Iron (Fe)	2022/08/12	0.98		%	20



QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Lithium (Li)	2022/08/12	NC		%	20
			Total Magnesium (Mg)	2022/08/12	1.8		%	20
			Total Manganese (Mn)	2022/08/12	1.8		%	20
			Total Phosphorus (P)	2022/08/12	1.9		%	20
			Total Potassium (K)	2022/08/12	0.60		%	20
			Total Silicon (Si)	2022/08/12	4.1		%	20
			Total Sodium (Na)	2022/08/12	2.6		%	20
			Total Strontium (Sr)	2022/08/12	3.1		%	20
			Total Sulphur (S)	2022/08/12	2.1		%	20
A678530	ACR	Matrix Spike	Total Ammonia (N)	2022/08/13		113	%	80 - 120
A678530	ACR	Spiked Blank	Total Ammonia (N)	2022/08/13		100	%	80 - 120
A678530	ACR	Method Blank	Total Ammonia (N)	2022/08/13	<0.015		mg/L	
A678530	ACR	RPD	Total Ammonia (N)	2022/08/13	1.3		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Duplicate exceeds acceptance criteria due to sample matrix. Reanalysis yields similar results.



BUREAU
VERITAS

Bureau Veritas Job #: C258047

Report Date: 2022/08/16

OUTCOME CONSULTANTS INC.

Client Project #: Resolute Landfills GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Gita Pokhrel, Laboratory Supervisor

Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

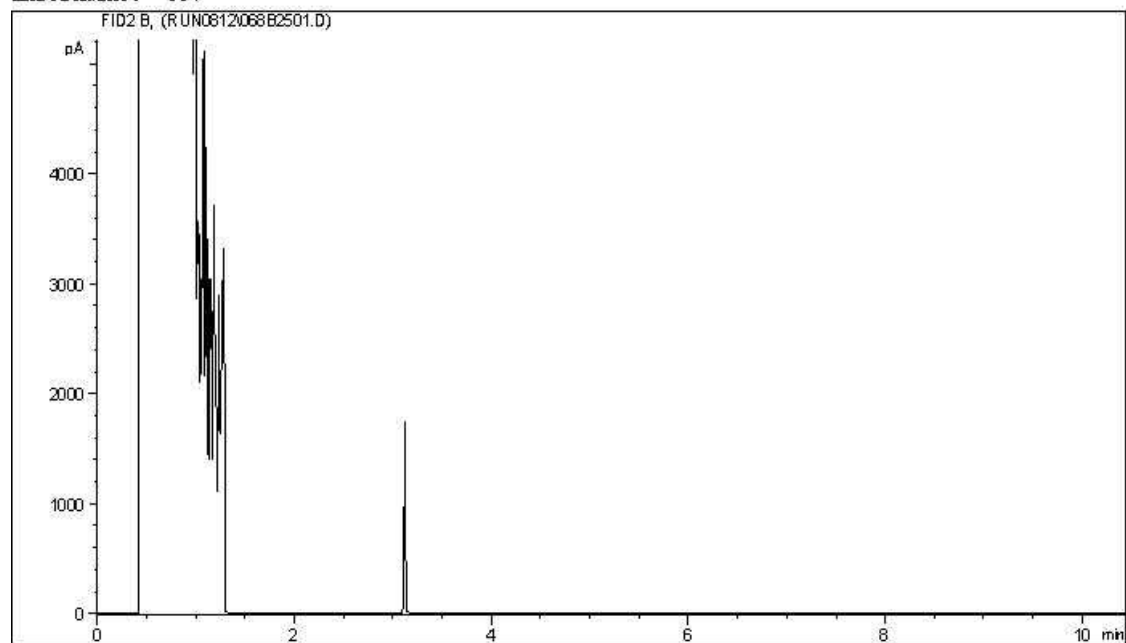
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



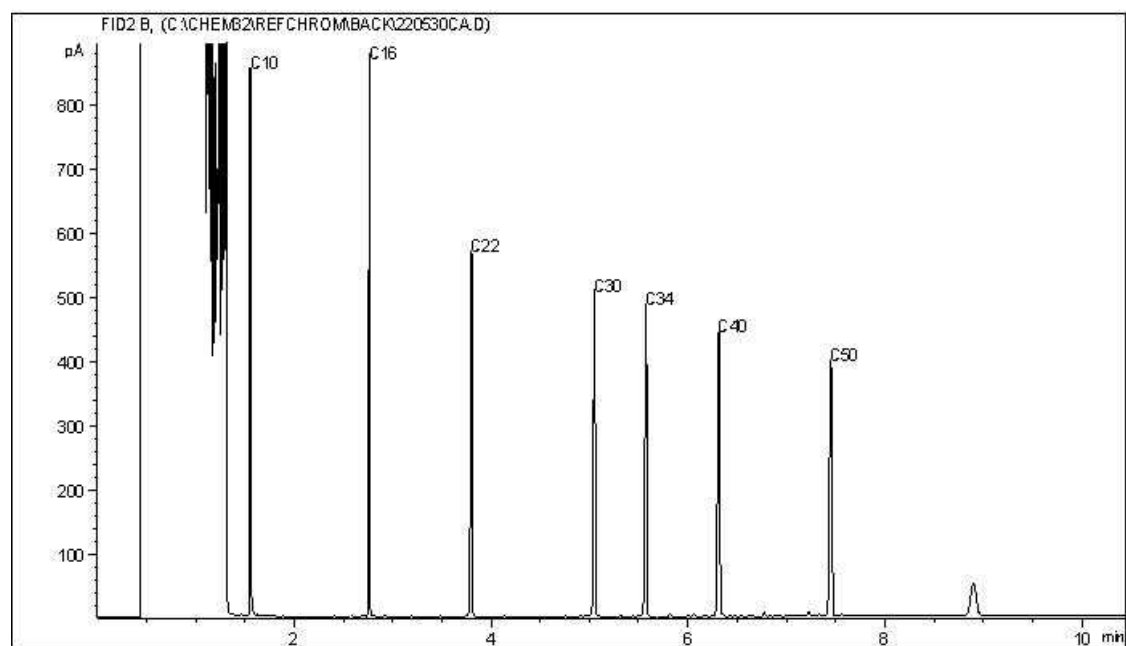
INVOICE TO: Company Name: #12700 OUTCOME CONSULTANTS INC. Contact Name: Keelan Veitch Address: 151 HOLLAND AVENUE SUITE 200 OTTAWA ON K1Y 0Y2 Phone: (613) 297-0341 Email: keelan@outcomeinc.ca		Report Information Company Name: <u>SAME</u> Contact Name: <u>SAME</u> Address: <u>SAME</u> Phone: <u>SAME</u> Email: <u>SAME</u>		Project Information Quotation #: <u>C20222</u> P.O. #: <u>P2022-14</u> Project #: <u>Resolute Landfills GW/SW</u> Project Name: <u>" "</u> Site #: <u>P2022-14</u> Sampled By: <u>Keelan Veitch</u>		Laboratory Use Only Bureau Veritas Job #: <u>C258 047</u> Chain Of Custody Record: <u>C258 047</u> Project Manager: <u>Katherine Szojda</u> Bottle Order #: <u>669184</u> C#669184-01-01	
Regulatory Criteria Compare results to CCME. As per quote C20222 ↳ Analyze for as much as possible		Special Instructions * Two coolers for COC submission		Analysis Requested Routine Water: ☒ Regulated Metals including Mercury-Total: ☒ BTX and F1-F4 in Water: ☒ NH4AC-W, PHEN, ABTKN-T, TDS: ☒ Total Hexavalent Chromium: ☒ Oil and Grease by IR: ☒ Total Phosphorus: ☒ Total Suspended Solids (NFR, low): ☒ PAH in Water by GC/MS: ☒ Regulated Metals + Hg (CCME/AT1) - HGD-V: ☒		Turnaround Time (TAT) Required Please provide advance notice for rush projects Regular (Standard) TAT (will be applied if Rush TAT is not specified): ☒ Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details. Job Specific Rush TAT (if applies to entire submission): ☐ Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)	
Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form Samples must be kept cool (< 10°C) from time of sampling until delivery to Bureau Veritas				Regulated Drinking Water ? (Y/N) Metals Field Filtered ? (Y/N)		Comments	
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water ? (Y/N)	Metals Field Filtered ? (Y/N)	Comments
1	RBL-6	2022-08-04	1300	GW	N	N	Limited volume, Analyze for as much as possible
2	RBL-7	2022-08-02	900	GW	Y	Y	
3	2-MW-8	2022-08-04	1400	GW	Y	Y	Limited volume
4	FL-MW-7	2022-08-02	1000	GW	Y	Y	
5	DUPA	↓	1000	GW	Y	Y	
6	RBL-8	↓	1300	SW	Y	Y	Received in Yellowknife By: J. Mervin
7	Field Blank	2022-08-04	1400	Other	Y	Y	@ 16:30
8	Trip Blank	↓	1430	Other	Y	Y	AUG 03 2022
9							1cc-yes / 5-yes
10							Temp: 2 / 2 / 5
RELINQUISHED BY: (Signature/Print) Keelan Veitch		Date: (YY/MM/DD) 22/08/04	Time: 1500	RECEIVED BY: (Signature/Print) J. Mervin		Date: (YY/MM/DD) 2022/08/08	Time: 06:00
# jars used and not submitted		Lab Use Only Temperature (°C) on Receipt: <u>16.0</u> Custody Seal Intact on Cooler? ☒ Yes ☐ No		White: Bureau Veritas Yellow: Client			

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



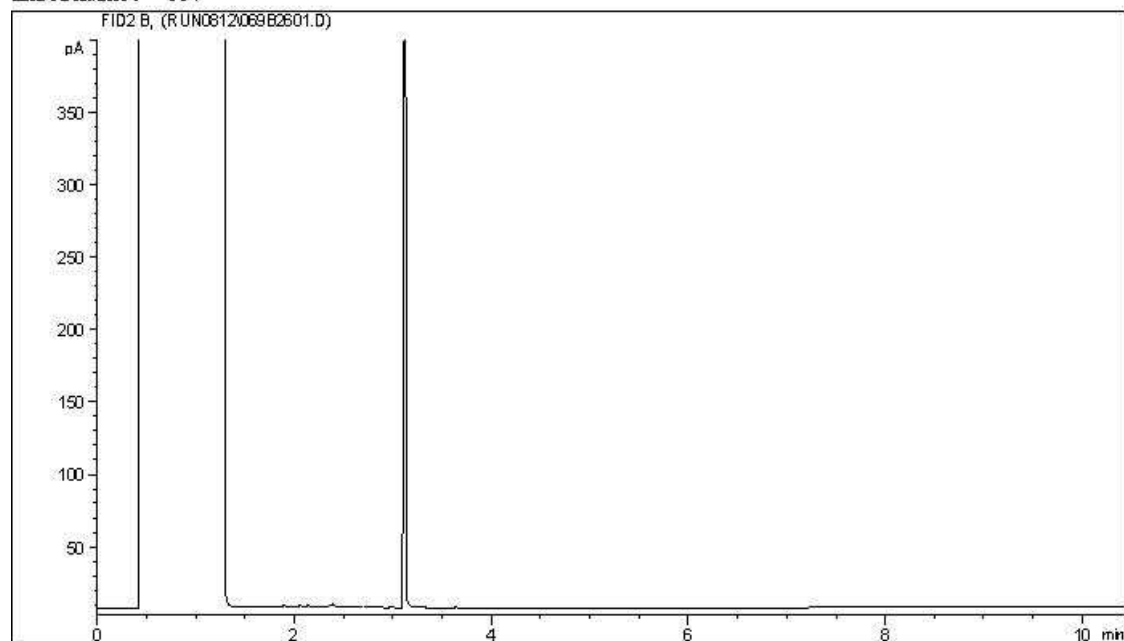
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

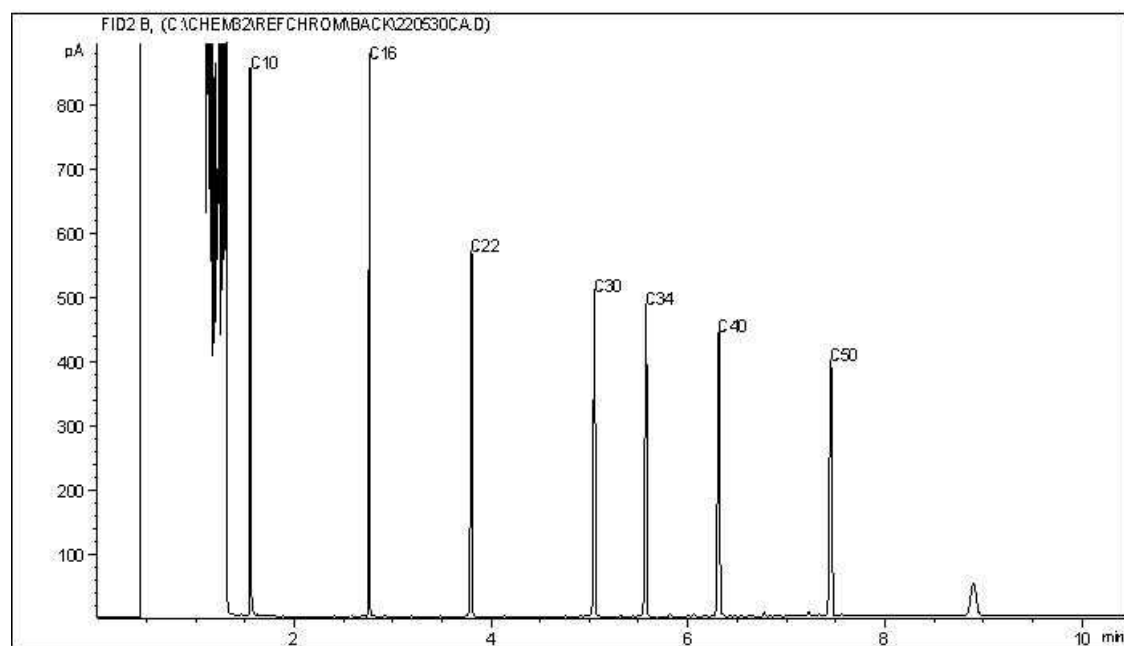
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



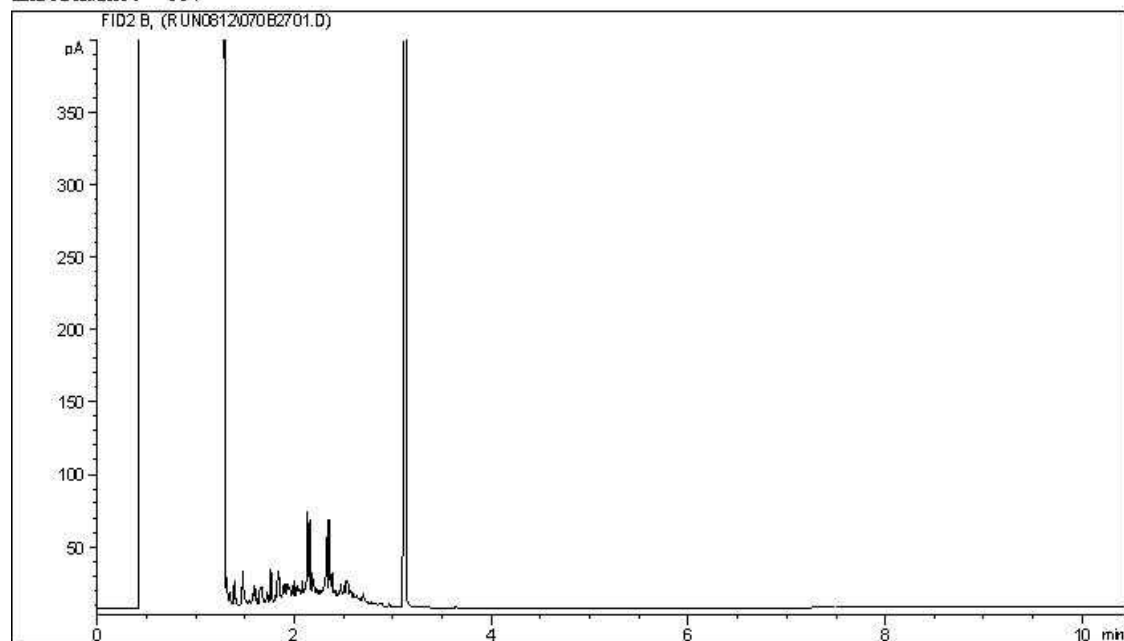
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

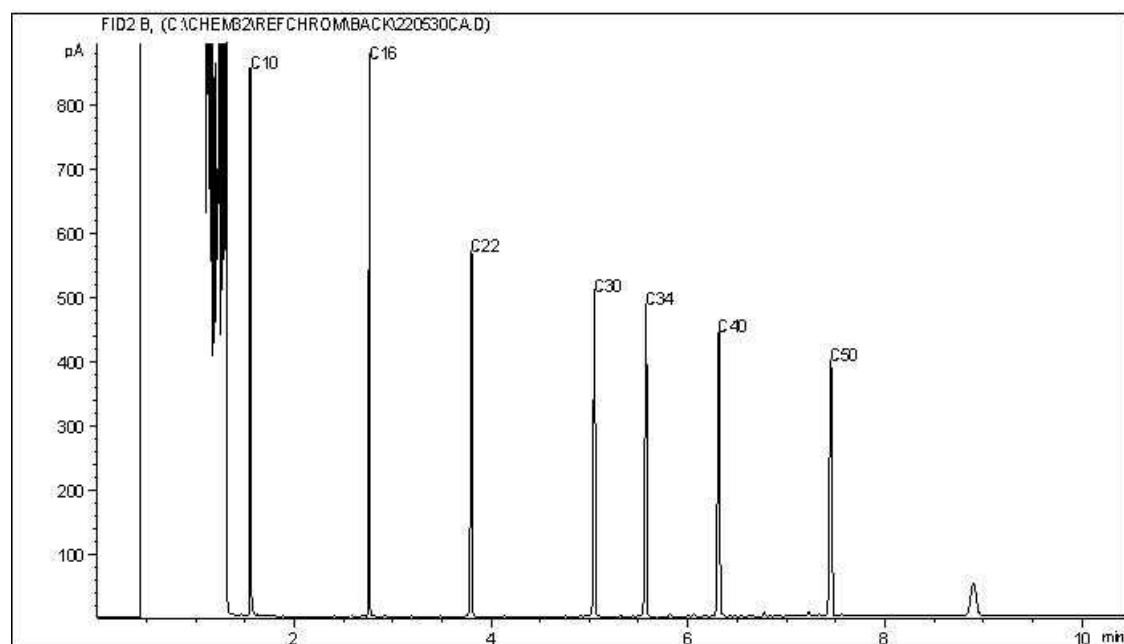
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



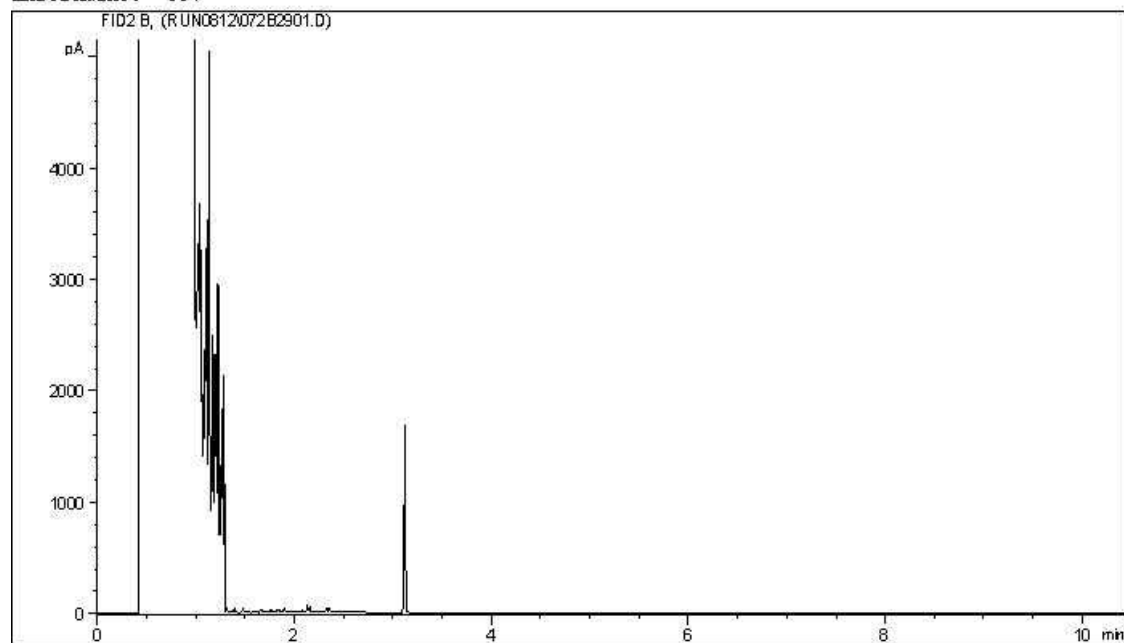
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

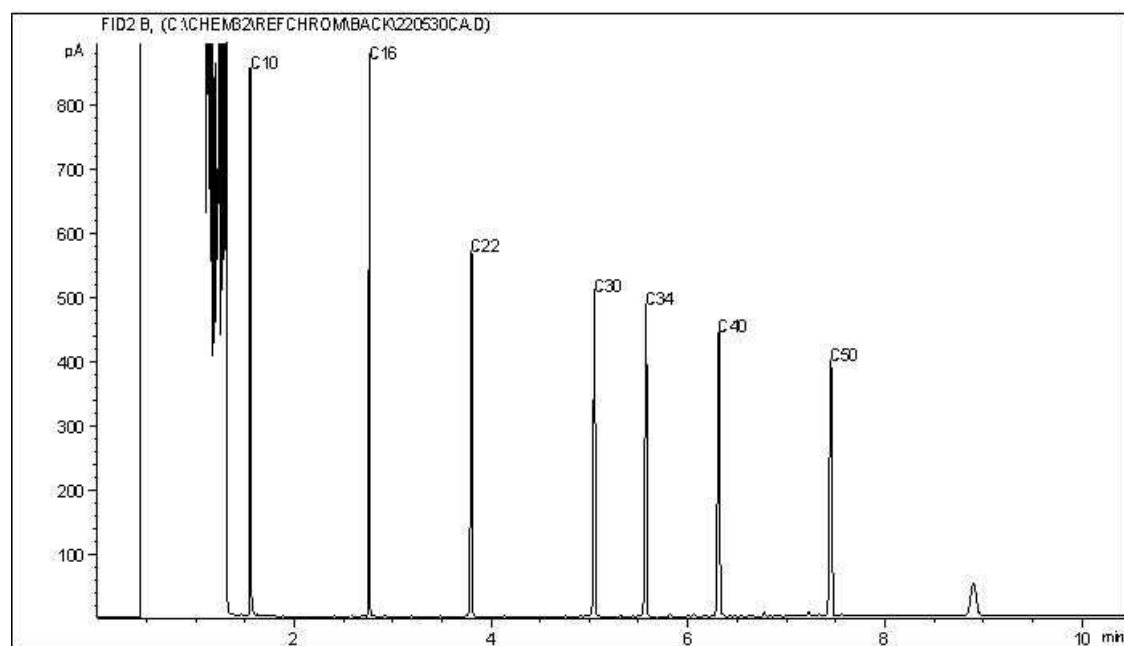
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



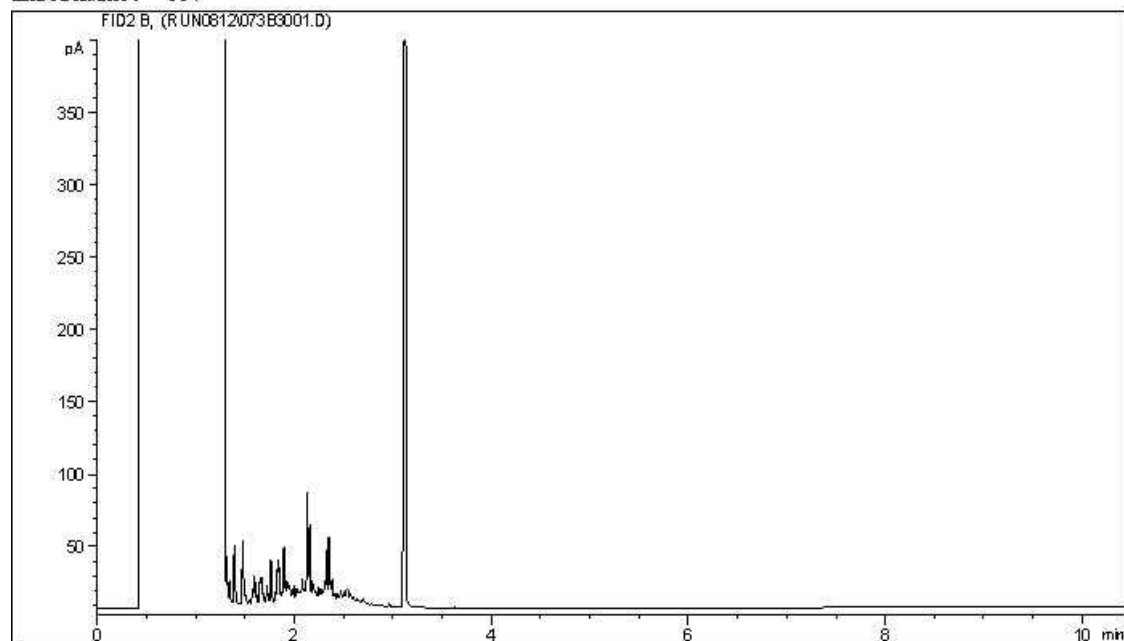
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

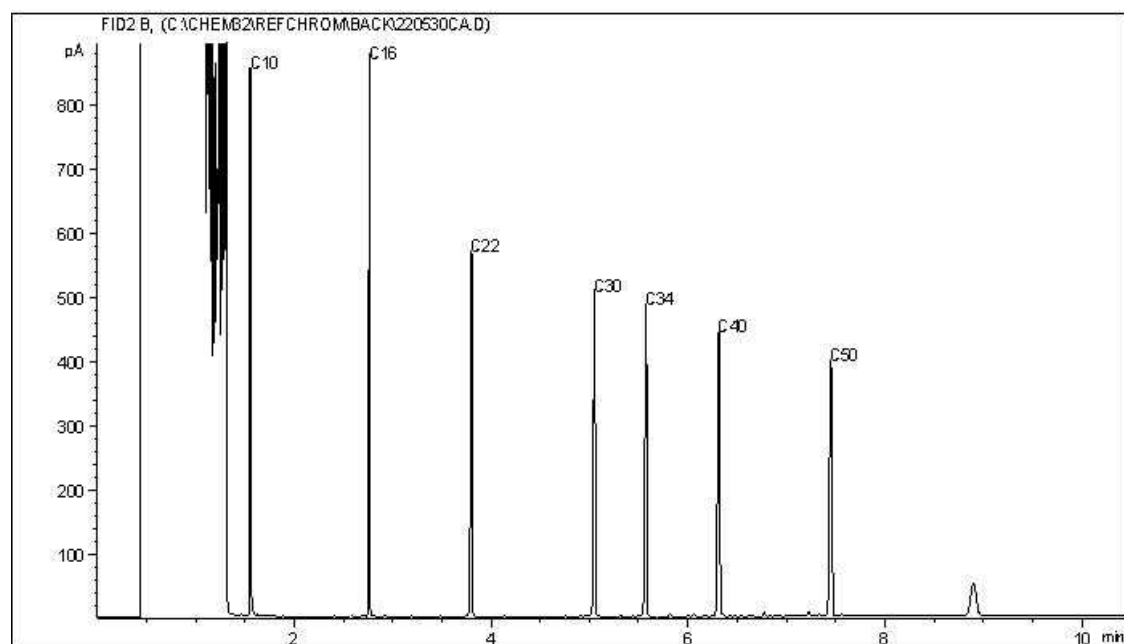
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



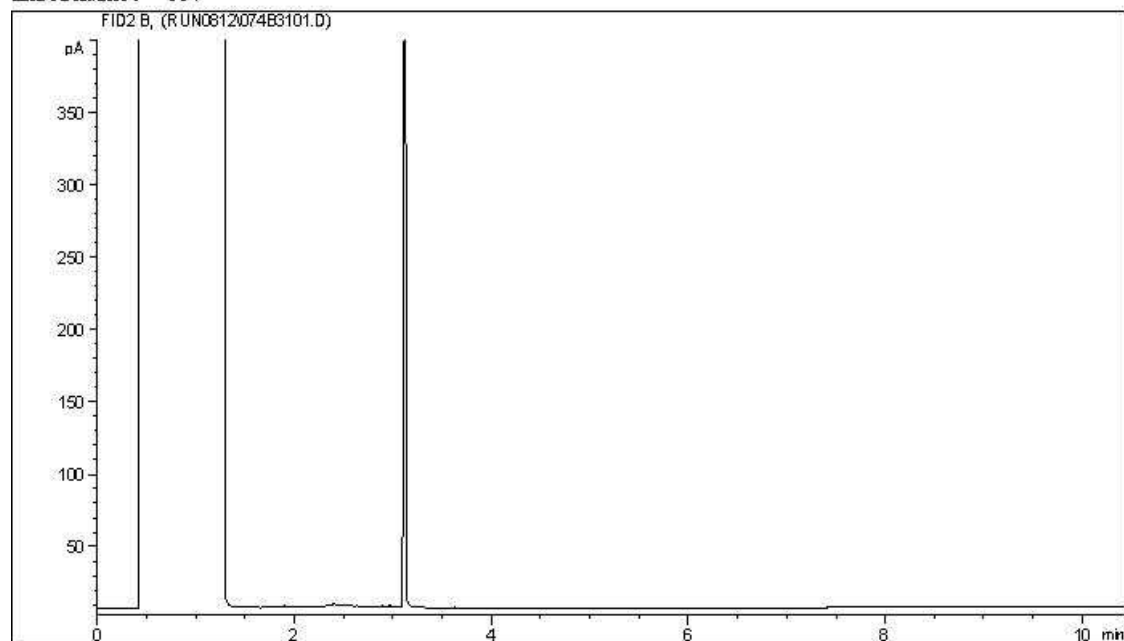
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

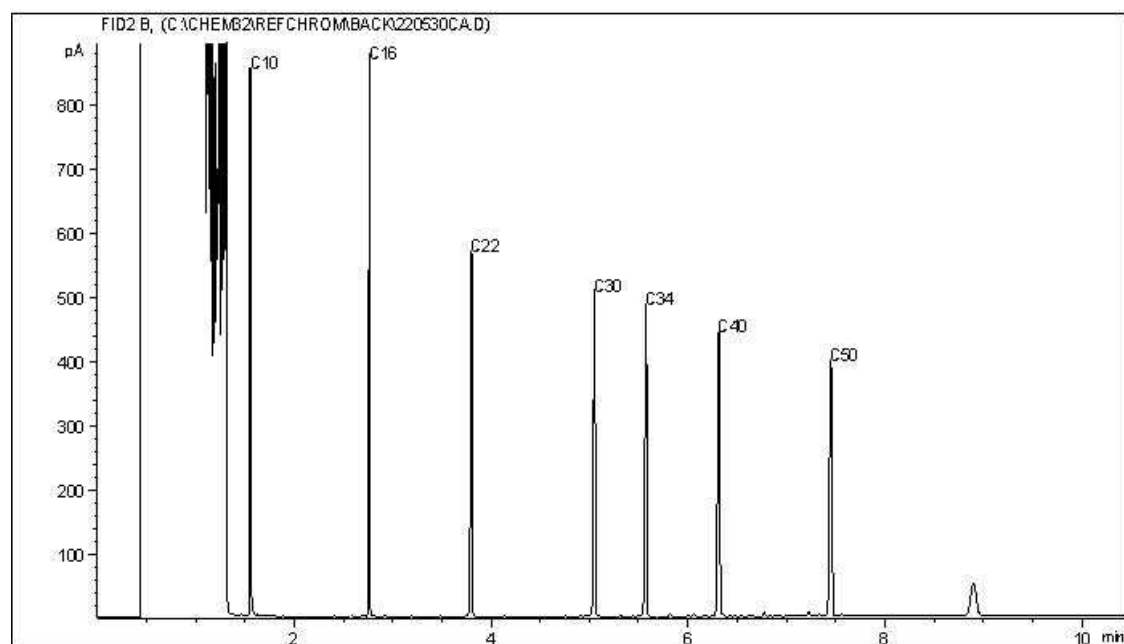
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



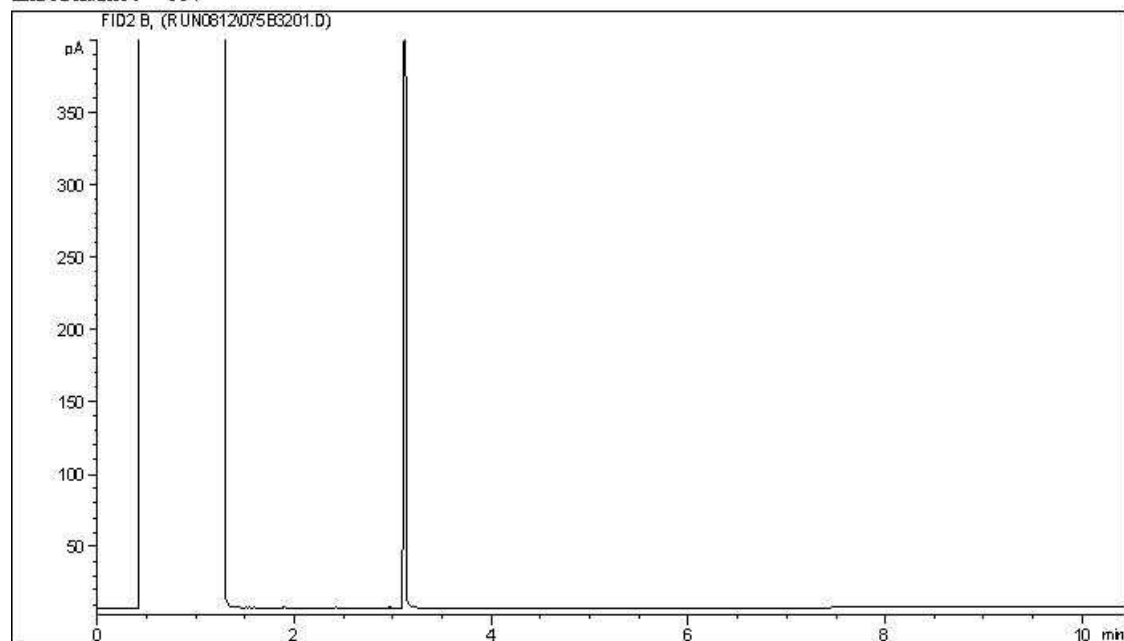
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

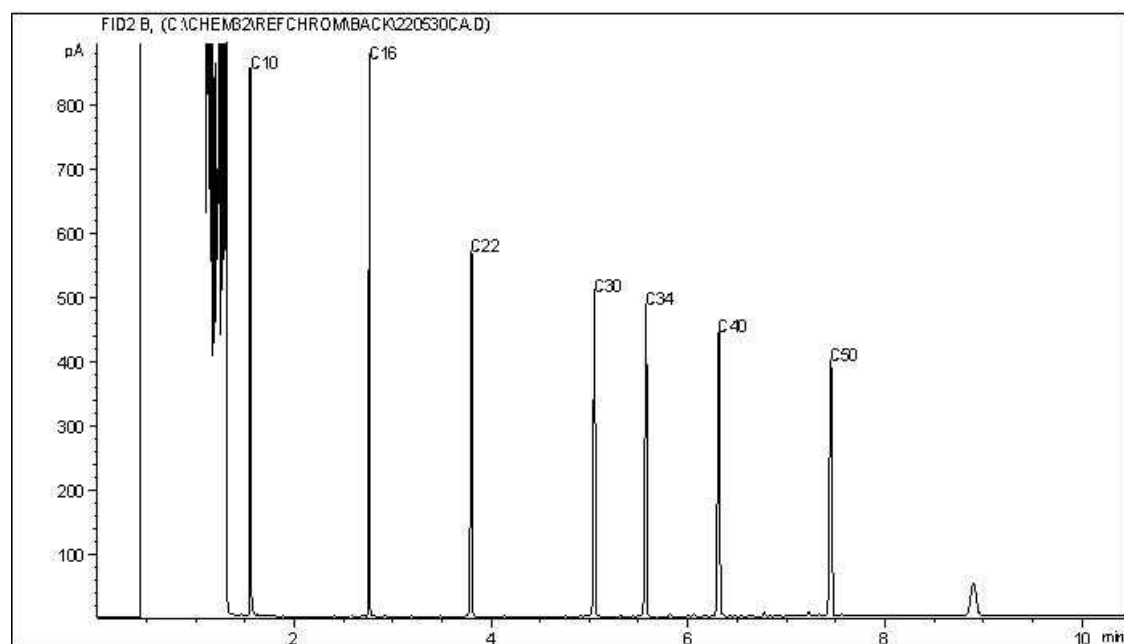
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



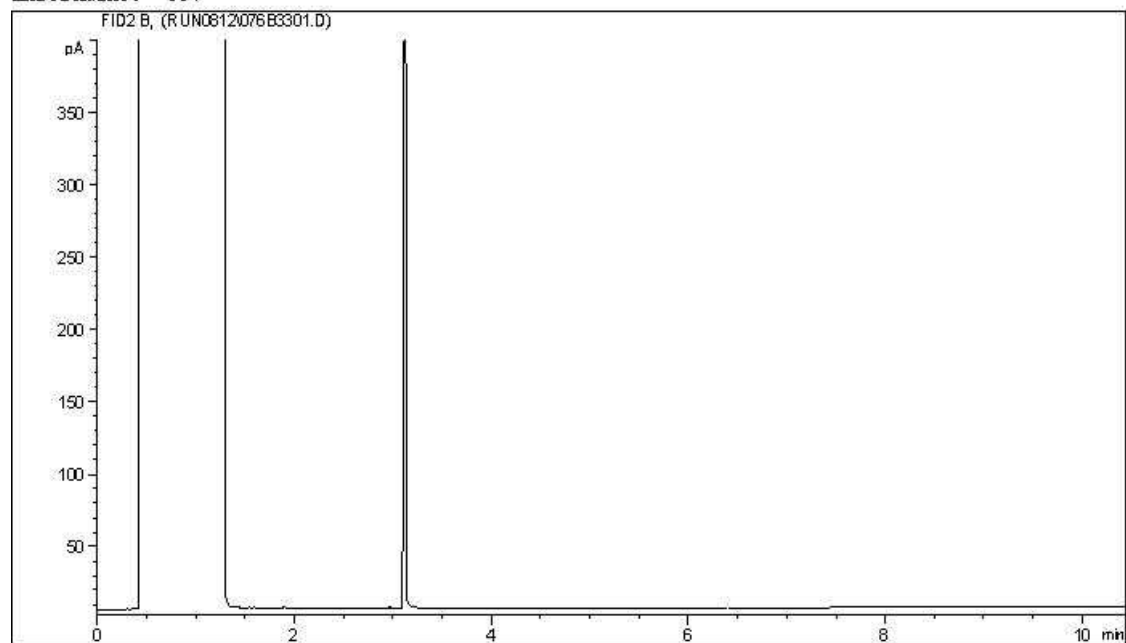
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

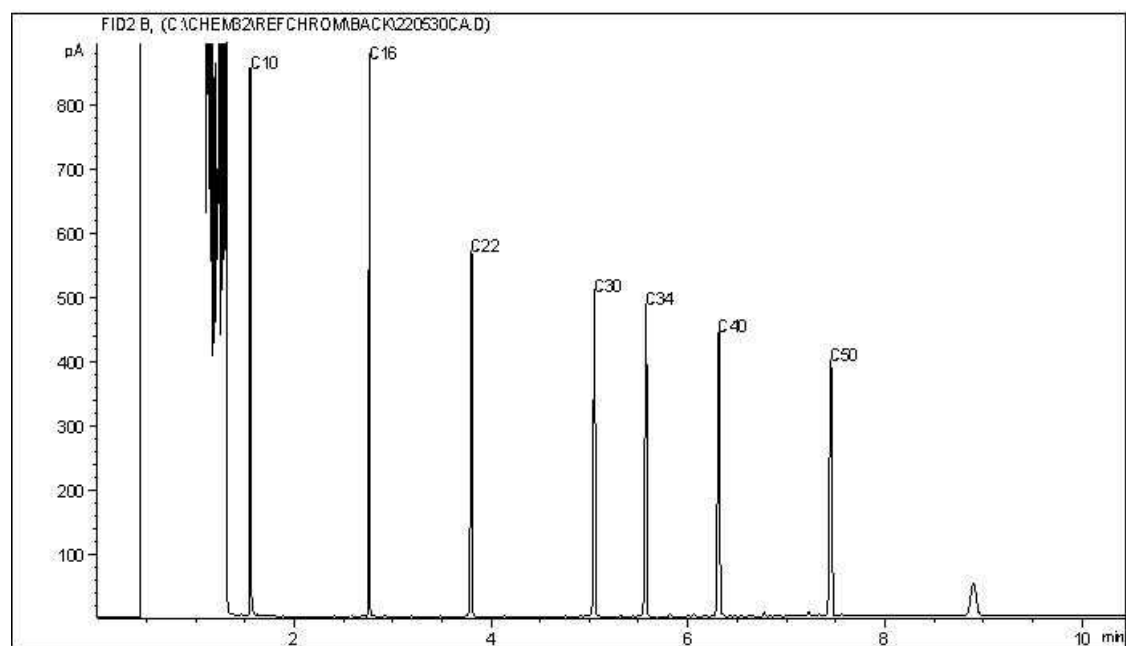
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Your P.O. #: P2022-14
Your Project #: RESOLUTE LANDFILLS GW/SW
Site#: P2022-14
Your C.O.C. #: 669184-03-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
151 HOLLAND AVENUE
SUITE 200
OTTAWA, ON
CANADA K1Y 0Y2

Report Date: 2022/08/12
Report #: R3215306
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258095

Received: 2022/08/03, 16:30

Sample Matrix: Water
Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH (1)	6	N/A	2022/08/09	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID (1)	6	N/A	2022/08/11	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	6	N/A	2022/08/12		Auto Calc
Cadmium - low level CCME - Dissolved (1)	6	N/A	2022/08/11		Auto Calc
Cadmium - low level CCME (Total) (1)	6	N/A	2022/08/11		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	6	N/A	2022/08/09	AB SOP-00020	SM23-4500-Cl/SO ₄ -E m
Total Hexavalent Chromium (1)	6	N/A	2022/08/11	AB SOP-00063	SM 23 3500-Cr B m
Conductivity @25C (1)	6	N/A	2022/08/09	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons (F2-F4 in water) (1, 2)	4	2022/08/10	2022/08/10	AB SOP-00037	CCME PHC-CWS m
CCME Hydrocarbons (F2-F4 in water) (1, 2)	2	2022/08/10	2022/08/11	AB SOP-00037	CCME PHC-CWS m
Hardness (1)	6	N/A	2022/08/10		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	6	N/A	2022/08/11	BBY WI-00033	Auto Calc
Mercury (Total) by CV (1)	6	2022/08/10	2022/08/10	AB SOP-00084	BCMOE BCLM Oct2013 m
Elements by ICP-Dissolved-Lab Filtered (1, 4)	6	N/A	2022/08/09	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Total (1)	5	2022/08/09	2022/08/10	AB SOP-00014 / AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Total (1)	1	2022/08/10	2022/08/11	AB SOP-00014 / AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS-Dissolved-Lab Filtered (1, 5)	3	N/A	2022/08/11	AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	5	2022/08/09	2022/08/11	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	1	2022/08/10	2022/08/11	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	6	N/A	2022/08/10		Auto Calc
Sum of cations, anions (1)	6	N/A	2022/08/10		Auto Calc
Ammonia-N (Total) (1)	6	N/A	2022/08/10	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite (1)	6	N/A	2022/08/10		Auto Calc
NO ₂ (N); NO ₂ (N) + NO ₃ (N) in Water (1)	6	N/A	2022/08/09	AB SOP-00091	SM 23 4500 NO ₃ m
Nitrate (as N) (1)	6	2022/08/08	2022/08/10		Auto Calc
Oil and Grease by IR (1)	6	2022/08/09	2022/08/10	CAL SOP-00096	SM 23 5520C m
Benzo[a]pyrene Equivalency (1, 6)	6	N/A	2022/08/11		Auto Calc



Your P.O. #: P2022-14
 Your Project #: RESOLUTE LANDFILLS GW/SW
 Site#: P2022-14
 Your C.O.C. #: 669184-03-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
 151 HOLLAND AVENUE
 SUITE 200
 OTTAWA, ON
 CANADA K1Y 0Y2

Report Date: 2022/08/12
 Report #: R3215306
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258095

Received: 2022/08/03, 16:30

Sample Matrix: Water
 # Samples Received: 6

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
PAH in Water by GC/MS (1)	6	2022/08/10	2022/08/11	AB SOP-00037 / AB SOP-00003	EPA 3510C/8270E m
pH @25°C (1, 7)	6	N/A	2022/08/09	AB SOP-00005	SM 23 4500-H+B m
Phenols (4-AAP) (1)	6	N/A	2022/08/10	AB SOP-00088	EPA 9066 R0 m
Total Dissolved Solids (Calculated) (1)	6	N/A	2022/08/10		Auto Calc
Nitrogen (Total) (1)	4	2022/08/09	2022/08/09	AB SOP-00093	SM 23 4500-N C m
Nitrogen (Total) (1)	2	2022/08/10	2022/08/11	AB SOP-00093	SM 23 4500-N C m
Total Phosphorus (1)	6	2022/08/09	2022/08/11	AB SOP-00024	SM 23 4500-P A,B,F m
Total Suspended Solids (NFR, low) (1)	6	N/A	2022/08/10	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8

(2) Silica gel clean up employed.



Your P.O. #: P2022-14
Your Project #: RESOLUTE LANDFILLS GW/SW
Site#: P2022-14
Your C.O.C. #: 669184-03-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
151 HOLLAND AVENUE
SUITE 200
OTTAWA, ON
CANADA K1Y 0Y2

Report Date: 2022/08/12
Report #: R3215306
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258095

Received: 2022/08/03, 16:30

- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (5) Samples were filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (6) B[a]P TPE is calculated using 1/2 of the RDL for non detect results as per Alberta Environment instructions. This protocol may not apply in other jurisdictions.
- (7) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (780) 577-7100

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This report has been generated and distributed using a secure automated process.

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

AT1 BTEX AND F1-F4 IN WATER (WATER)

Bureau Veritas ID		AZA424	AZA425	AZA426	AZA427	AZA428	AZA429		
Sampling Date		2022/08/03 10:30	2022/08/03 17:00	2022/08/04 10:00	2022/08/04 11:00	2022/08/03 17:30	2022/08/03 17:30		
COC Number		669184-03-01	669184-03-01	669184-03-01	669184-03-01	669184-03-01	669184-03-01		
	UNITS	RBL-1	AEC-GW1	RBL-2	RBL-3	RBL-4	DUP C	RDL	QC Batch
Ext. Pet. Hydrocarbon									
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	0.19	<0.10	0.16	<0.10	<0.10	0.10	A672815
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	0.16	<0.10	<0.10	<0.10	<0.10	0.10	A672815
F4 (C34-C50 Hydrocarbons)	mg/L	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A672815
Volatiles									
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A675539
Toluene	ug/L	<0.40	1.1	<0.40	<0.40	<0.40	<0.40	0.40	A675539
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40	0.40	A675539
m & p-Xylene	ug/L	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	0.80	A675539
o-Xylene	ug/L	<0.40	0.55	<0.40	<0.40	<0.40	<0.40	0.40	A675539
Xylenes (Total)	ug/L	<0.89	<0.89	<0.89	<0.89	<0.89	<0.89	0.89	A673042
F1 (C6-C10) - BTEX	ug/L	<100	120	<100	<100	<100	<100	100	A673042
F1 (C6-C10)	ug/L	<100	120	<100	<100	<100	<100	100	A675539
Surrogate Recovery (%)									
1,4-Difluorobenzene (sur.)	%	121	127	104	108	98	98		A675539
4-Bromofluorobenzene (sur.)	%	90	84	84	88	81	98		A675539
D4-1,2-Dichloroethane (sur.)	%	105	111	88	92	86	90		A675539
O-TERPHENYL (sur.)	%	96	94	91	92	93	94		A672815
RDL = Reportable Detection Limit									



BUREAU
VERITAS

Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		AZA424			AZA425		AZA426		
Sampling Date		2022/08/03 10:30			2022/08/03 17:00		2022/08/04 10:00		
COC Number		669184-03-01			669184-03-01		669184-03-01		
	UNITS	RBL-1	RDL	QC Batch	AEC-GW1	QC Batch	RBL-2	RDL	QC Batch
Calculated Parameters									
Anion Sum	meq/L	3.9	N/A	A672506	10	A672506	10	N/A	A672506
Cation Sum	meq/L	3.9	N/A	A672506	11	A672506	10	N/A	A672506
Hardness (CaCO ₃)	mg/L	130	0.50	A672503	240	A672503	380	0.50	A673279
Ion Balance (% Difference)	%	0.82	N/A	A672504	4.8	A673282	1.6	N/A	A673282
Nitrate (N)	mg/L	1.4	0.050	A672422	<0.010	A672422	<0.010	0.010	A672422
Nitrate (NO ₃)	mg/L	6.4	0.22	A672421	<0.044	A672421	<0.044	0.044	A672421
Nitrite (NO ₂)	mg/L	<0.033	0.033	A672421	<0.033	A672421	<0.033	0.033	A672421
Calculated Total Dissolved Solids	mg/L	200	10	A672511	540	A672511	590	10	A673299
Misc. Inorganics									
Conductivity	uS/cm	380	2.0	A674329	1100	A674329	930	2.0	A673697
pH	pH	7.62	N/A	A674327	7.24	A674327	7.18	N/A	A673695
Anions									
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	1.0	A674328	<1.0	A674328	<1.0	1.0	A673696
Alkalinity (Total as CaCO ₃)	mg/L	130	1.0	A674328	410	A674328	240	1.0	A673696
Bicarbonate (HCO ₃)	mg/L	160	1.0	A674328	500	A674328	290	1.0	A673696
Carbonate (CO ₃)	mg/L	<1.0	1.0	A674328	<1.0	A674328	<1.0	1.0	A673696
Hydroxide (OH)	mg/L	<1.0	1.0	A674328	<1.0	A674328	<1.0	1.0	A673696
Chloride (Cl)	mg/L	36	1.0	A674248	67	A674248	43	1.0	A674248
Sulphate (SO ₄)	mg/L	7.9	1.0	A674248	<5.0 (1)	A674248	200	5.0	A674248
Nutrients									
Nitrite (N)	mg/L	<0.010	0.010	A674585	<0.010	A674585	<0.010	0.010	A674585
Nitrate plus Nitrite (N)	mg/L	1.4	0.050	A674585	<0.010	A674585	<0.010	0.010	A674585
Lab Filtered Elements									
Dissolved Calcium (Ca)	mg/L	34	0.30	A674438	75	A674438	120	0.30	A674438
Dissolved Iron (Fe)	mg/L	<0.060	0.060	A674438	3.1	A674438	1.3	0.060	A674438
Dissolved Magnesium (Mg)	mg/L	11	0.20	A674438	12	A674438	18	0.20	A674438
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	A674438	0.39	A674438	0.35	0.0040	A674438
Dissolved Potassium (K)	mg/L	1.4	0.30	A674438	23	A674438	18	0.30	A674438
Dissolved Sodium (Na)	mg/L	27	0.50	A674438	50	A674438	42	0.50	A674438
RDL = Reportable Detection Limit									
N/A = Not Applicable									
(1) Detection limits raised due to matrix interference.									



BUREAU
VERITAS

Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		AZA427		AZA428		AZA429		
Sampling Date		2022/08/04 11:00		2022/08/03 17:30		2022/08/03 17:30		
COC Number		669184-03-01		669184-03-01		669184-03-01		
	UNITS	RBL-3	QC Batch	RBL-4	QC Batch	DUP C	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	4.5	A672506	3.6	A673289	3.8	N/A	A673293
Cation Sum	meq/L	4.5	A672506	3.7	A673289	3.6	N/A	A673293
Hardness (CaCO ₃)	mg/L	180	A673279	130	A673279	130	0.50	A673279
Ion Balance (% Difference)	%	0.092	A673282	0.073	A673282	1.6	N/A	A673282
Nitrate (N)	mg/L	0.22	A672422	0.87	A672422	0.86	0.010	A672422
Nitrate (NO ₃)	mg/L	0.98	A672421	3.8	A672421	3.8	0.044	A672421
Nitrite (NO ₂)	mg/L	1.0	A672421	<0.033	A672421	<0.033	0.033	A672421
Calculated Total Dissolved Solids	mg/L	230	A673299	190	A673299	200	10	A673299
Misc. Inorganics								
Conductivity	uS/cm	420	A674329	360	A673697	370	2.0	A673697
pH	pH	7.14	A674327	7.76	A673695	7.80	N/A	A673695
Anions								
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A673696
Alkalinity (Total as CaCO ₃)	mg/L	170	A674328	120	A673696	120	1.0	A673696
Bicarbonate (HCO ₃)	mg/L	200	A674328	140	A673696	150	1.0	A673696
Carbonate (CO ₃)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A673696
Hydroxide (OH)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A673696
Chloride (Cl)	mg/L	24	A674248	32	A674248	31	1.0	A674248
Sulphate (SO ₄)	mg/L	23	A674248	19	A674248	19	1.0	A674248
Nutrients								
Nitrite (N)	mg/L	0.32	A674585	<0.010	A674585	<0.010	0.010	A674585
Nitrate plus Nitrite (N)	mg/L	0.54	A674585	0.87	A674585	0.86	0.010	A674585
Lab Filtered Elements								
Dissolved Calcium (Ca)	mg/L	49	A674438	35	A674438	35	0.30	A674438
Dissolved Iron (Fe)	mg/L	0.096	A674438	<0.060	A674438	<0.060	0.060	A674438
Dissolved Magnesium (Mg)	mg/L	13	A674438	12	A674438	11	0.20	A674438
Dissolved Manganese (Mn)	mg/L	0.16	A674438	<0.0040	A674438	<0.0040	0.0040	A674438
Dissolved Potassium (K)	mg/L	3.6	A674438	1.9	A674438	1.9	0.30	A674438
Dissolved Sodium (Na)	mg/L	18	A674438	21	A674438	21	0.50	A674438
RDL = Reportable Detection Limit								
N/A = Not Applicable								



BUREAU
VERITAS

Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		AZA424		AZA425		AZA426		AZA427		
Sampling Date		2022/08/03 10:30		2022/08/03 17:00		2022/08/04 10:00		2022/08/04 11:00		
COC Number		669184-03-01		669184-03-01		669184-03-01		669184-03-01		
	UNITS	RBL-1	RDL	AEC-GW1	RDL	RBL-2	RDL	RBL-3	RDL	QC Batch

Nutrients										
Total Nitrogen (N)	mg/L	2.0 (1)	0.10	40	0.50	5.2	0.10	1.8	0.020	A673970

RDL = Reportable Detection Limit

(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Bureau Veritas ID		AZA428		AZA429		
Sampling Date		2022/08/03 17:30		2022/08/03 17:30		
COC Number		669184-03-01		669184-03-01		
	UNITS	RBL-4	RDL	DUP C	RDL	QC Batch

Nutrients						
Total Nitrogen (N)	mg/L	2.0	0.10	1.1	0.020	A676131
RDL = Reportable Detection Limit						



BUREAU
VERITAS

Bureau Veritas Job #: C258095
Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.
Client Project #: RESOLUTE LANDFILLS GW/SW
Your P.O. #: P2022-14
Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA424	AZA425		AZA426			AZA427		
Sampling Date		2022/08/03 10:30	2022/08/03 17:00		2022/08/04 10:00			2022/08/04 11:00		
COC Number		669184-03-01	669184-03-01		669184-03-01			669184-03-01		
	UNITS	RBL-1	AEC-GW1	RDL	RBL-2	RDL	QC Batch	RBL-3	RDL	QC Batch
Elements										
Total Cadmium (Cd)	ug/L	0.28	0.16	0.020	0.071	0.020	A673000	0.046	0.020	A673000
Total Mercury (Hg)	ug/L	0.086	0.034	0.019	0.0032	0.0019	A675333	0.0086	0.0019	A675333
Total Aluminum (Al)	mg/L	3.0	0.075	0.0030	0.088	0.0030	A674203	0.12	0.0030	A675312
Total Antimony (Sb)	mg/L	<0.00060	<0.00060	0.00060	0.00077	0.00060	A674203	<0.00060	0.00060	A675312
Total Arsenic (As)	mg/L	0.0012	0.0039	0.00020	0.0019	0.00020	A674203	0.00061	0.00020	A675312
Total Barium (Ba)	mg/L	0.062	0.015	0.010	0.059	0.010	A674211	0.11	0.010	A676047
Total Beryllium (Be)	mg/L	<0.0010	<0.0010	0.0010	<0.0010	0.0010	A674203	<0.0010	0.0010	A675312
Total Boron (B)	mg/L	0.039	0.45	0.020	0.16	0.020	A674211	0.095	0.020	A676047
Total Calcium (Ca)	mg/L	130	77	0.30	110	0.30	A674211	50	0.30	A676047
Total Chromium (Cr)	mg/L	0.0054	0.0013	0.0010	<0.0010	0.0010	A674203	0.0012	0.0010	A675312
Total Cobalt (Co)	mg/L	0.0025	0.0046	0.00030	0.0019	0.00030	A674203	0.00063	0.00030	A675312
Total Copper (Cu)	mg/L	0.0061	0.0089	0.0010	0.0015	0.0010	A674203	0.0015	0.0010	A675312
Total Iron (Fe)	mg/L	4.2	3.3	0.060	1.8	0.060	A674211	0.76	0.060	A676047
Total Lead (Pb)	mg/L	0.0091	0.0018	0.00020	0.00098	0.00020	A674203	0.00074	0.00020	A675312
Total Lithium (Li)	mg/L	<0.020	0.029	0.020	<0.020	0.020	A674211	<0.020	0.020	A676047
Total Magnesium (Mg)	mg/L	38	13	0.20	18	0.20	A674211	13	0.20	A676047
Total Manganese (Mn)	mg/L	0.18	0.39	0.0040	0.36	0.0040	A674211	0.22	0.0040	A676047
Total Molybdenum (Mo)	mg/L	0.00070	0.0014	0.00020	0.0013	0.00020	A674203	0.0013	0.00020	A675312
Total Nickel (Ni)	mg/L	0.0052	0.013	0.00050	0.0058	0.00050	A674203	0.0015	0.00050	A675312
Total Phosphorus (P)	mg/L	0.13	6.8	0.10	1.3	0.10	A674211	0.22	0.10	A676047
Total Potassium (K)	mg/L	3.2	23	0.30	17	0.30	A674211	3.8	0.30	A676047
Total Selenium (Se)	mg/L	0.00022	0.00063	0.00020	0.00025	0.00020	A674203	0.00025	0.00020	A675312
Total Silicon (Si)	mg/L	8.4	3.5	0.17	2.2	0.17	A674211	1.3	0.15	A676047
Total Silver (Ag)	mg/L	<0.00010	0.00022	0.00010	<0.00010	0.00010	A674203	<0.00010	0.00010	A675312
Total Sodium (Na)	mg/L	27	48	0.50	39	0.50	A674211	25	0.50	A676047
Total Strontium (Sr)	mg/L	0.14	0.17	0.020	0.43	0.020	A674211	0.16	0.020	A676047
Total Sulphur (S)	mg/L	2.8	3.3	0.20	51	0.20	A674211	6.4	0.20	A676047
Total Thallium (Tl)	mg/L	<0.00020	<0.00020	0.00020	0.00040	0.00020	A674203	<0.00020	0.00020	A675312
Total Tin (Sn)	mg/L	<0.0010	0.0011	0.0010	0.0021	0.0010	A674203	<0.0010	0.0010	A675312
Total Titanium (Ti)	mg/L	0.11	0.0043	0.0010	0.0029	0.0010	A674203	0.0037	0.0010	A675312
Total Uranium (U)	mg/L	0.00041	<0.00010	0.00010	0.00023	0.00010	A674203	0.00027	0.00010	A675312
Total Vanadium (V)	mg/L	0.0064	0.0026	0.0010	<0.0010	0.0010	A674203	0.0011	0.0010	A675312
RDL = Reportable Detection Limit										



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Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA424	AZA425		AZA426			AZA427		
Sampling Date		2022/08/03 10:30	2022/08/03 17:00		2022/08/04 10:00			2022/08/04 11:00		
COC Number		669184-03-01	669184-03-01		669184-03-01			669184-03-01		
	UNITS	RBL-1	AEC-GW1	RDL	RBL-2	RDL	QC Batch	RBL-3	RDL	QC Batch
Total Zinc (Zn)	mg/L	0.027	0.017	0.0030	0.016	0.0030	A674203	0.0089	0.0030	A675312
RDL = Reportable Detection Limit										



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OUTCOME CONSULTANTS INC.
Client Project #: RESOLUTE LANDFILLS GW/SW
Your P.O. #: P2022-14
Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA428	AZA429		
Sampling Date		2022/08/03 17:30	2022/08/03 17:30		
COC Number		669184-03-01	669184-03-01		
	UNITS	RBL-4	DUP C	RDL	QC Batch
Elements					
Total Cadmium (Cd)	ug/L	0.10	0.054	0.020	A673000
Total Mercury (Hg)	ug/L	0.0025	0.0029	0.0019	A675333
Total Aluminum (Al)	mg/L	0.051	0.0078	0.0030	A674203
Total Antimony (Sb)	mg/L	<0.00060	<0.00060	0.00060	A674203
Total Arsenic (As)	mg/L	0.00036	0.00026	0.00020	A674203
Total Barium (Ba)	mg/L	0.084	0.082	0.010	A674211
Total Beryllium (Be)	mg/L	<0.0010	<0.0010	0.0010	A674203
Total Boron (B)	mg/L	0.059	0.072	0.020	A674211
Total Calcium (Ca)	mg/L	35	34	0.30	A674211
Total Chromium (Cr)	mg/L	0.0025	0.0018	0.0010	A674203
Total Cobalt (Co)	mg/L	<0.00030	<0.00030	0.00030	A674203
Total Copper (Cu)	mg/L	0.0022	0.0017	0.0010	A674203
Total Iron (Fe)	mg/L	0.080	<0.060	0.060	A674211
Total Lead (Pb)	mg/L	0.00093	0.00036	0.00020	A674203
Total Lithium (Li)	mg/L	0.028	<0.020	0.020	A674211
Total Magnesium (Mg)	mg/L	11	11	0.20	A674211
Total Manganese (Mn)	mg/L	<0.0040	<0.0040	0.0040	A674211
Total Molybdenum (Mo)	mg/L	0.00092	0.0012	0.00020	A674203
Total Nickel (Ni)	mg/L	0.00062	0.00061	0.00050	A674203
Total Phosphorus (P)	mg/L	<0.10	<0.10	0.10	A674211
Total Potassium (K)	mg/L	2.0	1.9	0.30	A674211
Total Selenium (Se)	mg/L	<0.00020	0.00020	0.00020	A674203
Total Silicon (Si)	mg/L	0.71	0.65	0.17	A674211
Total Silver (Ag)	mg/L	<0.00010	<0.00010	0.00010	A674203
Total Sodium (Na)	mg/L	20	20	0.50	A674211
Total Strontium (Sr)	mg/L	0.092	0.092	0.020	A674211
Total Sulphur (S)	mg/L	5.8	5.7	0.20	A674211
Total Thallium (Tl)	mg/L	<0.00020	<0.00020	0.00020	A674203
Total Tin (Sn)	mg/L	<0.0010	<0.0010	0.0010	A674203
Total Titanium (Ti)	mg/L	0.0011	<0.0010	0.0010	A674203
Total Uranium (U)	mg/L	0.00027	0.00033	0.00010	A674203
Total Vanadium (V)	mg/L	<0.0010	<0.0010	0.0010	A674203
RDL = Reportable Detection Limit					



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Bureau Veritas Job #: C258095

Report Date: 2022/08/12

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Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA428	AZA429		
Sampling Date		2022/08/03 17:30	2022/08/03 17:30		
COC Number		669184-03-01	669184-03-01		
	UNITS	RBL-4	DUP C	RDL	QC Batch
Total Zinc (Zn)	mg/L	0.017	0.0081	0.0030	A674203
RDL = Reportable Detection Limit					



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Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AZA424		AZA425		AZA426		
Sampling Date		2022/08/03 10:30		2022/08/03 17:00		2022/08/04 10:00		
COC Number		669184-03-01		669184-03-01		669184-03-01		
	UNITS	RBL-1	RDL	AEC-GW1	RDL	RBL-2	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	484	0.50	245	0.50	347	0.50	A675930
Elements								
Dissolved Cadmium (Cd)	ug/L	<0.020	0.020	0.071	0.020	0.021	0.020	A672997
Misc. Inorganics								
Total Suspended Solids	mg/L	490 (1)	1.5	200 (1)	1.5	13 (1)	0.60	A675588
Metals								
Total Hex. Chromium (Cr 6+)	mg/L	<0.00099	0.00099	<0.00099	0.00099	<0.00099	0.00099	A675309
Nutrients								
Total Ammonia (N)	mg/L	<0.015	0.015	49	0.75	5.3	0.075	A675329
Total Phosphorus (P)	mg/L	0.16 (2)	0.015	7.6 (2)	0.30	1.1	0.030	A674110
Misc. Organics								
Oil and grease	mg/L	<2.0	2.0	9.8	2.0	<2.0	2.0	A669495
Phenols	mg/L	<0.0015	0.0015	0.63 (3)	0.030	0.031	0.0015	A675540
RDL = Reportable Detection Limit								
(1) Detection limit raised based on sample volume used for analysis.								
(2) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.								
(3) Matrix Spike recovery non calculable due to matrix interference. Original sample diluted to remove interference.								



RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AZA427			AZA428	AZA429		
Sampling Date		2022/08/04 11:00			2022/08/03 17:30	2022/08/03 17:30		
COC Number		669184-03-01			669184-03-01	669184-03-01		
	UNITS	RBL-3	RDL	QC Batch	RBL-4	DUP C	RDL	QC Batch
Calculated Parameters								
Total Hardness (CaCO ₃)	mg/L	180	0.50	A675930	134	132	0.50	A675930
Elements								
Dissolved Cadmium (Cd)	ug/L	<0.020	0.020	A672997	0.029	0.031	0.020	A672997
Misc. Inorganics								
Total Suspended Solids	mg/L	19 (1)	0.56	A675588	18	19	0.40	A675588
Metals								
Total Hex. Chromium (Cr 6+)	mg/L	<0.00099	0.00099	A675309	0.0016	0.0015	0.00099	A675309
Nutrients								
Total Ammonia (N)	mg/L	1.1	0.015	A675329	<0.015	<0.015	0.015	A675329
Total Phosphorus (P)	mg/L	0.23	0.0030	A674110	0.10	0.0066	0.0030	A674110
Misc. Organics								
Oil and grease	mg/L	<2.0	2.0	A669495	<2.0	<2.0	2.0	A669495
Phenols	mg/L	0.013	0.0015	A675533	<0.0015	<0.0015	0.0015	A675540
RDL = Reportable Detection Limit								
(1) Detection limit raised based on sample volume used for analysis.								



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Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		AZA424	AZA425	AZA426	AZA427	AZA428		
Sampling Date		2022/08/03 10:30	2022/08/03 17:00	2022/08/04 10:00	2022/08/04 11:00	2022/08/03 17:30		
COC Number		669184-03-01	669184-03-01	669184-03-01	669184-03-01	669184-03-01		
	UNITS	RBL-1	AEC-GW1	RBL-2	RBL-3	RBL-4	RDL	QC Batch
Polycyclic Aromatics								
B[a]P TPE Total Potency Equivalents	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A672953
Acenaphthene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A672820
Acenaphthylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	A672820
Acridine	ug/L	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	A672820
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A672820
Benzo(a)anthracene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
Benzo(b&j)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
Benzo(k)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
Benzo(g,h,i)perylene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
Benzo(c)phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A672820
Benzo(a)pyrene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A672820
Benzo(e)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A672820
Chrysene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
Dibenz(a,h)anthracene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A672820
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A672820
Fluorene	ug/L	<0.050	<0.050	<0.050	0.054	<0.050	0.050	A672820
Indeno(1,2,3-cd)pyrene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A672820
1-Methylnaphthalene	ug/L	0.23	0.41	<0.10	3.2	<0.10	0.10	A672820
2-Methylnaphthalene	ug/L	0.34	0.67	<0.10	5.6	<0.10	0.10	A672820
Naphthalene	ug/L	<0.10	0.30	<0.10	0.73	<0.10	0.10	A672820
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A672820
Perylene	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A672820
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A672820
Quinoline	ug/L	<0.20	<0.20	<0.20	<0.20	<0.20	0.20	A672820
Surrogate Recovery (%)								
D10-ANTHRACENE (sur.)	%	106	107	109	123	107		A672820
D8-ACENAPHTHYLENE (sur.)	%	97	100	100	104	100		A672820
D8-NAPHTHALENE (sur.)	%	78	103	75	79	83		A672820
TERPHENYL-D14 (sur.)	%	129	124	123	123	122		A672820
RDL = Reportable Detection Limit								



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Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		AZA429		
Sampling Date		2022/08/03 17:30		
COC Number		669184-03-01		
	UNITS	DUP C	RDL	QC Batch
Polycyclic Aromatics				
B[a]P TPE Total Potency Equivalents	ug/L	<0.010	0.010	A672953
Acenaphthene	ug/L	<0.10	0.10	A672820
Acenaphthylene	ug/L	<0.10	0.10	A672820
Acridine	ug/L	<0.040	0.040	A672820
Anthracene	ug/L	<0.010	0.010	A672820
Benzo(a)anthracene	ug/L	<0.0085	0.0085	A672820
Benzo(b&j)fluoranthene	ug/L	<0.0085	0.0085	A672820
Benzo(k)fluoranthene	ug/L	<0.0085	0.0085	A672820
Benzo(g,h,i)perylene	ug/L	<0.0085	0.0085	A672820
Benzo(c)phenanthrene	ug/L	<0.050	0.050	A672820
Benzo(a)pyrene	ug/L	<0.0075	0.0075	A672820
Benzo(e)pyrene	ug/L	<0.050	0.050	A672820
Chrysene	ug/L	<0.0085	0.0085	A672820
Dibenz(a,h)anthracene	ug/L	<0.0075	0.0075	A672820
Fluoranthene	ug/L	<0.010	0.010	A672820
Fluorene	ug/L	<0.050	0.050	A672820
Indeno(1,2,3-cd)pyrene	ug/L	<0.0085	0.0085	A672820
1-Methylnaphthalene	ug/L	<0.10	0.10	A672820
2-Methylnaphthalene	ug/L	<0.10	0.10	A672820
Naphthalene	ug/L	<0.10	0.10	A672820
Phenanthrene	ug/L	<0.050	0.050	A672820
Perylene	ug/L	<0.050	0.050	A672820
Pyrene	ug/L	<0.020	0.020	A672820
Quinoline	ug/L	<0.20	0.20	A672820
Surrogate Recovery (%)				
D10-ANTHRACENE (sur.)	%	110		A672820
D8-ACENAPHTHYLENE (sur.)	%	98		A672820
D8-NAPHTHALENE (sur.)	%	78		A672820
TERPHENYL-D14 (sur.)	%	124		A672820
RDL = Reportable Detection Limit				



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OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		AZA426		AZA428	AZA429		
Sampling Date		2022/08/04 10:00		2022/08/03 17:30	2022/08/03 17:30		
COC Number		669184-03-01		669184-03-01	669184-03-01		
	UNITS	RBL-2	QC Batch	RBL-4	DUP C	RDL	QC Batch
Lab Filtered Elements							
Dissolved Aluminum (Al)	mg/L	<0.0030	A674338	0.0033	<0.0030	0.0030	A675718
Dissolved Antimony (Sb)	mg/L	0.00079	A674338	<0.00060	<0.00060	0.00060	A674338
Dissolved Arsenic (As)	mg/L	0.0010	A674338	<0.00020	<0.00020	0.00020	A674338
Dissolved Beryllium (Be)	mg/L	<0.0010	A674338	<0.0010	<0.0010	0.0010	A674338
Dissolved Chromium (Cr)	mg/L	<0.0010	A674338	0.0011	0.0015	0.0010	A674338
Dissolved Cobalt (Co)	mg/L	0.0015	A674338	<0.00030	<0.00030	0.00030	A674338
Dissolved Copper (Cu)	mg/L	<0.0010	A674338	0.0012	0.0014	0.0010	A674338
Dissolved Lead (Pb)	mg/L	0.00022	A674338	0.00022	0.00023	0.00020	A674338
Dissolved Molybdenum (Mo)	mg/L	0.0012	A674338	0.00092	0.00095	0.00020	A674338
Dissolved Nickel (Ni)	mg/L	0.0043	A674338	<0.00050	<0.00050	0.00050	A674338
Dissolved Selenium (Se)	mg/L	<0.00020	A674338	<0.00020	<0.00020	0.00020	A674338
Dissolved Silver (Ag)	mg/L	<0.00010	A674338	<0.00010	<0.00010	0.00010	A674338
Dissolved Thallium (Tl)	mg/L	<0.00020	A674338	<0.00020	<0.00020	0.00020	A674338
Dissolved Tin (Sn)	mg/L	<0.0010	A674338	<0.0010	<0.0010	0.0010	A674338
Dissolved Titanium (Ti)	mg/L	<0.0010	A674338	<0.0010	<0.0010	0.0010	A674338
Dissolved Uranium (U)	mg/L	0.00019	A674338	0.00026	0.00027	0.00010	A674338
Dissolved Vanadium (V)	mg/L	<0.0010	A674338	<0.0010	<0.0010	0.0010	A674338
Dissolved Zinc (Zn)	mg/L	0.0036	A675718	0.0062	0.0061	0.0030	A674338
RDL = Reportable Detection Limit							



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
Package 2	5.0°C
Package 3	3.3°C
Package 4	3.0°C
Package 5	3.7°C

Sample AZA424 [RBL-1] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA425 [AEC-GW1] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA426 [RBL-2] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA427 [RBL-3] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA428 [RBL-4] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA429 [DUP C] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

REGULATED METALS + HG (CCME/AT1) - HGT-V Comments

Sample AZA424 [RBL-1] Mercury (Total) by CV: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA425 [AEC-GW1] Mercury (Total) by CV: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA426, Elements by ICPMS-Dissolved-Lab Filtered: Test repeated.

Sample AZA428, Elements by ICPMS-Dissolved-Lab Filtered: Test repeated.

Sample AZA429, Elements by ICPMS-Dissolved-Lab Filtered: Test repeated.

Results relate only to the items tested.



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Bureau Veritas Job #: C258095
Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.
Client Project #: RESOLUTE LANDFILLS GW/SW
Your P.O. #: P2022-14
Sampler Initials: KV

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A669495	ZSN	Spiked Blank	Oil and grease	2022/08/10		92	%	70 - 130
A669495	ZSN	Method Blank	Oil and grease	2022/08/10	<2.0		mg/L	
A672815	GG3	Matrix Spike	O-TERPHENYL (sur.)	2022/08/10		95	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/10		100	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/10		105	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/10		92	%	60 - 140
A672815	GG3	Spiked Blank	O-TERPHENYL (sur.)	2022/08/10		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/10		87	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/10		96	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/10		87	%	60 - 140
A672815	GG3	Method Blank	O-TERPHENYL (sur.)	2022/08/10		92	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/10	<0.10		mg/L	
			F3 (C16-C34 Hydrocarbons)	2022/08/10	<0.10		mg/L	
			F4 (C34-C50 Hydrocarbons)	2022/08/10	<0.20		mg/L	
A672815	GG3	RPD	F2 (C10-C16 Hydrocarbons)	2022/08/10	29		%	30
			F3 (C16-C34 Hydrocarbons)	2022/08/10	41 (1)		%	30
			F4 (C34-C50 Hydrocarbons)	2022/08/10	12		%	30
A672820	NK3	Matrix Spike	D10-ANTHRACENE (sur.)	2022/08/10		121	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/10		107	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/10		71	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/10		142 (1)	%	50 - 130
			Acenaphthene	2022/08/10		100	%	50 - 130
			Acenaphthylene	2022/08/10		105	%	50 - 130
			Acridine	2022/08/10		98	%	50 - 130
			Anthracene	2022/08/10		102	%	50 - 130
			Benzo(a)anthracene	2022/08/10		101	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/10		91	%	50 - 130
			Benzo(k)fluoranthene	2022/08/10		88	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/10		87	%	50 - 130
			Benzo(c)phenanthrene	2022/08/10		106	%	50 - 130
			Benzo(a)pyrene	2022/08/10		92	%	50 - 130
			Benzo(e)pyrene	2022/08/10		77	%	50 - 130
			Chrysene	2022/08/10		92	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/10		88	%	50 - 130
			Fluoranthene	2022/08/10		102	%	50 - 130
			Fluorene	2022/08/10		111	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/10		85	%	50 - 130
			1-Methylnaphthalene	2022/08/10		79	%	50 - 130
			2-Methylnaphthalene	2022/08/10		98	%	50 - 130
			Naphthalene	2022/08/10		90	%	50 - 130
			Phenanthrene	2022/08/10		103	%	50 - 130
			Perylene	2022/08/10		85	%	50 - 130
			Pyrene	2022/08/10		99	%	50 - 130
			Quinoline	2022/08/10		87	%	50 - 130
A672820	NK3	Spiked Blank	D10-ANTHRACENE (sur.)	2022/08/10		110	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/10		96	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/10		75	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/10		134 (1)	%	50 - 130
			Acenaphthene	2022/08/10		86	%	50 - 130
			Acenaphthylene	2022/08/10		91	%	50 - 130
			Acridine	2022/08/10		88	%	50 - 130
			Anthracene	2022/08/10		94	%	50 - 130
			Benzo(a)anthracene	2022/08/10		113	%	50 - 130



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A672820	NK3	Method Blank	Benzo(b&j)fluoranthene	2022/08/10		105	%	50 - 130
			Benzo(k)fluoranthene	2022/08/10		100	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/10		99	%	50 - 130
			Benzo(c)phenanthrene	2022/08/10		114	%	50 - 130
			Benzo(a)pyrene	2022/08/10		98	%	50 - 130
			Benzo(e)pyrene	2022/08/10		87	%	50 - 130
			Chrysene	2022/08/10		106	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/10		101	%	50 - 130
			Fluoranthene	2022/08/10		97	%	50 - 130
			Fluorene	2022/08/10		90	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/10		94	%	50 - 130
			1-Methylnaphthalene	2022/08/10		72	%	50 - 130
			2-Methylnaphthalene	2022/08/10		89	%	50 - 130
			Naphthalene	2022/08/10		84	%	50 - 130
			Phenanthrene	2022/08/10		90	%	50 - 130
			Perylene	2022/08/10		99	%	50 - 130
			Pyrene	2022/08/10		97	%	50 - 130
			Quinoline	2022/08/10		84	%	50 - 130
			D10-ANTHRACENE (sur.)	2022/08/10		109	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/10		93	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/10		68	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/10		125	%	50 - 130
			Acenaphthene	2022/08/10	<0.10		ug/L	
			Acenaphthylene	2022/08/10	<0.10		ug/L	
			Acridine	2022/08/10	<0.040		ug/L	
			Anthracene	2022/08/10	<0.010		ug/L	
			Benzo(a)anthracene	2022/08/10	<0.0085		ug/L	
			Benzo(b&j)fluoranthene	2022/08/10	<0.0085		ug/L	
			Benzo(k)fluoranthene	2022/08/10	<0.0085		ug/L	
			Benzo(g,h,i)perylene	2022/08/10	<0.0085		ug/L	
			Benzo(c)phenanthrene	2022/08/10	<0.050		ug/L	
			Benzo(a)pyrene	2022/08/10	<0.0075		ug/L	
			Benzo(e)pyrene	2022/08/10	<0.050		ug/L	
			Chrysene	2022/08/10	<0.0085		ug/L	
			Dibenz(a,h)anthracene	2022/08/10	<0.0075		ug/L	
			Fluoranthene	2022/08/10	<0.010		ug/L	
			Fluorene	2022/08/10	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2022/08/10	<0.0085		ug/L	
			1-Methylnaphthalene	2022/08/10	<0.10		ug/L	
			2-Methylnaphthalene	2022/08/10	<0.10		ug/L	
			Naphthalene	2022/08/10	<0.10		ug/L	
			Phenanthrene	2022/08/10	<0.050		ug/L	
			Perylene	2022/08/10	<0.050		ug/L	
			Pyrene	2022/08/10	<0.020		ug/L	
			Quinoline	2022/08/10	<0.20		ug/L	
A672820	NK3	RPD	Acenaphthene	2022/08/10	11		%	30
			Acenaphthylene	2022/08/10	NC		%	30
			Acridine	2022/08/10	20		%	30
			Anthracene	2022/08/10	NC		%	30
			Benzo(a)anthracene	2022/08/10	NC		%	30
			Benzo(b&j)fluoranthene	2022/08/10	NC		%	30
			Benzo(k)fluoranthene	2022/08/10	NC		%	30
			Benzo(g,h,i)perylene	2022/08/10	NC		%	30



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(c)phenanthrene	2022/08/10	NC		%	30
			Benzo(a)pyrene	2022/08/10	25		%	30
			Benzo(e)pyrene	2022/08/10	22		%	30
			Chrysene	2022/08/10	44 (1)		%	30
			Dibenz(a,h)anthracene	2022/08/10	NC		%	30
			Fluoranthene	2022/08/10	23		%	30
			Fluorene	2022/08/10	14		%	30
			Indeno(1,2,3-cd)pyrene	2022/08/10	NC		%	30
			1-Methylnaphthalene	2022/08/10	NC		%	30
			2-Methylnaphthalene	2022/08/10	NC		%	30
			Naphthalene	2022/08/10	4.8		%	30
			Phenanthrene	2022/08/10	14		%	30
			Perylene	2022/08/10	19		%	30
			Pyrene	2022/08/10	20		%	30
			Quinoline	2022/08/10	NC		%	30
A673695	MEL	Spiked Blank	pH	2022/08/09		100	%	97 - 103
A673695	MEL	RPD	pH	2022/08/09	0.53		%	N/A
A673696	MEL	Spiked Blank	Alkalinity (Total as CaCO3)	2022/08/09		96	%	80 - 120
A673696	MEL	Method Blank	Alkalinity (PP as CaCO3)	2022/08/09	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2022/08/09	<1.0		mg/L	
			Bicarbonate (HCO3)	2022/08/09	<1.0		mg/L	
			Carbonate (CO3)	2022/08/09	<1.0		mg/L	
			Hydroxide (OH)	2022/08/09	<1.0		mg/L	
A673696	MEL	RPD	Alkalinity (Total as CaCO3)	2022/08/09	3.2		%	20
			Bicarbonate (HCO3)	2022/08/09	3.2		%	20
			Carbonate (CO3)	2022/08/09	NC		%	20
A673697	MEL	Spiked Blank	Conductivity	2022/08/09		97	%	90 - 110
A673697	MEL	Method Blank	Conductivity	2022/08/09	<2.0		uS/cm	
A673697	MEL	RPD	Conductivity	2022/08/09	2.3		%	10
A673970	MAP	Matrix Spike [AZA428-04]	Total Nitrogen (N)	2022/08/09		NC	%	80 - 120
A673970	MAP	QC Standard	Total Nitrogen (N)	2022/08/09		92	%	80 - 120
A673970	MAP	Spiked Blank	Total Nitrogen (N)	2022/08/09		97	%	80 - 120
A673970	MAP	Method Blank	Total Nitrogen (N)	2022/08/09	<0.020		mg/L	
A674110	MAP	Matrix Spike	Total Phosphorus (P)	2022/08/11		105	%	80 - 120
A674110	MAP	QC Standard	Total Phosphorus (P)	2022/08/11		93	%	80 - 120
A674110	MAP	Spiked Blank	Total Phosphorus (P)	2022/08/11		102	%	80 - 120
A674110	MAP	Method Blank	Total Phosphorus (P)	2022/08/11	<0.0030		mg/L	
A674110	MAP	RPD	Total Phosphorus (P)	2022/08/11	NC		%	20
A674203	MKJ	Matrix Spike [AZA426-03]	Total Aluminum (Al)	2022/08/11		107	%	80 - 120
			Total Antimony (Sb)	2022/08/11		107	%	80 - 120
			Total Arsenic (As)	2022/08/11		99	%	80 - 120
			Total Beryllium (Be)	2022/08/11		94	%	80 - 120
			Total Chromium (Cr)	2022/08/11		96	%	80 - 120
			Total Cobalt (Co)	2022/08/11		97	%	80 - 120
			Total Copper (Cu)	2022/08/11		95	%	80 - 120
			Total Lead (Pb)	2022/08/11		98	%	80 - 120
			Total Molybdenum (Mo)	2022/08/11		102	%	80 - 120
			Total Nickel (Ni)	2022/08/11		95	%	80 - 120
			Total Selenium (Se)	2022/08/11		99	%	80 - 120
			Total Silver (Ag)	2022/08/11		99	%	80 - 120
			Total Thallium (Tl)	2022/08/11		98	%	80 - 120
			Total Tin (Sn)	2022/08/11		104	%	80 - 120
			Total Titanium (Ti)	2022/08/11		98	%	80 - 120



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A674203	MKJ	Spiked Blank	Total Uranium (U)	2022/08/11		98	%	80 - 120
			Total Vanadium (V)	2022/08/11		99	%	80 - 120
			Total Zinc (Zn)	2022/08/11		98	%	80 - 120
			Total Aluminum (Al)	2022/08/10		107	%	80 - 120
			Total Antimony (Sb)	2022/08/10		109	%	80 - 120
			Total Arsenic (As)	2022/08/10		99	%	80 - 120
			Total Beryllium (Be)	2022/08/10		92	%	80 - 120
			Total Chromium (Cr)	2022/08/10		97	%	80 - 120
			Total Cobalt (Co)	2022/08/10		98	%	80 - 120
			Total Copper (Cu)	2022/08/10		98	%	80 - 120
			Total Lead (Pb)	2022/08/10		100	%	80 - 120
			Total Molybdenum (Mo)	2022/08/10		101	%	80 - 120
			Total Nickel (Ni)	2022/08/10		97	%	80 - 120
			Total Selenium (Se)	2022/08/10		101	%	80 - 120
			Total Silver (Ag)	2022/08/10		100	%	80 - 120
			Total Thallium (Tl)	2022/08/10		103	%	80 - 120
			Total Tin (Sn)	2022/08/10		103	%	80 - 120
			Total Titanium (Ti)	2022/08/10		99	%	80 - 120
			Total Uranium (U)	2022/08/10		99	%	80 - 120
			Total Vanadium (V)	2022/08/10		99	%	80 - 120
A674203	MKJ	Method Blank	Total Zinc (Zn)	2022/08/10		99	%	80 - 120
			Total Aluminum (Al)	2022/08/11	<0.0030		mg/L	
			Total Antimony (Sb)	2022/08/11	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/11	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/11	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/11	<0.0010		mg/L	
			Total Cobalt (Co)	2022/08/11	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/11	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/11	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/11	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/11	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/11	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/11	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/11	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/11	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/11	<0.0010		mg/L	
			Total Uranium (U)	2022/08/11	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/11	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/11	<0.0030		mg/L	
A674203	MKJ	RPD [AZA429-03]	Total Aluminum (Al)	2022/08/11	4.9		%	20
			Total Antimony (Sb)	2022/08/11	NC		%	20
			Total Arsenic (As)	2022/08/11	8.6		%	20
			Total Beryllium (Be)	2022/08/11	NC		%	20
			Total Chromium (Cr)	2022/08/11	13		%	20
			Total Cobalt (Co)	2022/08/11	NC		%	20
			Total Copper (Cu)	2022/08/11	0.059		%	20
			Total Lead (Pb)	2022/08/11	5.0		%	20
			Total Molybdenum (Mo)	2022/08/11	2.7		%	20
			Total Nickel (Ni)	2022/08/11	16		%	20
			Total Selenium (Se)	2022/08/11	1.7		%	20
			Total Silver (Ag)	2022/08/11	NC		%	20
			Total Thallium (Tl)	2022/08/11	NC		%	20
			Total Tin (Sn)	2022/08/11	NC		%	20



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674211	MPU	Matrix Spike	Total Titanium (Ti)	2022/08/11	NC		%	20
			Total Uranium (U)	2022/08/11	8.5		%	20
			Total Vanadium (V)	2022/08/11	NC		%	20
			Total Zinc (Zn)	2022/08/11	7.6		%	20
			Total Barium (Ba)	2022/08/10		92	%	80 - 120
			Total Boron (B)	2022/08/10		NC	%	80 - 120
			Total Calcium (Ca)	2022/08/10		100	%	80 - 120
			Total Iron (Fe)	2022/08/10		103	%	80 - 120
			Total Lithium (Li)	2022/08/10		93	%	80 - 120
			Total Magnesium (Mg)	2022/08/10		97	%	80 - 120
			Total Manganese (Mn)	2022/08/10		101	%	80 - 120
			Total Phosphorus (P)	2022/08/10		104	%	80 - 120
			Total Potassium (K)	2022/08/10		99	%	80 - 120
			Total Silicon (Si)	2022/08/10		89	%	80 - 120
			Total Sodium (Na)	2022/08/10		NC	%	80 - 120
			Total Strontium (Sr)	2022/08/10		NC	%	80 - 120
A674211	MPU	Spiked Blank	Total Sulphur (S)	2022/08/10		105	%	80 - 120
			Total Barium (Ba)	2022/08/10		100	%	80 - 120
			Total Boron (B)	2022/08/10		99	%	80 - 120
			Total Calcium (Ca)	2022/08/10		101	%	80 - 120
			Total Iron (Fe)	2022/08/10		102	%	80 - 120
			Total Lithium (Li)	2022/08/10		98	%	80 - 120
			Total Magnesium (Mg)	2022/08/10		101	%	80 - 120
			Total Manganese (Mn)	2022/08/10		99	%	80 - 120
			Total Phosphorus (P)	2022/08/10		102	%	80 - 120
			Total Potassium (K)	2022/08/10		101	%	80 - 120
			Total Silicon (Si)	2022/08/10		91	%	80 - 120
			Total Sodium (Na)	2022/08/10		97	%	80 - 120
			Total Strontium (Sr)	2022/08/10		97	%	80 - 120
			Total Sulphur (S)	2022/08/10		101	%	80 - 120
A674211	MPU	Method Blank	Total Barium (Ba)	2022/08/10	<0.010		mg/L	
			Total Boron (B)	2022/08/10	<0.020		mg/L	
			Total Calcium (Ca)	2022/08/10	<0.30		mg/L	
			Total Iron (Fe)	2022/08/10	<0.060		mg/L	
			Total Lithium (Li)	2022/08/10	<0.020		mg/L	
			Total Magnesium (Mg)	2022/08/10	<0.20		mg/L	
			Total Manganese (Mn)	2022/08/10	<0.0040		mg/L	
			Total Phosphorus (P)	2022/08/10	<0.10		mg/L	
			Total Potassium (K)	2022/08/10	<0.30		mg/L	
			Total Silicon (Si)	2022/08/10	<0.17		mg/L	
			Total Sodium (Na)	2022/08/10	<0.50		mg/L	
			Total Strontium (Sr)	2022/08/10	<0.020		mg/L	
			Total Sulphur (S)	2022/08/10	<0.20		mg/L	
A674211	MPU	RPD [AZA429-03]	Total Barium (Ba)	2022/08/10	1.4		%	20
			Total Boron (B)	2022/08/10	NC		%	20
			Total Calcium (Ca)	2022/08/10	0.28		%	20
			Total Iron (Fe)	2022/08/10	NC		%	20
			Total Lithium (Li)	2022/08/10	NC		%	20
			Total Magnesium (Mg)	2022/08/10	0.32		%	20
			Total Manganese (Mn)	2022/08/10	NC		%	20
			Total Phosphorus (P)	2022/08/10	NC		%	20
			Total Potassium (K)	2022/08/10	2.6		%	20
			Total Silicon (Si)	2022/08/10	4.4		%	20



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QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674248	TOR	Matrix Spike	Total Sodium (Na)	2022/08/10	1.6		%	20
			Total Strontium (Sr)	2022/08/10	1.5		%	20
			Total Sulphur (S)	2022/08/10	1.2		%	20
			Chloride (Cl)	2022/08/09		106	%	80 - 120
			Sulphate (SO4)	2022/08/09		NC	%	80 - 120
A674248	TOR	Spiked Blank	Chloride (Cl)	2022/08/09		102	%	80 - 120
			Sulphate (SO4)	2022/08/09		98	%	80 - 120
A674248	TOR	Method Blank	Chloride (Cl)	2022/08/09	<1.0		mg/L	
			Sulphate (SO4)	2022/08/09	<1.0		mg/L	
A674248	TOR	RPD	Chloride (Cl)	2022/08/09	0.14		%	20
			Sulphate (SO4)	2022/08/09	0.79		%	20
A674327	MEL	Spiked Blank	pH	2022/08/09		100	%	97 - 103
A674327	MEL	RPD [AZA427-02]	pH	2022/08/09	0.74		%	N/A
A674328	MEL	Spiked Blank	Alkalinity (Total as CaCO3)	2022/08/09		93	%	80 - 120
A674328	MEL	Method Blank	Alkalinity (PP as CaCO3)	2022/08/09	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2022/08/09	<1.0		mg/L	
			Bicarbonate (HCO3)	2022/08/09	<1.0		mg/L	
			Carbonate (CO3)	2022/08/09	<1.0		mg/L	
			Hydroxide (OH)	2022/08/09	<1.0		mg/L	
A674328	MEL	RPD [AZA427-02]	Alkalinity (PP as CaCO3)	2022/08/09	NC		%	20
			Alkalinity (Total as CaCO3)	2022/08/09	0.65		%	20
			Bicarbonate (HCO3)	2022/08/09	0.65		%	20
			Carbonate (CO3)	2022/08/09	NC		%	20
			Hydroxide (OH)	2022/08/09	NC		%	20
A674329	MEL	Spiked Blank	Conductivity	2022/08/09		97	%	90 - 110
A674329	MEL	Method Blank	Conductivity	2022/08/09	<2.0		uS/cm	
A674329	MEL	RPD [AZA427-02]	Conductivity	2022/08/09	3.6		%	10
A674338	STI	Matrix Spike	Dissolved Aluminum (Al)	2022/08/10		80	%	80 - 120
			Dissolved Antimony (Sb)	2022/08/10		110	%	80 - 120
			Dissolved Arsenic (As)	2022/08/10		104	%	80 - 120
			Dissolved Beryllium (Be)	2022/08/10		120	%	80 - 120
			Dissolved Chromium (Cr)	2022/08/10		107	%	80 - 120
			Dissolved Cobalt (Co)	2022/08/10		105	%	80 - 120
			Dissolved Copper (Cu)	2022/08/10		105	%	80 - 120
			Dissolved Lead (Pb)	2022/08/10		112	%	80 - 120
			Dissolved Molybdenum (Mo)	2022/08/10		113	%	80 - 120
			Dissolved Nickel (Ni)	2022/08/10		105	%	80 - 120
			Dissolved Selenium (Se)	2022/08/10		101	%	80 - 120
			Dissolved Silver (Ag)	2022/08/10		99	%	80 - 120
			Dissolved Thallium (Tl)	2022/08/10		114	%	80 - 120
			Dissolved Tin (Sn)	2022/08/10		106	%	80 - 120
			Dissolved Titanium (Ti)	2022/08/10		109	%	80 - 120
			Dissolved Uranium (U)	2022/08/10		104	%	80 - 120
			Dissolved Vanadium (V)	2022/08/10		111	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/10		108	%	80 - 120
			Dissolved Aluminum (Al)	2022/08/10		95	%	80 - 120
			Dissolved Antimony (Sb)	2022/08/10		105	%	80 - 120
A674338	STI	Spiked Blank	Dissolved Arsenic (As)	2022/08/10		100	%	80 - 120
			Dissolved Beryllium (Be)	2022/08/10		109	%	80 - 120
			Dissolved Chromium (Cr)	2022/08/10		102	%	80 - 120
			Dissolved Cobalt (Co)	2022/08/10		101	%	80 - 120
			Dissolved Copper (Cu)	2022/08/10		100	%	80 - 120
			Dissolved Lead (Pb)	2022/08/10		106	%	80 - 120



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A674338	STI	Method Blank	Dissolved Molybdenum (Mo)	2022/08/10		101	%	80 - 120
			Dissolved Nickel (Ni)	2022/08/10		100	%	80 - 120
			Dissolved Selenium (Se)	2022/08/10		100	%	80 - 120
			Dissolved Silver (Ag)	2022/08/10		97	%	80 - 120
			Dissolved Thallium (Tl)	2022/08/10		105	%	80 - 120
			Dissolved Tin (Sn)	2022/08/10		101	%	80 - 120
			Dissolved Titanium (Ti)	2022/08/10		100	%	80 - 120
			Dissolved Uranium (U)	2022/08/10		96	%	80 - 120
			Dissolved Vanadium (V)	2022/08/10		103	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/10		104	%	80 - 120
			Dissolved Aluminum (Al)	2022/08/11	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2022/08/11	<0.00060		mg/L	
			Dissolved Arsenic (As)	2022/08/11	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2022/08/11	<0.0010		mg/L	
			Dissolved Chromium (Cr)	2022/08/11	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2022/08/11	<0.00030		mg/L	
			Dissolved Copper (Cu)	2022/08/11	<0.0010		mg/L	
			Dissolved Lead (Pb)	2022/08/11	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2022/08/11	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2022/08/11	<0.00050		mg/L	
			Dissolved Selenium (Se)	2022/08/11	<0.00020		mg/L	
			Dissolved Silver (Ag)	2022/08/11	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2022/08/11	<0.00020		mg/L	
			Dissolved Tin (Sn)	2022/08/11	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2022/08/11	<0.0010		mg/L	
			Dissolved Uranium (U)	2022/08/11	<0.00010		mg/L	
			Dissolved Vanadium (V)	2022/08/11	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2022/08/11	<0.0030		mg/L	
A674338	STI	RPD	Dissolved Aluminum (Al)	2022/08/10	10		%	20
			Dissolved Antimony (Sb)	2022/08/10	NC		%	20
			Dissolved Arsenic (As)	2022/08/10	2.0		%	20
			Dissolved Beryllium (Be)	2022/08/10	NC		%	20
			Dissolved Chromium (Cr)	2022/08/10	NC		%	20
			Dissolved Cobalt (Co)	2022/08/10	0.59		%	20
			Dissolved Copper (Cu)	2022/08/10	NC		%	20
			Dissolved Lead (Pb)	2022/08/10	NC		%	20
			Dissolved Molybdenum (Mo)	2022/08/10	3.6		%	20
			Dissolved Nickel (Ni)	2022/08/10	3.5		%	20
			Dissolved Selenium (Se)	2022/08/10	NC		%	20
			Dissolved Silver (Ag)	2022/08/10	NC		%	20
			Dissolved Thallium (Tl)	2022/08/10	NC		%	20
			Dissolved Tin (Sn)	2022/08/10	NC		%	20
			Dissolved Titanium (Ti)	2022/08/10	1.6		%	20
			Dissolved Uranium (U)	2022/08/10	0.63		%	20
			Dissolved Vanadium (V)	2022/08/10	5.6		%	20
			Dissolved Zinc (Zn)	2022/08/10	NC		%	20
A674438	MPU	Matrix Spike [AZA426-02]	Dissolved Calcium (Ca)	2022/08/09		NC	%	80 - 120
			Dissolved Iron (Fe)	2022/08/09		106	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/09		99	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/09		103	%	80 - 120
			Dissolved Potassium (K)	2022/08/09		100	%	80 - 120
A674438	MPU	Spiked Blank	Dissolved Sodium (Na)	2022/08/09		99	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/09		97	%	80 - 120



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A674438	MPU	Method Blank	Dissolved Iron (Fe)	2022/08/09		96	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/09		96	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/09		94	%	80 - 120
			Dissolved Potassium (K)	2022/08/09		97	%	80 - 120
			Dissolved Sodium (Na)	2022/08/09		95	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/09	<0.30		mg/L	
			Dissolved Iron (Fe)	2022/08/09	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2022/08/09	<0.20		mg/L	
			Dissolved Manganese (Mn)	2022/08/09	<0.0040		mg/L	
			Dissolved Potassium (K)	2022/08/09	<0.30		mg/L	
A674438	MPU	RPD [AZA426-02]	Dissolved Sodium (Na)	2022/08/09	<0.50		mg/L	
			Dissolved Calcium (Ca)	2022/08/09	0.87		%	20
			Dissolved Iron (Fe)	2022/08/09	0.58		%	20
			Dissolved Magnesium (Mg)	2022/08/09	0.27		%	20
			Dissolved Manganese (Mn)	2022/08/09	0.93		%	20
			Dissolved Potassium (K)	2022/08/09	1.1		%	20
			Dissolved Sodium (Na)	2022/08/09	0.93		%	20
A674585	SKM	Matrix Spike [AZA426-02]	Nitrite (N)	2022/08/09		95	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/09		116	%	80 - 120
A674585	SKM	Spiked Blank	Nitrite (N)	2022/08/09		99	%	80 - 120
			Nitrate plus Nitrite (N)	2022/08/09		102	%	80 - 120
A674585	SKM	Method Blank	Nitrite (N)	2022/08/09	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2022/08/09	<0.010		mg/L	
A674585	SKM	RPD [AZA426-02]	Nitrite (N)	2022/08/09	NC		%	20
			Nitrate plus Nitrite (N)	2022/08/09	NC		%	20
A675309	FM0	Matrix Spike	Total Hex. Chromium (Cr 6+)	2022/08/11		102	%	80 - 120
A675309	FM0	Spiked Blank	Total Hex. Chromium (Cr 6+)	2022/08/11		105	%	80 - 120
A675309	FM0	Method Blank	Total Hex. Chromium (Cr 6+)	2022/08/11	<0.00099		mg/L	
A675309	FM0	RPD	Total Hex. Chromium (Cr 6+)	2022/08/11	NC		%	20
A675312	MKJ	Matrix Spike	Total Aluminum (Al)	2022/08/11		102	%	80 - 120
			Total Antimony (Sb)	2022/08/11		107	%	80 - 120
			Total Arsenic (As)	2022/08/11		97	%	80 - 120
			Total Beryllium (Be)	2022/08/11		94	%	80 - 120
			Total Chromium (Cr)	2022/08/11		96	%	80 - 120
			Total Cobalt (Co)	2022/08/11		94	%	80 - 120
			Total Copper (Cu)	2022/08/11		91	%	80 - 120
			Total Lead (Pb)	2022/08/11		94	%	80 - 120
			Total Molybdenum (Mo)	2022/08/11		106	%	80 - 120
			Total Nickel (Ni)	2022/08/11		92	%	80 - 120
			Total Selenium (Se)	2022/08/11		96	%	80 - 120
			Total Silver (Ag)	2022/08/11		96	%	80 - 120
			Total Thallium (Tl)	2022/08/11		94	%	80 - 120
			Total Tin (Sn)	2022/08/11		107	%	80 - 120
			Total Titanium (Ti)	2022/08/11		103	%	80 - 120
			Total Uranium (U)	2022/08/11		98	%	80 - 120
			Total Vanadium (V)	2022/08/11		101	%	80 - 120
			Total Zinc (Zn)	2022/08/11		94	%	80 - 120
			Total Aluminum (Al)	2022/08/11		106	%	80 - 120
			Total Antimony (Sb)	2022/08/11		105	%	80 - 120
			Total Arsenic (As)	2022/08/11		97	%	80 - 120
			Total Beryllium (Be)	2022/08/11		89	%	80 - 120
			Total Chromium (Cr)	2022/08/11		96	%	80 - 120
			Total Cobalt (Co)	2022/08/11		97	%	80 - 120
A675312	MKJ	Spiked Blank	Total Aluminum (Al)	2022/08/11		106	%	80 - 120
			Total Antimony (Sb)	2022/08/11		105	%	80 - 120
			Total Arsenic (As)	2022/08/11		97	%	80 - 120
			Total Beryllium (Be)	2022/08/11		89	%	80 - 120
			Total Chromium (Cr)	2022/08/11		96	%	80 - 120
			Total Cobalt (Co)	2022/08/11		97	%	80 - 120



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A675312	MKJ	Method Blank	Total Copper (Cu)	2022/08/11		97	%	80 - 120
			Total Lead (Pb)	2022/08/11		99	%	80 - 120
			Total Molybdenum (Mo)	2022/08/11		99	%	80 - 120
			Total Nickel (Ni)	2022/08/11		97	%	80 - 120
			Total Selenium (Se)	2022/08/11		100	%	80 - 120
			Total Silver (Ag)	2022/08/11		99	%	80 - 120
			Total Thallium (Tl)	2022/08/11		99	%	80 - 120
			Total Tin (Sn)	2022/08/11		102	%	80 - 120
			Total Titanium (Ti)	2022/08/11		97	%	80 - 120
			Total Uranium (U)	2022/08/11		98	%	80 - 120
			Total Vanadium (V)	2022/08/11		98	%	80 - 120
			Total Zinc (Zn)	2022/08/11		98	%	80 - 120
			Total Aluminum (Al)	2022/08/11	<0.0030		mg/L	
			Total Antimony (Sb)	2022/08/11	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/11	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/11	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/11	<0.0010		mg/L	
			Total Cobalt (Co)	2022/08/11	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/11	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/11	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/11	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/11	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/11	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/11	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/11	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/11	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/11	<0.0010		mg/L	
			Total Uranium (U)	2022/08/11	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/11	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/11	<0.0030		mg/L	
A675312	MKJ	RPD	Total Aluminum (Al)	2022/08/11	NC		%	20
			Total Antimony (Sb)	2022/08/11	NC		%	20
			Total Arsenic (As)	2022/08/11	NC		%	20
			Total Beryllium (Be)	2022/08/11	NC		%	20
			Total Chromium (Cr)	2022/08/11	NC		%	20
			Total Cobalt (Co)	2022/08/11	NC		%	20
			Total Copper (Cu)	2022/08/11	9.1		%	20
			Total Lead (Pb)	2022/08/11	NC		%	20
			Total Molybdenum (Mo)	2022/08/11	NC		%	20
			Total Nickel (Ni)	2022/08/11	1.6		%	20
			Total Selenium (Se)	2022/08/11	NC		%	20
			Total Silver (Ag)	2022/08/11	NC		%	20
			Total Thallium (Tl)	2022/08/11	NC		%	20
			Total Tin (Sn)	2022/08/11	NC		%	20
			Total Titanium (Ti)	2022/08/11	NC		%	20
			Total Uranium (U)	2022/08/11	NC		%	20
			Total Vanadium (V)	2022/08/11	NC		%	20
A675329	ACR	Matrix Spike	Total Ammonia (N)	2022/08/10		NC	%	80 - 120
A675329	ACR	Spiked Blank	Total Ammonia (N)	2022/08/10		101	%	80 - 120
A675329	ACR	Method Blank	Total Ammonia (N)	2022/08/10	<0.015		mg/L	
A675329	ACR	RPD	Total Ammonia (N)	2022/08/10	0.40		%	20
A675333	JAB	Matrix Spike	Total Mercury (Hg)	2022/08/10		109	%	80 - 120
A675333	JAB	Spiked Blank	Total Mercury (Hg)	2022/08/10		99	%	80 - 120



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A675333	JAB	Method Blank	Total Mercury (Hg)	2022/08/10	<0.0019		ug/L	
A675333	JAB	RPD	Total Mercury (Hg)	2022/08/10	NC		%	20
A675533	TMU	Matrix Spike	Phenols	2022/08/10		83	%	80 - 120
A675533	TMU	Spiked Blank	Phenols	2022/08/10		93	%	80 - 120
A675533	TMU	Method Blank	Phenols	2022/08/10	<0.0015		mg/L	
A675533	TMU	RPD	Phenols	2022/08/10	NC		%	20
A675539	QW1	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/08/11		114	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		82	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		101	%	50 - 140
			Benzene	2022/08/11		124	%	50 - 140
			Toluene	2022/08/11		91	%	50 - 140
			Ethylbenzene	2022/08/11		87	%	50 - 140
			m & p-Xylene	2022/08/11		86	%	50 - 140
			o-Xylene	2022/08/11		82	%	50 - 140
			F1 (C6-C10)	2022/08/11		93	%	60 - 140
A675539	QW1	Spiked Blank	1,4-Difluorobenzene (sur.)	2022/08/11		129	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		90	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		117	%	50 - 140
			Benzene	2022/08/11		114	%	60 - 130
			Toluene	2022/08/11		97	%	60 - 130
			Ethylbenzene	2022/08/11		88	%	60 - 130
			m & p-Xylene	2022/08/11		89	%	60 - 130
			o-Xylene	2022/08/11		90	%	60 - 130
			F1 (C6-C10)	2022/08/11		92	%	60 - 140
A675539	QW1	Method Blank	1,4-Difluorobenzene (sur.)	2022/08/11		121	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		74	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		105	%	50 - 140
			Benzene	2022/08/11	<0.40		ug/L	
			Toluene	2022/08/11	<0.40		ug/L	
			Ethylbenzene	2022/08/11	<0.40		ug/L	
			m & p-Xylene	2022/08/11	<0.80		ug/L	
			o-Xylene	2022/08/11	<0.40		ug/L	
			F1 (C6-C10)	2022/08/11	<100		ug/L	
A675539	QW1	RPD	Benzene	2022/08/11	3.5		%	30
			Toluene	2022/08/11	3.8		%	30
			Ethylbenzene	2022/08/11	14		%	30
			m & p-Xylene	2022/08/11	27		%	30
			o-Xylene	2022/08/11	22		%	30
			F1 (C6-C10)	2022/08/11	0.30		%	30
A675540	TMU	Matrix Spike [AZA425-04]	Phenols	2022/08/10		202 (1)	%	80 - 120
A675540	TMU	Spiked Blank	Phenols	2022/08/10		92	%	80 - 120
A675540	TMU	Method Blank	Phenols	2022/08/10	<0.0015		mg/L	
A675540	TMU	RPD [AZA425-04]	Phenols	2022/08/10	0.27		%	20
A675588	HE1	Matrix Spike [AZA424-01]	Total Suspended Solids	2022/08/10		NC (2)	%	80 - 120
A675588	HE1	Spiked Blank	Total Suspended Solids	2022/08/10		89	%	80 - 120
A675588	HE1	Method Blank	Total Suspended Solids	2022/08/10	<0.40		mg/L	
A675588	HE1	RPD [AZA425-01]	Total Suspended Solids	2022/08/10	15 (2)		%	20
A675718	MKJ	Matrix Spike	Dissolved Aluminum (Al)	2022/08/11		NC	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/11		NC	%	80 - 120
A675718	MKJ	Spiked Blank	Dissolved Aluminum (Al)	2022/08/11		101	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/11		100	%	80 - 120
A675718	MKJ	Method Blank	Dissolved Aluminum (Al)	2022/08/11	<0.0030		mg/L	
			Dissolved Zinc (Zn)	2022/08/11	<0.0030		mg/L	



**BUREAU
VERITAS**

Bureau Veritas Job #: C258095

Report Date: 2022/08/12

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A675718	MKJ	RPD	Dissolved Aluminum (Al)	2022/08/11	1.2		%	20
			Dissolved Zinc (Zn)	2022/08/11	1.1		%	20
A676047	MPU	Matrix Spike	Total Barium (Ba)	2022/08/11		91	%	80 - 120
			Total Boron (B)	2022/08/11		NC	%	80 - 120
			Total Calcium (Ca)	2022/08/11		101	%	80 - 120
			Total Iron (Fe)	2022/08/11		105	%	80 - 120
			Total Lithium (Li)	2022/08/11		95	%	80 - 120
			Total Magnesium (Mg)	2022/08/11		97	%	80 - 120
			Total Manganese (Mn)	2022/08/11		108	%	80 - 120
			Total Phosphorus (P)	2022/08/11		101	%	80 - 120
			Total Potassium (K)	2022/08/11		100	%	80 - 120
			Total Silicon (Si)	2022/08/11		100	%	80 - 120
			Total Sodium (Na)	2022/08/11		NC	%	80 - 120
			Total Strontium (Sr)	2022/08/11		87	%	80 - 120
			Total Sulphur (S)	2022/08/11		104	%	80 - 120
A676047	MPU	Spiked Blank	Total Barium (Ba)	2022/08/11		99	%	80 - 120
			Total Boron (B)	2022/08/11		99	%	80 - 120
			Total Calcium (Ca)	2022/08/11		100	%	80 - 120
			Total Iron (Fe)	2022/08/11		103	%	80 - 120
			Total Lithium (Li)	2022/08/11		98	%	80 - 120
			Total Magnesium (Mg)	2022/08/11		98	%	80 - 120
			Total Manganese (Mn)	2022/08/11		103	%	80 - 120
			Total Phosphorus (P)	2022/08/11		95	%	80 - 120
			Total Potassium (K)	2022/08/11		102	%	80 - 120
			Total Silicon (Si)	2022/08/11		98	%	80 - 120
			Total Sodium (Na)	2022/08/11		100	%	80 - 120
			Total Strontium (Sr)	2022/08/11		95	%	80 - 120
			Total Sulphur (S)	2022/08/11		98	%	80 - 120
A676047	MPU	Method Blank	Total Barium (Ba)	2022/08/11	<0.010		mg/L	
			Total Boron (B)	2022/08/11	<0.020		mg/L	
			Total Calcium (Ca)	2022/08/11	<0.30		mg/L	
			Total Iron (Fe)	2022/08/11	<0.060		mg/L	
			Total Lithium (Li)	2022/08/11	<0.020		mg/L	
			Total Magnesium (Mg)	2022/08/11	<0.20		mg/L	
			Total Manganese (Mn)	2022/08/11	<0.0040		mg/L	
			Total Phosphorus (P)	2022/08/11	<0.10		mg/L	
			Total Potassium (K)	2022/08/11	<0.30		mg/L	
			Total Silicon (Si)	2022/08/11	<0.15		mg/L	
			Total Sodium (Na)	2022/08/11	<0.50		mg/L	
			Total Strontium (Sr)	2022/08/11	<0.020		mg/L	
			Total Sulphur (S)	2022/08/11	<0.20		mg/L	
A676047	MPU	RPD	Total Barium (Ba)	2022/08/11	0.50		%	20
			Total Boron (B)	2022/08/11	2.5		%	20
			Total Calcium (Ca)	2022/08/11	3.2		%	20
			Total Iron (Fe)	2022/08/11	2.3		%	20
			Total Lithium (Li)	2022/08/11	3.3		%	20
			Total Magnesium (Mg)	2022/08/11	3.2		%	20
			Total Manganese (Mn)	2022/08/11	3.5		%	20
			Total Phosphorus (P)	2022/08/11	NC		%	20
			Total Potassium (K)	2022/08/11	3.8		%	20
			Total Silicon (Si)	2022/08/11	3.1		%	20
			Total Sodium (Na)	2022/08/11	3.4		%	20
			Total Strontium (Sr)	2022/08/11	4.2		%	20



QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Sulphur (S)	2022/08/11	NC		%	20
A676131	MAP	Matrix Spike	Total Nitrogen (N)	2022/08/11		NC	%	80 - 120
A676131	MAP	QC Standard	Total Nitrogen (N)	2022/08/11		106	%	80 - 120
A676131	MAP	Spiked Blank	Total Nitrogen (N)	2022/08/11		108	%	80 - 120
A676131	MAP	Method Blank	Total Nitrogen (N)	2022/08/11	<0.020		mg/L	
A676131	MAP	RPD	Total Nitrogen (N)	2022/08/11	0.032		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Detection limit raised based on sample volume used for analysis.



VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Gita Pokhrel, Laboratory Supervisor

Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

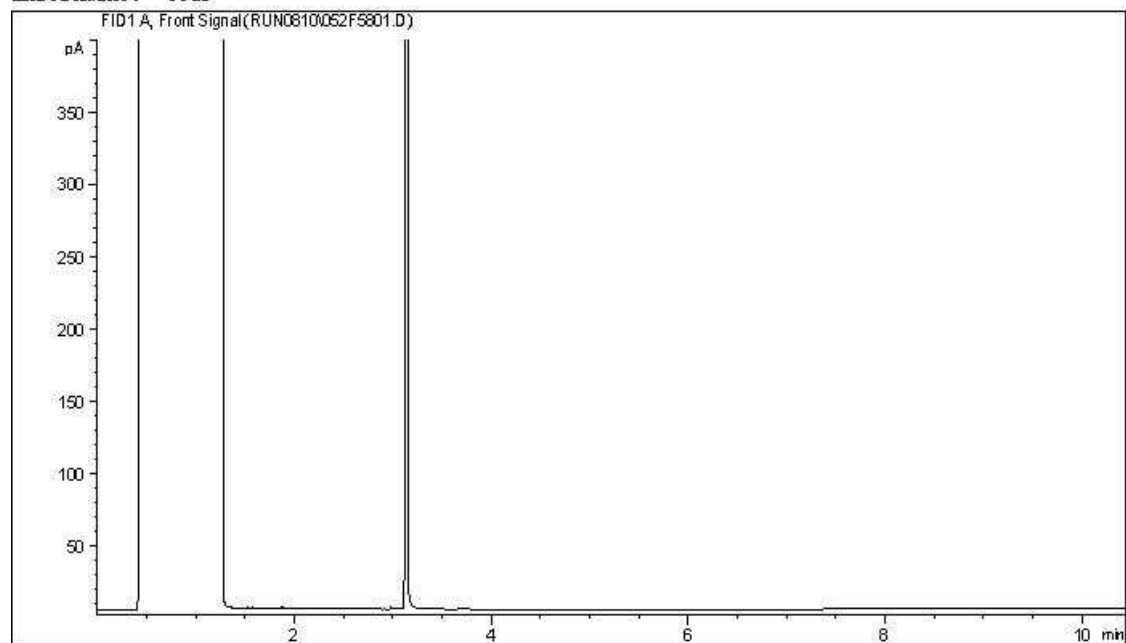
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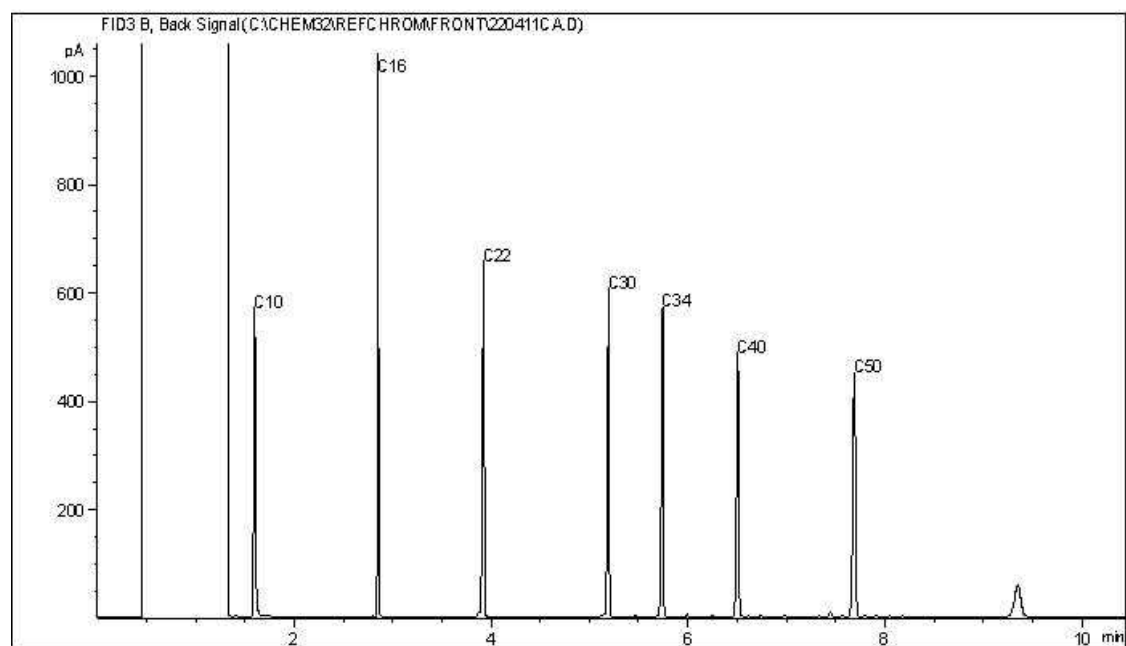
INVOICE TO:				Report Information				Project Information				Laboratory Use Only								
Company Name #12700 OUTCOME CONSULTANTS INC.				Company Name				Quotation # C20222				Bureau Veritas Job #								
Contact Name Keelan Veitch				Contact Name				P.O. # P2022-14				Bottle Order #								
Address 151 HOLLAND AVENUE SUITE 200				Address				Project # Resolute Landfills GW/SW												
OTTAWA ON K1Y 0Y2								Project Name				Chain Of Custody Record								
Phone (613) 297-0341				Phone				Site # P2022-14				Project Manager								
Email keelan@outcomeinc.ca				Email				Sampled By Keelan Veitch												
Regulatory Criteria				Special Instructions				Analysis Requested				Turnaround Time (TAT) Required								
Compare to CCME Analyze as per quote C20222				*COC covers two coolers				Regulated Drinking Water ? (Y/N) Metals Field Filtered ? (Y/N) Routine Water Regulated Metals including Mercury-Total BTEX and F1-F4 in Water NH4AC-W, PHEN, ABTKN-T, TDS Total Hexavalent Chromium Oil and Grease by IR Total Phosphorus Total Suspended Solids (NFR, low) PAH in Water by GC/MS Regulated Metals + Hg (CCME/AT1) - HGD-V				Please provide advance notice for rush projects								
												Regular (Standard) TAT (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.								
Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form								Job Specific Rush TAT (if applies to entire submission)												
Samples must be kept cool (< 10°C) from time of sampling until delivery to Bureau Veritas								Date Required: _____ Time Required: _____ Rush Confirmation Number _____ (call lab for #)												
Sample Barcode Label		Sample (Location) Identification		Date Sampled	Time Sampled	Matrix														
1		RBL-1	2022-08-03	1030	GW	NN	X	X	X	X	X	X	X	X	X	X	12			
2		AEC-GW1	↓	1700	GW		X	X	X	X	X	X	X	X	X	X	12			
3		RBL-2	2022-08-04	1000	GW		X	X	X	X	X	X	X	X	X	X	12	Received in Yellowknife By: J. McEwen @ 16:30 AUG 03 2022		
4		RBL-3	↓	1100	GW		X	X	X	X	X	X	X	X	X	X	12			
5		RBL-4	2022-08-03	1730	SW		X	X	X	X	X	X	X	X	X	X	12	Temp: _____ See ACTR		
6		DUPC	↓	1730	SW		X	X	X	X	X	X	X	X	X	X	12			
7																				
8																				
9																				
10																				
RELINQUISHED BY: (Signature/Print)				Date: (YY/MM/DD)		Time	RECEIVED BY: (Signature/Print)				Date: (YY/MM/DD)		Time	# jars used and not submitted	Lab Use Only					
Keelan Veitch				2022/08/04		1730	J. McEwen				2022/08/08		06:00		Custody Seal Intact on Cooler? ☐ Yes ☐ No					
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS. * IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.																				
																White: Bureau Veritas		Yellow: Client		

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



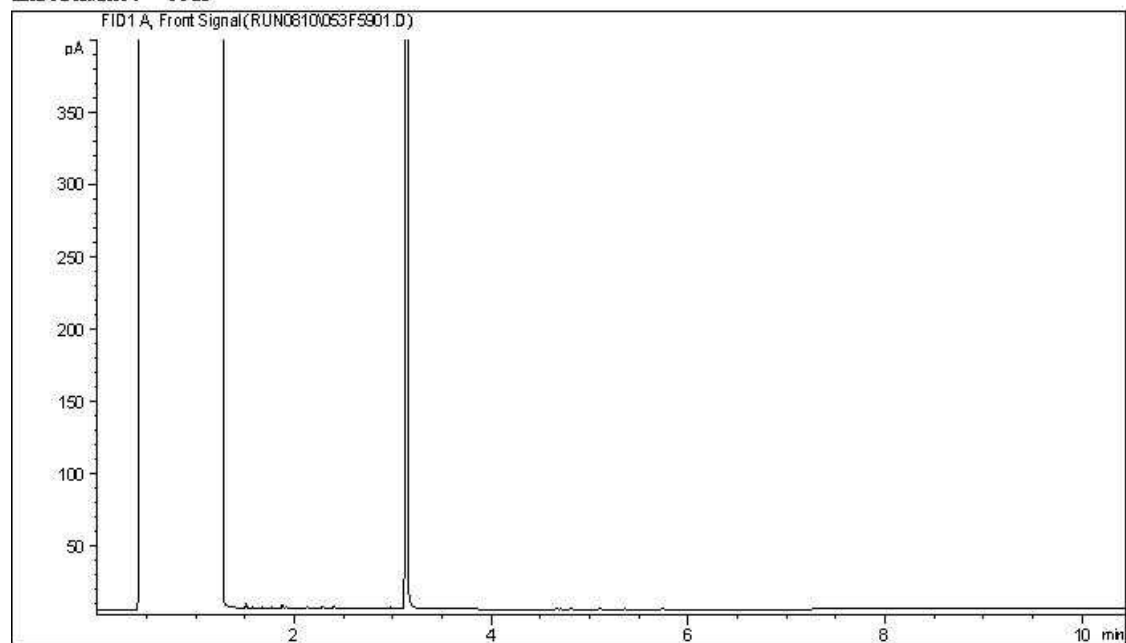
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

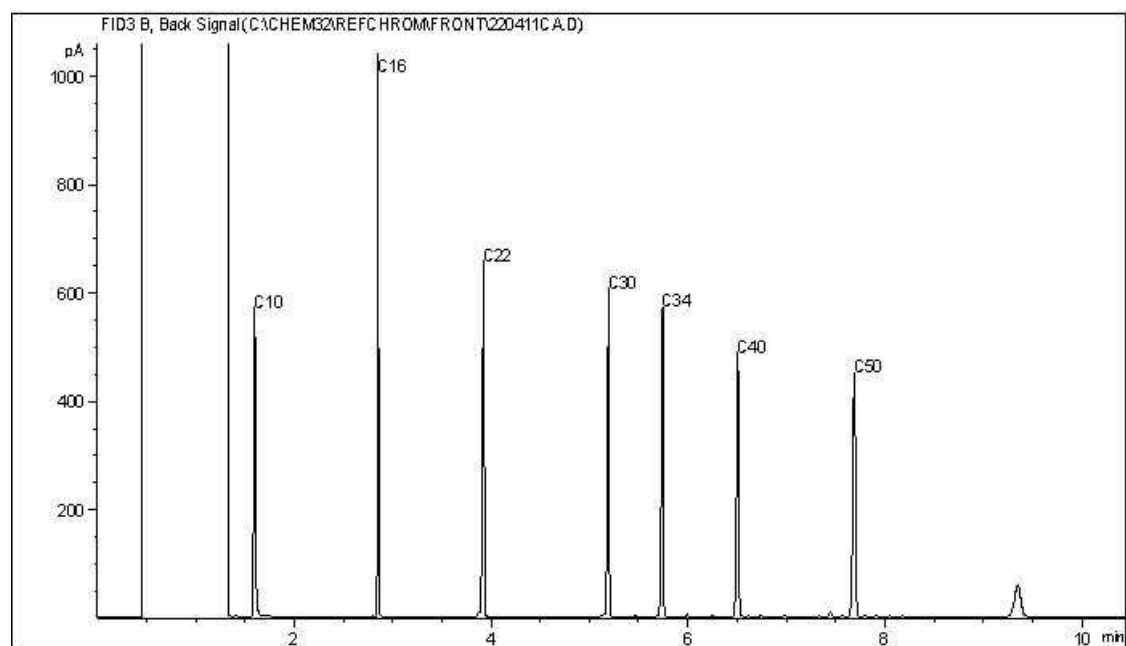
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



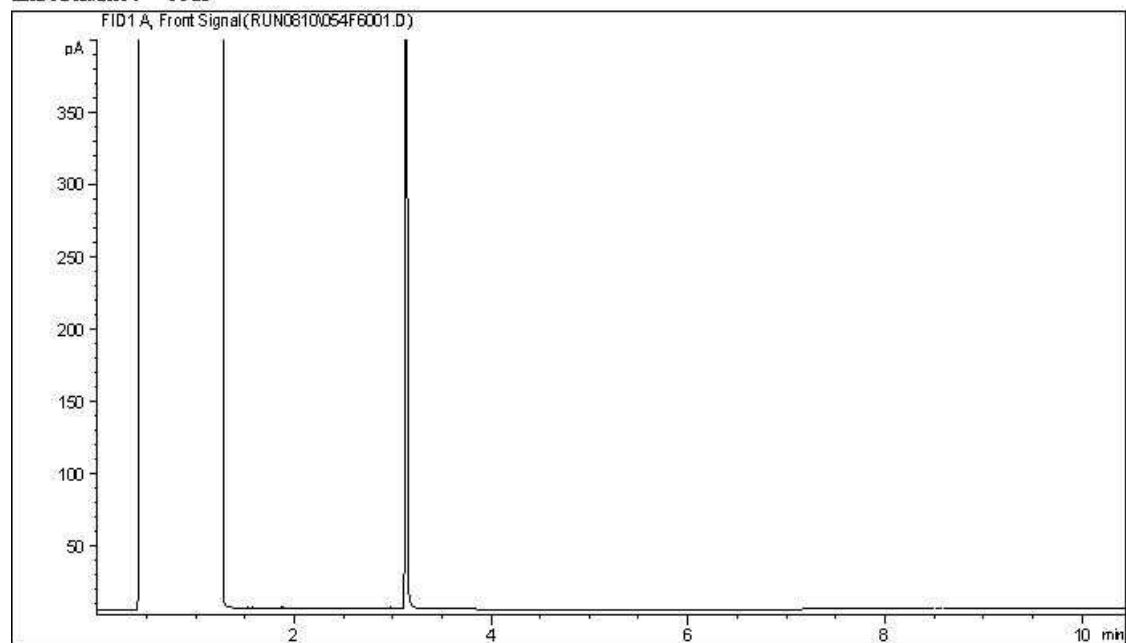
TYPICAL PRODUCT CARBON NUMBER RANGES

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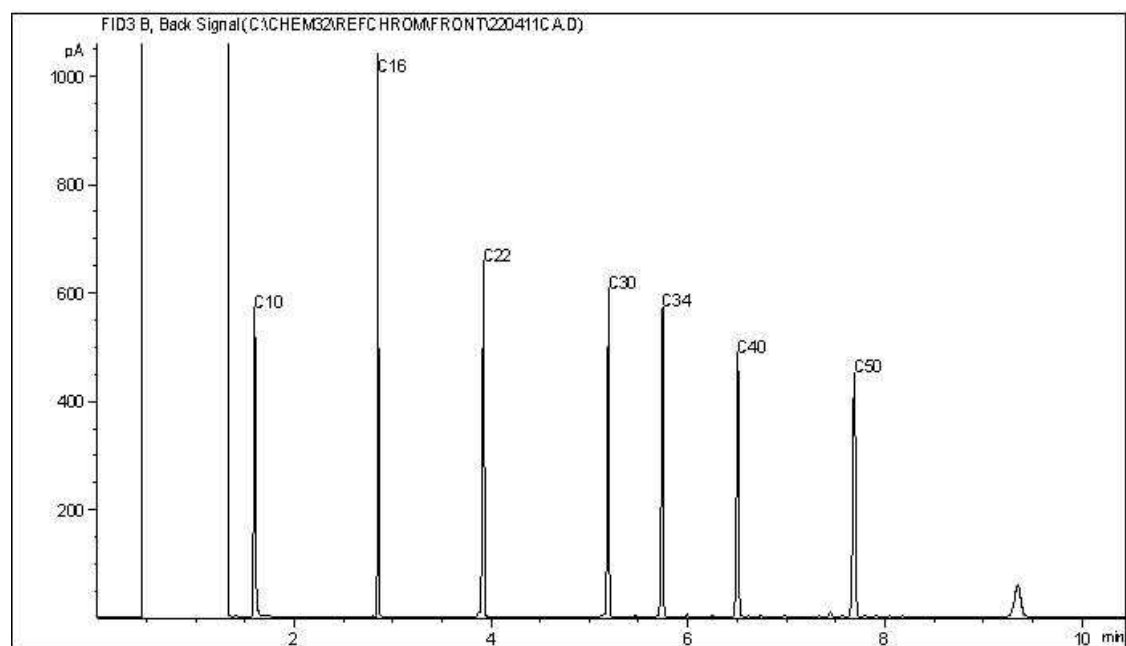
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



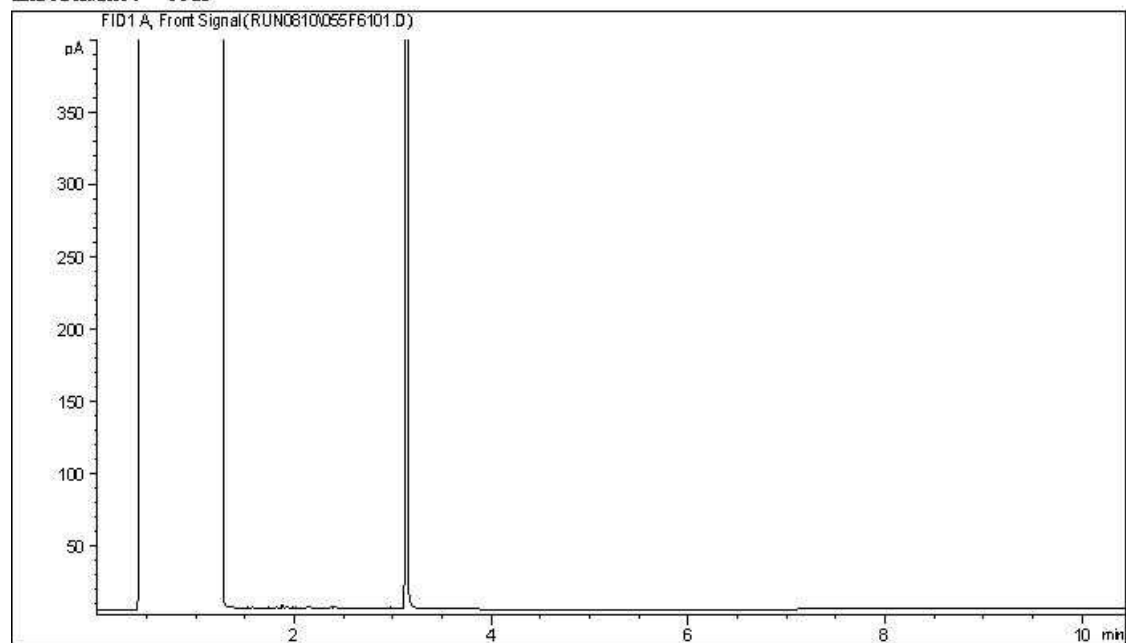
TYPICAL PRODUCT CARBON NUMBER RANGES

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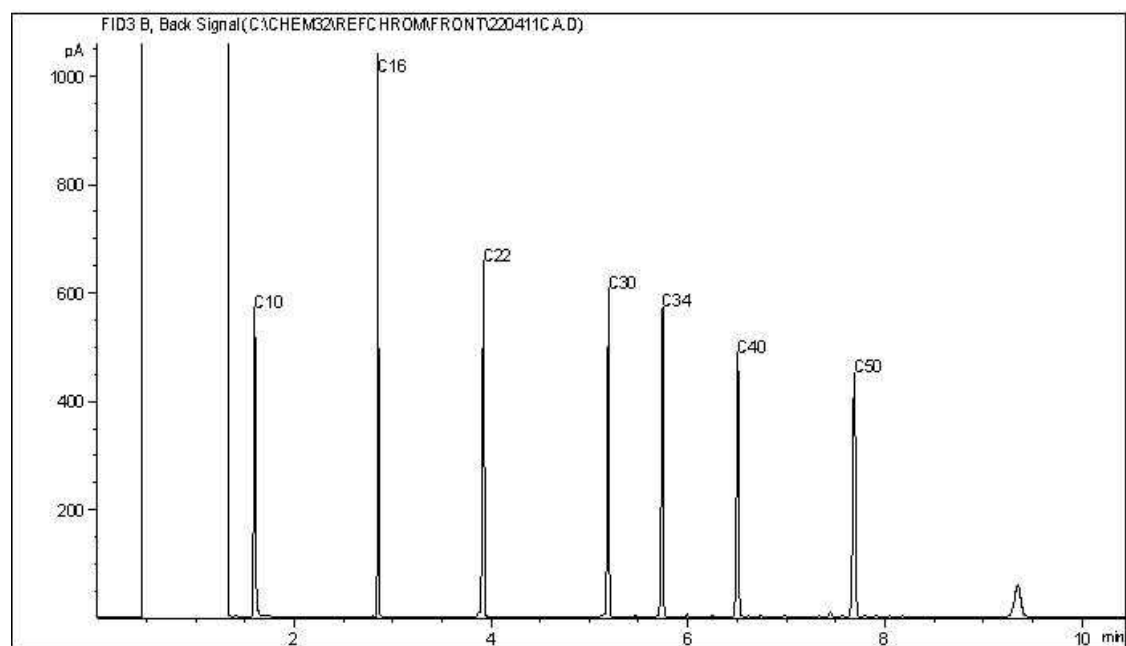
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



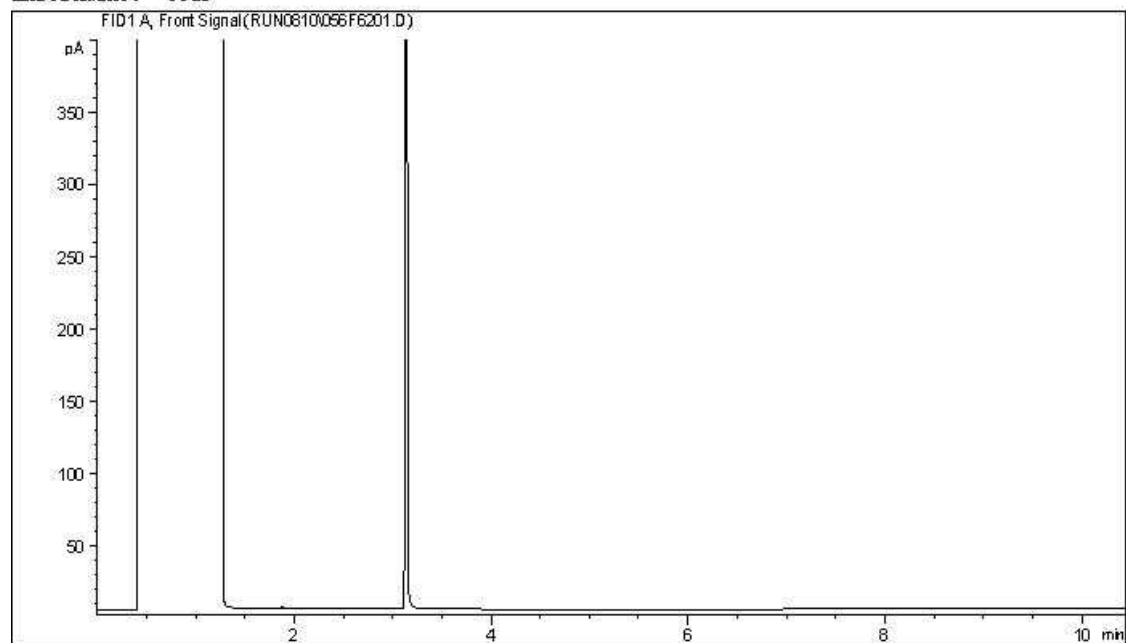
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
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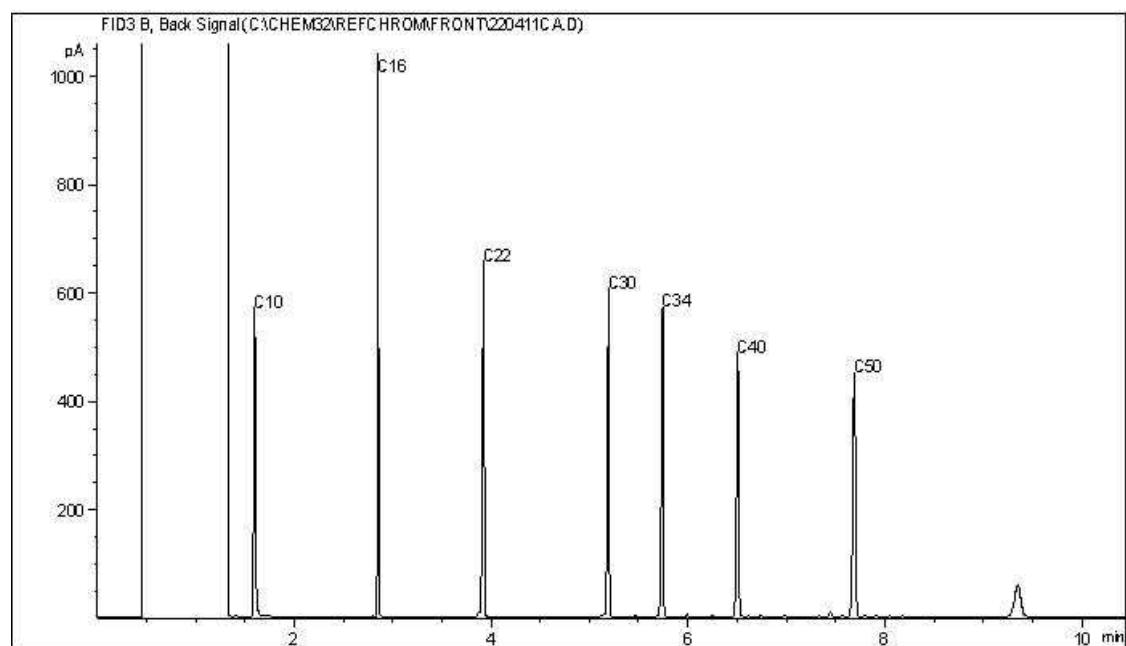
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



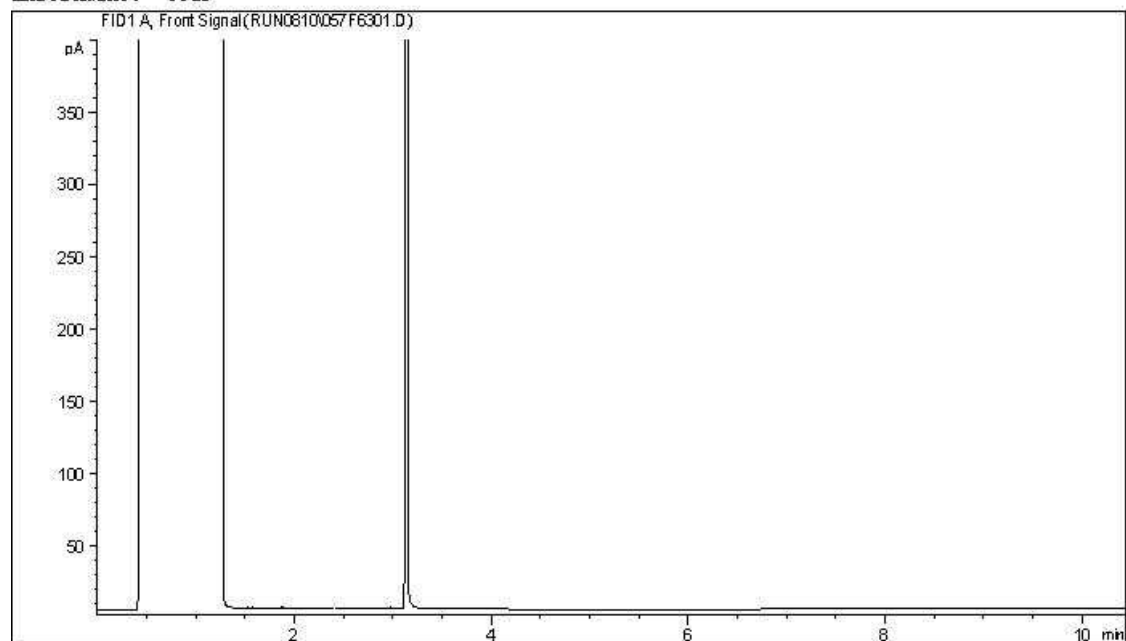
TYPICAL PRODUCT CARBON NUMBER RANGES

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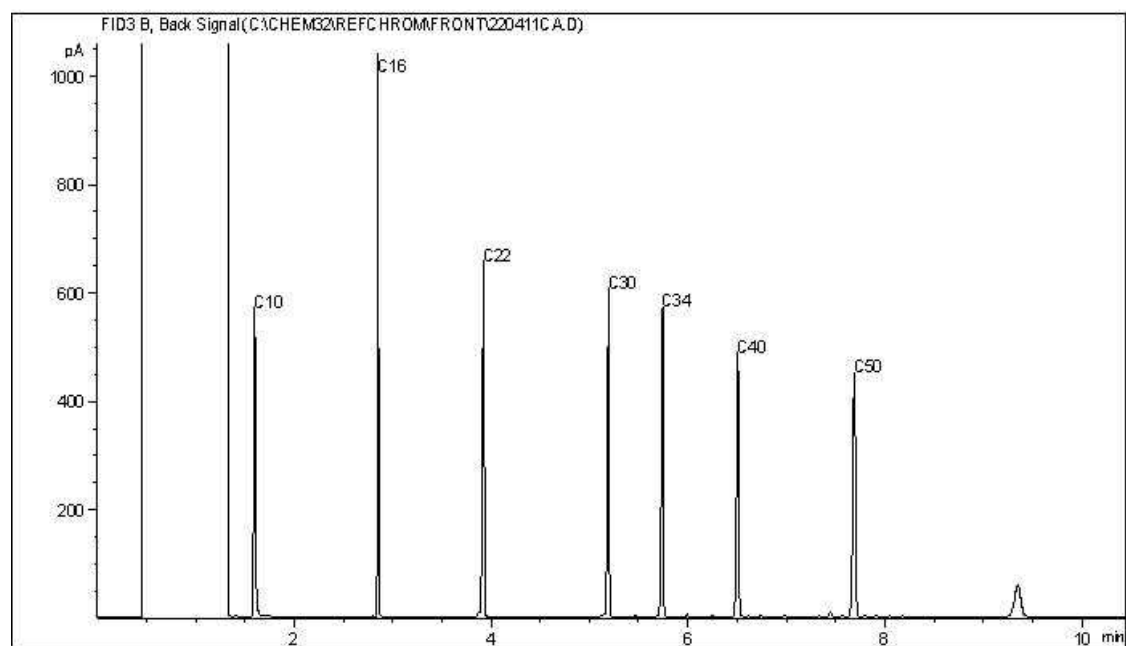
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CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC19



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

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Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.



Your P.O. #: P2022-14
 Your Project #: RESOLUTE LANDFILLS GW/SW
 Site#: P2022-14
 Your C.O.C. #: 669184-02-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
 151 HOLLAND AVENUE
 SUITE 200
 OTTAWA, ON
 CANADA K1Y 0Y2

Report Date: 2022/08/14
 Report #: R3215652
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258103

Received: 2022/08/08, 06:00

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO ₃ ,HCO ₃ ,OH (1)	4	N/A	2022/08/09	AB SOP-00005	SM 23 2320 B m
BTEX/F1 in Water by HS GC/MS/FID (1)	4	N/A	2022/08/11	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	4	N/A	2022/08/12		Auto Calc
Cadmium - low level CCME - Dissolved (1)	4	N/A	2022/08/11		Auto Calc
Cadmium - low level CCME (Total) (1)	1	N/A	2022/08/13		Auto Calc
Cadmium - low level CCME (Total) (1)	3	N/A	2022/08/14		Auto Calc
Chloride/Sulphate by Auto Colourimetry (1)	4	N/A	2022/08/09	AB SOP-00020	SM23-4500-Cl/SO ₄ -E m
Total Hexavalent Chromium (1)	4	N/A	2022/08/11	AB SOP-00063	SM 23 3500-Cr B m
Conductivity @25C (1)	4	N/A	2022/08/09	AB SOP-00005	SM 23 2510 B m
CCME Hydrocarbons (F2-F4 in water) (1, 2)	4	2022/08/11	2022/08/11	AB SOP-00037	CCME PHC-CWS m
Hardness (1)	4	N/A	2022/08/10		Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2022/08/13	BBY WI-00033	Auto Calc
Hardness Total (calculated as CaCO ₃) (1, 3)	2	N/A	2022/08/14	BBY WI-00033	Auto Calc
Mercury (Total) by CV (1)	4	2022/08/10	2022/08/10	AB SOP-00084	BCMOE BCLM Oct2013 m
Elements by ICP-Dissolved-Lab Filtered (1, 4)	4	N/A	2022/08/09	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Total (1)	4	2022/08/12	2022/08/13	AB SOP-00014 / AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS-Dissolved-Lab Filtered (1, 5)	4	N/A	2022/08/10	AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	1	2022/08/12	2022/08/12	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	1	2022/08/12	2022/08/13	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Elements by ICPMS - Total (1)	2	2022/08/12	2022/08/14	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	4	N/A	2022/08/10		Auto Calc
Sum of cations, anions (1)	4	N/A	2022/08/10		Auto Calc
Ammonia-N (Total) (1)	4	N/A	2022/08/13	AB SOP-00007	SM 23 4500 NH ₃ A G m
Nitrate and Nitrite (1)	4	N/A	2022/08/10		Auto Calc
NO ₂ (N); NO ₂ (N) + NO ₃ (N) in Water (1)	4	N/A	2022/08/09	AB SOP-00091	SM 23 4500 NO ₃ m
Nitrate (as N) (1)	4	2022/08/08	2022/08/10		Auto Calc
Oil and Grease by IR (1)	4	2022/08/09	2022/08/10	CAL SOP-00096	SM 23 5520C m



Your P.O. #: P2022-14
 Your Project #: RESOLUTE LANDFILLS GW/SW
 Site#: P2022-14
 Your C.O.C. #: 669184-02-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
 151 HOLLAND AVENUE
 SUITE 200
 OTTAWA, ON
 CANADA K1Y 0Y2

Report Date: 2022/08/14
 Report #: R3215652
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258103

Received: 2022/08/08, 06:00

Sample Matrix: Water
 # Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Benzo[a]pyrene Equivalency (1, 6)	4	N/A	2022/08/12		Auto Calc
PAH in Water by GC/MS (1)	4	2022/08/11	2022/08/12	AB SOP-00037 / AB SOP-00003	EPA 3510C/8270E m
pH @25°C (1, 7)	4	N/A	2022/08/09	AB SOP-00005	SM 23 4500-H+B m
Phenols (4-AAP) (1)	4	N/A	2022/08/10	AB SOP-00088	EPA 9066 R0 m
Total Dissolved Solids (Filt. Residue) (1)	4	2022/08/10	2022/08/10	AB SOP-00065	SM 23 2540 C m
Total Dissolved Solids (Calculated) (1)	4	N/A	2022/08/10		Auto Calc
Total Kjeldahl Nitrogen (Total) (1)	4	N/A	2022/08/11	BBY WI-00033	Auto Calc
Nitrogen (Total) (1)	3	2022/08/10	2022/08/10	AB SOP-00093	SM 23 4500-N C m
Nitrogen (Total) (1)	1	2022/08/11	2022/08/11	AB SOP-00093	SM 23 4500-N C m
Total Phosphorus (1)	4	2022/08/10	2022/08/12	AB SOP-00024	SM 23 4500-P A,B,F m
Total Suspended Solids (NFR, low) (1)	4	N/A	2022/08/10	AB SOP-00061	SM 23 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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Your P.O. #: P2022-14
Your Project #: RESOLUTE LANDFILLS GW/SW
Site#: P2022-14
Your C.O.C. #: 669184-02-01

Attention: Keelan Veitch

OUTCOME CONSULTANTS INC.
151 HOLLAND AVENUE
SUITE 200
OTTAWA, ON
CANADA K1Y 0Y2

Report Date: 2022/08/14
Report #: R3215652
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C258103

Received: 2022/08/08, 06:00

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
- (2) Silica gel clean up employed.
- (3) "Total Hardness" was calculated from Total Ca and Mg concentrations and may be biased high (Hardness, or Dissolved Hardness, calculated from Dissolved Ca and Mg, should be used for compliance if available).
- (4) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (5) Samples were filtered and preserved at the lab. Values may not reflect concentrations at the time of sampling. Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
- (6) B[a]P TPE is calculated using 1/2 of the RDL for non detect results as per Alberta Environment instructions. This protocol may not apply in other jurisdictions.
- (7) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (780) 577-7100

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This report has been generated and distributed using a secure automated process.

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For Service Group specific validation please refer to the Validation Signature Page.



BUREAU
VERITAS

Bureau Veritas Job #: C258103

Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

AT1 BTEX AND F1-F4 IN WATER (WATER)

Bureau Veritas ID		AZA455	AZA456	AZA457	AZA458		
Sampling Date		2022/08/03 10:00	2022/08/03 10:00	2022/08/03 13:00	2022/08/03 14:00		
COC Number		669184-02-01	669184-02-01	669184-02-01	669184-02-01		
	UNITS	RBL-14	DUP B	RBL-13	RBL-16	RDL	QC Batch
Ext. Pet. Hydrocarbon							
F2 (C10-C16 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	A673240
F3 (C16-C34 Hydrocarbons)	mg/L	<0.10	<0.10	<0.10	<0.10	0.10	A673240
F4 (C34-C50 Hydrocarbons)	mg/L	<0.20	<0.20	<0.20	<0.20	0.20	A673240
Volatiles							
Benzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A674545
Toluene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A674545
Ethylbenzene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A674545
m & p-Xylene	ug/L	<0.80	<0.80	<0.80	<0.80	0.80	A674545
o-Xylene	ug/L	<0.40	<0.40	<0.40	<0.40	0.40	A674545
Xylenes (Total)	ug/L	<0.89	<0.89	<0.89	<0.89	0.89	A673042
F1 (C6-C10) - BTEX	ug/L	<100	<100	<100	<100	100	A673042
F1 (C6-C10)	ug/L	<100	<100	<100	<100	100	A674545
Surrogate Recovery (%)							
1,4-Difluorobenzene (sur.)	%	106	108	101	103		A674545
4-Bromofluorobenzene (sur.)	%	96	97	101	96		A674545
D4-1,2-Dichloroethane (sur.)	%	98	99	104	92		A674545
O-TERPHENYL (sur.)	%	91	92	90	90		A673240
RDL = Reportable Detection Limit							



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Sampler Initials: KV

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		AZA455		AZA456		AZA457		
Sampling Date		2022/08/03 10:00		2022/08/03 10:00		2022/08/03 13:00		
COC Number		669184-02-01		669184-02-01		669184-02-01		
	UNITS	RBL-14	QC Batch	DUP B	QC Batch	RBL-13	RDL	QC Batch
Calculated Parameters								
Anion Sum	meq/L	3.7	A672506	3.8	A672506	2.3	N/A	A672506
Cation Sum	meq/L	3.8	A672506	3.8	A672506	2.3	N/A	A672506
Hardness (CaCO ₃)	mg/L	170	A672503	170	A672503	110	0.50	A672503
Ion Balance (% Difference)	%	0.91	A672504	0.15	A672504	1.3	N/A	A672504
Nitrate (N)	mg/L	0.19	A672422	0.18	A672422	0.27	0.010	A672422
Nitrate (NO ₃)	mg/L	0.86	A672421	0.82	A672421	1.2	0.044	A672421
Nitrite (NO ₂)	mg/L	<0.033	A672421	<0.033	A672421	<0.033	0.033	A672421
Calculated Total Dissolved Solids	mg/L	180	A672511	190	A672511	120	10	A672511
Misc. Inorganics								
Conductivity	uS/cm	350	A674329	350	A673697	230	2.0	A674329
pH	pH	7.82	A674327	7.67	A673695	7.47	N/A	A674327
Anions								
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A674328
Alkalinity (Total as CaCO ₃)	mg/L	170	A674328	170	A673696	83	1.0	A674328
Bicarbonate (HCO ₃)	mg/L	210	A674328	210	A673696	100	1.0	A674328
Carbonate (CO ₃)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A674328
Hydroxide (OH)	mg/L	<1.0	A674328	<1.0	A673696	<1.0	1.0	A674328
Chloride (Cl)	mg/L	9.3	A674325	9.1	A674248	6.3	1.0	A674325
Sulphate (SO ₄)	mg/L	2.8	A674325	2.1	A674248	20	1.0	A674325
Nutrients								
Nitrite (N)	mg/L	<0.010	A674585	<0.010	A674585	<0.010	0.010	A674589
Nitrate plus Nitrite (N)	mg/L	0.19	A674585	0.18	A674585	0.27	0.010	A674589
Lab Filtered Elements								
Dissolved Calcium (Ca)	mg/L	47	A674438	48	A674438	34	0.30	A674438
Dissolved Iron (Fe)	mg/L	<0.060	A674438	<0.060	A674438	<0.060	0.060	A674438
Dissolved Magnesium (Mg)	mg/L	13	A674438	13	A674438	4.9	0.20	A674438
Dissolved Manganese (Mn)	mg/L	<0.0040	A674438	<0.0040	A674438	<0.0040	0.0040	A674438
Dissolved Potassium (K)	mg/L	0.54	A674438	0.59	A674438	0.60	0.30	A674438
Dissolved Sodium (Na)	mg/L	7.4	A674438	7.5	A674438	5.2	0.50	A674438
RDL = Reportable Detection Limit								
N/A = Not Applicable								



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VERITAS

Bureau Veritas Job #: C258103

Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		AZA458		
Sampling Date		2022/08/03 14:00		
COC Number		669184-02-01		
	UNITS	RBL-16	RDL	QC Batch
Calculated Parameters				
Anion Sum	meq/L	2.3	N/A	A672506
Cation Sum	meq/L	2.3	N/A	A672506
Hardness (CaCO ₃)	mg/L	100	0.50	A672503
Ion Balance (% Difference)	%	0.95	N/A	A672504
Nitrate (N)	mg/L	0.26	0.010	A672422
Nitrate (NO ₃)	mg/L	1.1	0.044	A672421
Nitrite (NO ₂)	mg/L	<0.033	0.033	A672421
Calculated Total Dissolved Solids	mg/L	120	10	A672511
Misc. Inorganics				
Conductivity	uS/cm	230	2.0	A673697
pH	pH	7.48	N/A	A673695
Anions				
Alkalinity (PP as CaCO ₃)	mg/L	<1.0	1.0	A673696
Alkalinity (Total as CaCO ₃)	mg/L	86	1.0	A673696
Bicarbonate (HCO ₃)	mg/L	100	1.0	A673696
Carbonate (CO ₃)	mg/L	<1.0	1.0	A673696
Hydroxide (OH)	mg/L	<1.0	1.0	A673696
Chloride (Cl)	mg/L	6.4	1.0	A674325
Sulphate (SO ₄)	mg/L	20	1.0	A674325
Nutrients				
Nitrite (N)	mg/L	<0.010	0.010	A674585
Nitrate plus Nitrite (N)	mg/L	0.26	0.010	A674585
Lab Filtered Elements				
Dissolved Calcium (Ca)	mg/L	33	0.30	A674438
Dissolved Iron (Fe)	mg/L	<0.060	0.060	A674438
Dissolved Magnesium (Mg)	mg/L	4.8	0.20	A674438
Dissolved Manganese (Mn)	mg/L	<0.0040	0.0040	A674438
Dissolved Potassium (K)	mg/L	0.61	0.30	A674438
Dissolved Sodium (Na)	mg/L	5.4	0.50	A674438
RDL = Reportable Detection Limit				
N/A = Not Applicable				



**BUREAU
VERITAS**

Bureau Veritas Job #: C258103

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Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		AZA455		AZA456		AZA457	AZA458		
Sampling Date		2022/08/03 10:00		2022/08/03 10:00		2022/08/03 13:00	2022/08/03 14:00		
COC Number		669184-02-01		669184-02-01		669184-02-01	669184-02-01		
	UNITS	RBL-14	QC Batch	DUP B	QC Batch	RBL-13	RBL-16	RDL	QC Batch
Calculated Parameters									
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.171	A672423	0.311	A672423	0.059	0.087	0.020	A672423
Nutrients									
Total Nitrogen (N)	mg/L	0.36	A675717	0.49	A677098	0.33	0.34	0.020	A675717
RDL = Reportable Detection Limit									



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Your P.O. #: P2022-14

Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA455			AZA456		AZA457		
Sampling Date		2022/08/03 10:00			2022/08/03 10:00		2022/08/03 13:00		
COC Number		669184-02-01			669184-02-01		669184-02-01		
	UNITS	RBL-14	RDL	QC Batch	DUP B	RDL	RBL-13	RDL	QC Batch
Elements									
Total Cadmium (Cd)	ug/L	1.8	0.40	A673000	1.8	0.040	<0.020	0.020	A673000
Total Mercury (Hg)	ug/L	0.0047	0.0019	A675290	<0.0019	0.0019	<0.0019	0.0019	A675290
Total Aluminum (Al)	mg/L	21	0.060	A679168	10	0.0060	0.010	0.0030	A678191
Total Antimony (Sb)	mg/L	<0.012	0.012	A679168	<0.0012	0.0012	<0.00060	0.00060	A678191
Total Arsenic (As)	mg/L	0.014	0.0040	A679168	0.0070	0.00040	<0.00020	0.00020	A678191
Total Barium (Ba)	mg/L	0.21	0.010	A678259	0.19	0.010	<0.010	0.010	A678259
Total Beryllium (Be)	mg/L	<0.020	0.020	A679168	<0.0020	0.0020	<0.0010	0.0010	A678191
Total Boron (B)	mg/L	0.048	0.020	A678259	0.034	0.020	0.021	0.020	A678259
Total Calcium (Ca)	mg/L	580	1.5	A678259	650	1.5	34	0.30	A678259
Total Chromium (Cr)	mg/L	0.040	0.020	A679168	0.020	0.0020	<0.0010	0.0010	A678191
Total Cobalt (Co)	mg/L	0.020	0.0060	A679168	0.011	0.00060	<0.00030	0.00030	A678191
Total Copper (Cu)	mg/L	0.047	0.020	A679168	0.025	0.0020	<0.0010	0.0010	A678191
Total Iron (Fe)	mg/L	39	0.060	A678259	16	0.060	<0.060	0.060	A678259
Total Lead (Pb)	mg/L	0.093	0.0040	A679168	0.055	0.00040	<0.00020	0.00020	A678191
Total Lithium (Li)	mg/L	0.032	0.020	A678259	<0.020	0.020	<0.020	0.020	A678259
Total Magnesium (Mg)	mg/L	160	0.20	A678259	150	0.20	5.0	0.20	A678259
Total Manganese (Mn)	mg/L	1.4	0.0040	A678259	1.3	0.0040	<0.0040	0.0040	A678259
Total Molybdenum (Mo)	mg/L	<0.0040	0.0040	A679168	0.00062	0.00040	<0.00020	0.00020	A678191
Total Nickel (Ni)	mg/L	0.054	0.010	A679168	0.027	0.0010	<0.00050	0.00050	A678191
Total Phosphorus (P)	mg/L	1.0	0.10	A678259	0.72	0.10	<0.10	0.10	A678259
Total Potassium (K)	mg/L	6.5	0.30	A678259	3.8	0.30	0.58	0.30	A678259
Total Selenium (Se)	mg/L	<0.0040	0.0040	A679168	0.00066	0.00040	<0.00020	0.00020	A678191
Total Silicon (Si)	mg/L	32	0.10	A678259	15	0.10	0.65	0.10	A678259
Total Silver (Ag)	mg/L	<0.0020	0.0020	A679168	<0.00020	0.00020	<0.00010	0.00010	A678191
Total Sodium (Na)	mg/L	9.9	0.50	A678259	9.9	0.50	5.1	0.50	A678259
Total Strontium (Sr)	mg/L	0.83	0.020	A678259	0.98	0.020	0.087	0.020	A678259
Total Sulphur (S)	mg/L	2.5	0.20	A678259	2.1	0.20	6.2	0.20	A678259
Total Thallium (Tl)	mg/L	<0.0040	0.0040	A679168	<0.00040	0.00040	<0.00020	0.00020	A678191
Total Tin (Sn)	mg/L	<0.020	0.020	A679168	0.0028	0.0020	<0.0010	0.0010	A678191
Total Titanium (Ti)	mg/L	0.56	0.020	A679168	0.28	0.0020	<0.0010	0.0010	A678191
Total Uranium (U)	mg/L	<0.0020	0.0020	A679168	0.0011	0.00020	0.00022	0.00010	A678191
Total Vanadium (V)	mg/L	0.067	0.020	A679168	0.032	0.0020	<0.0010	0.0010	A678191
RDL = Reportable Detection Limit									



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VERITAS

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OUTCOME CONSULTANTS INC.

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Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA455			AZA456		AZA457		
Sampling Date		2022/08/03 10:00			2022/08/03 10:00		2022/08/03 13:00		
COC Number		669184-02-01			669184-02-01		669184-02-01		
	UNITS	RBL-14	RDL	QC Batch	DUP B	RDL	RBL-13	RDL	QC Batch
Total Zinc (Zn)	mg/L	1.5	0.060	A679168	0.24	0.0060	<0.0030	0.0030	A678191
RDL = Reportable Detection Limit									



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Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA458		
Sampling Date		2022/08/03 14:00		
COC Number		669184-02-01		
	UNITS	RBL-16	RDL	QC Batch
Elements				
Total Cadmium (Cd)	ug/L	<0.020	0.020	A673000
Total Mercury (Hg)	ug/L	<0.0019	0.0019	A675333
Total Aluminum (Al)	mg/L	0.034	0.0030	A678191
Total Antimony (Sb)	mg/L	<0.00060	0.00060	A678191
Total Arsenic (As)	mg/L	0.00020	0.00020	A678191
Total Barium (Ba)	mg/L	<0.010	0.010	A678259
Total Beryllium (Be)	mg/L	<0.0010	0.0010	A678191
Total Boron (B)	mg/L	0.023	0.020	A678259
Total Calcium (Ca)	mg/L	34	0.30	A678259
Total Chromium (Cr)	mg/L	<0.0010	0.0010	A678191
Total Cobalt (Co)	mg/L	<0.00030	0.00030	A678191
Total Copper (Cu)	mg/L	<0.0010	0.0010	A678191
Total Iron (Fe)	mg/L	0.072	0.060	A678259
Total Lead (Pb)	mg/L	<0.00020	0.00020	A678191
Total Lithium (Li)	mg/L	<0.020	0.020	A678259
Total Magnesium (Mg)	mg/L	5.2	0.20	A678259
Total Manganese (Mn)	mg/L	<0.0040	0.0040	A678259
Total Molybdenum (Mo)	mg/L	<0.00020	0.00020	A678191
Total Nickel (Ni)	mg/L	<0.00050	0.00050	A678191
Total Phosphorus (P)	mg/L	<0.10	0.10	A678259
Total Potassium (K)	mg/L	0.60	0.30	A678259
Total Selenium (Se)	mg/L	<0.00020	0.00020	A678191
Total Silicon (Si)	mg/L	0.91	0.10	A678259
Total Silver (Ag)	mg/L	<0.00010	0.00010	A678191
Total Sodium (Na)	mg/L	5.5	0.50	A678259
Total Strontium (Sr)	mg/L	0.087	0.020	A678259
Total Sulphur (S)	mg/L	6.3	0.20	A678259
Total Thallium (Tl)	mg/L	<0.00020	0.00020	A678191
Total Tin (Sn)	mg/L	<0.0010	0.0010	A678191
Total Titanium (Ti)	mg/L	0.0014	0.0010	A678191
Total Uranium (U)	mg/L	0.00024	0.00010	A678191
Total Vanadium (V)	mg/L	<0.0010	0.0010	A678191
RDL = Reportable Detection Limit				



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Sampler Initials: KV

REGULATED METALS + HG (CCME/AT1) - HGT-V

Bureau Veritas ID		AZA458		
Sampling Date		2022/08/03 14:00		
COC Number		669184-02-01		
	UNITS	RBL-16	RDL	QC Batch
Total Zinc (Zn)	mg/L	<0.0030	0.0030	A678191
RDL = Reportable Detection Limit				



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Sampler Initials: KV

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		AZA455		AZA456		AZA457	AZA458		
Sampling Date		2022/08/03 10:00		2022/08/03 10:00		2022/08/03 13:00	2022/08/03 14:00		
COC Number		669184-02-01		669184-02-01		669184-02-01	669184-02-01		
	UNITS	RBL-14	RDL	DUP B	RDL	RBL-13	RBL-16	RDL	QC Batch
Calculated Parameters									
Total Hardness (CaCO ₃)	mg/L	2120	0.50	2230	0.50	105	107	0.50	A675930
Elements									
Dissolved Cadmium (Cd)	ug/L	<0.020	0.020	<0.020	0.020	<0.020	<0.020	0.020	A672997
Misc. Inorganics									
Total Dissolved Solids	mg/L	200	10	200	10	130	130	10	A675114
Total Suspended Solids	mg/L	170 (1)	0.94	110 (1)	0.60	0.45	5.7	0.40	A675588
Metals									
Total Hex. Chromium (Cr 6+)	mg/L	<0.00099	0.00099	<0.00099	0.00099	<0.00099	<0.00099	0.00099	A675309
Nutrients									
Total Ammonia (N)	mg/L	0.071	0.015	0.069	0.015	<0.015	<0.015	0.015	A678530
Total Phosphorus (P)	mg/L	<0.0030	0.0030	0.035	0.0030	<0.0030	<0.0030	0.0030	A676061
Misc. Organics									
Oil and grease	mg/L	<2.0	2.0	<2.0	2.0	<2.0	<2.0	2.0	A669495
Phenols	mg/L	<0.0015	0.0015	<0.0015	0.0015	<0.0015	<0.0015	0.0015	A675533
RDL = Reportable Detection Limit									
(1) Detection limit raised based on sample volume used for analysis.									

BUREAU
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Sampler Initials: KV

SEMIVOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		AZA455	AZA456	AZA457	AZA458		
Sampling Date		2022/08/03 10:00	2022/08/03 10:00	2022/08/03 13:00	2022/08/03 14:00		
COC Number		669184-02-01	669184-02-01	669184-02-01	669184-02-01		
	UNITS	RBL-14	DUP B	RBL-13	RBL-16	RDL	QC Batch
Polycyclic Aromatics							
B[a]P TPE Total Potency Equivalents	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A672953
Acenaphthene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A674786
Acenaphthylene	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	A674786
Acridine	ug/L	<0.040	<0.040	<0.040	<0.040	0.040	A674786
Anthracene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A674786
Benzo(a)anthracene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
Benzo(b&j)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
Benzo(k)fluoranthene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
Benzo(g,h,i)perylene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
Benzo(c)phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A674786
Benzo(a)pyrene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A674786
Benzo(e)pyrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A674786
Chrysene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
Dibenz(a,h)anthracene	ug/L	<0.0075	<0.0075	<0.0075	<0.0075	0.0075	A674786
Fluoranthene	ug/L	<0.010	<0.010	<0.010	<0.010	0.010	A674786
Fluorene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A674786
Indeno(1,2,3-cd)pyrene	ug/L	<0.0085	<0.0085	<0.0085	<0.0085	0.0085	A674786
1-Methylnaphthalene	ug/L	0.23	0.27	<0.10	<0.10	0.10	A674786
2-Methylnaphthalene	ug/L	0.42	0.49	<0.10	<0.10	0.10	A674786
Naphthalene	ug/L	<0.10	0.10	<0.10	<0.10	0.10	A674786
Phenanthrene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A674786
Perylene	ug/L	<0.050	<0.050	<0.050	<0.050	0.050	A674786
Pyrene	ug/L	<0.020	<0.020	<0.020	<0.020	0.020	A674786
Quinoline	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	A674786
Surrogate Recovery (%)							
D10-ANTHRACENE (sur.)	%	112	126	122	127		A674786
D8-ACENAPHTHYLENE (sur.)	%	104	119	112	116		A674786
D8-NAPHTHALENE (sur.)	%	89	102	99	99		A674786
TERPHENYL-D14 (sur.)	%	152 (1)	176 (1)	160 (1)	172 (1)		A674786
RDL = Reportable Detection Limit							
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.							



BUREAU
VERITAS

Bureau Veritas Job #: C258103

Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		AZA455	AZA456	AZA457	AZA458		
Sampling Date		2022/08/03 10:00	2022/08/03 10:00	2022/08/03 13:00	2022/08/03 14:00		
COC Number		669184-02-01	669184-02-01	669184-02-01	669184-02-01		
	UNITS	RBL-14	DUP B	RBL-13	RBL-16	RDL	QC Batch
Lab Filtered Elements							
Dissolved Aluminum (Al)	mg/L	0.0038	0.0047	0.0039	<0.0030	0.0030	A674338
Dissolved Antimony (Sb)	mg/L	<0.00060	<0.00060	<0.00060	<0.00060	0.00060	A674338
Dissolved Arsenic (As)	mg/L	0.00022	0.00024	<0.00020	<0.00020	0.00020	A674338
Dissolved Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Cobalt (Co)	mg/L	<0.00030	<0.00030	<0.00030	<0.00030	0.00030	A674338
Dissolved Copper (Cu)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Lead (Pb)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	A674338
Dissolved Molybdenum (Mo)	mg/L	0.00048	0.00046	<0.00020	<0.00020	0.00020	A674338
Dissolved Nickel (Ni)	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	0.00050	A674338
Dissolved Selenium (Se)	mg/L	0.0010	0.00099	<0.00020	<0.00020	0.00020	A674338
Dissolved Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	0.00010	A674338
Dissolved Thallium (Tl)	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	0.00020	A674338
Dissolved Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Titanium (Ti)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Uranium (U)	mg/L	0.00037	0.00034	0.00020	0.00022	0.00010	A674338
Dissolved Vanadium (V)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	0.0010	A674338
Dissolved Zinc (Zn)	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	0.0030	A674338
RDL = Reportable Detection Limit							



GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
Package 2	5.0°C
Package 3	3.3°C
Package 4	3.0°C
Package 5	3.7°C

Sample AZA455 [RBL-14] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA456 [DUP B] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA457 [RBL-13] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample AZA458 [RBL-16] : Sample was analyzed past method specified hold time for NO₂ (N); NO₂ (N) + NO₃ (N) in Water. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

REGULATED METALS + HG (CCME/AT1) - HGT-V Comments

Sample AZA455 [RBL-14] Elements by ICPMS - Total: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample AZA456 [DUP B] Elements by ICPMS - Total: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.



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Bureau Veritas Job #: C258103
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Sampler Initials: KV

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A669495	ZSN	Spiked Blank	Oil and grease	2022/08/10		92	%	70 - 130
A669495	ZSN	Method Blank	Oil and grease	2022/08/10	<2.0		mg/L	
A673240	LSH	Matrix Spike	O-TERPHENYL (sur.)	2022/08/11		91	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/11		88	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/11		96	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/11		92	%	60 - 140
A673240	LSH	Spiked Blank	O-TERPHENYL (sur.)	2022/08/11		94	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/11		88	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2022/08/11		97	%	60 - 140
			F4 (C34-C50 Hydrocarbons)	2022/08/11		94	%	60 - 140
A673240	LSH	Method Blank	O-TERPHENYL (sur.)	2022/08/11		97	%	60 - 140
			F2 (C10-C16 Hydrocarbons)	2022/08/11	<0.10		mg/L	
			F3 (C16-C34 Hydrocarbons)	2022/08/11	<0.10		mg/L	
			F4 (C34-C50 Hydrocarbons)	2022/08/11	<0.20		mg/L	
A673240	LSH	RPD	F2 (C10-C16 Hydrocarbons)	2022/08/11	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2022/08/11	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2022/08/11	NC		%	30
A673695	MEL	Spiked Blank	pH	2022/08/09		100	%	97 - 103
A673695	MEL	RPD	pH	2022/08/09	0.53		%	N/A
A673696	MEL	Spiked Blank	Alkalinity (Total as CaCO3)	2022/08/09		96	%	80 - 120
A673696	MEL	Method Blank	Alkalinity (PP as CaCO3)	2022/08/09	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2022/08/09	<1.0		mg/L	
			Bicarbonate (HCO3)	2022/08/09	<1.0		mg/L	
			Carbonate (CO3)	2022/08/09	<1.0		mg/L	
			Hydroxide (OH)	2022/08/09	<1.0		mg/L	
A673696	MEL	RPD	Alkalinity (Total as CaCO3)	2022/08/09	3.2		%	20
			Bicarbonate (HCO3)	2022/08/09	3.2		%	20
			Carbonate (CO3)	2022/08/09	NC		%	20
A673697	MEL	Spiked Blank	Conductivity	2022/08/09		97	%	90 - 110
A673697	MEL	Method Blank	Conductivity	2022/08/09	<2.0		uS/cm	
A673697	MEL	RPD	Conductivity	2022/08/09	2.3		%	10
A674248	TOR	Matrix Spike	Chloride (Cl)	2022/08/09		106	%	80 - 120
			Sulphate (SO4)	2022/08/09		NC	%	80 - 120
A674248	TOR	Spiked Blank	Chloride (Cl)	2022/08/09		102	%	80 - 120
			Sulphate (SO4)	2022/08/09		98	%	80 - 120
A674248	TOR	Method Blank	Chloride (Cl)	2022/08/09	<1.0		mg/L	
			Sulphate (SO4)	2022/08/09	<1.0		mg/L	
A674248	TOR	RPD	Chloride (Cl)	2022/08/09	0.14		%	20
			Sulphate (SO4)	2022/08/09	0.79		%	20
A674325	CTU	Matrix Spike	Chloride (Cl)	2022/08/09		102	%	80 - 120
			Sulphate (SO4)	2022/08/09		NC	%	80 - 120
A674325	CTU	Spiked Blank	Chloride (Cl)	2022/08/09		105	%	80 - 120
			Sulphate (SO4)	2022/08/09		97	%	80 - 120
A674325	CTU	Method Blank	Chloride (Cl)	2022/08/09	<1.0		mg/L	
			Sulphate (SO4)	2022/08/09	<1.0		mg/L	
A674325	CTU	RPD	Chloride (Cl)	2022/08/09	0.11		%	20
			Sulphate (SO4)	2022/08/09	2.0		%	20
A674327	MEL	Spiked Blank	pH	2022/08/09		100	%	97 - 103
A674327	MEL	RPD	pH	2022/08/09	0.74		%	N/A
A674328	MEL	Spiked Blank	Alkalinity (Total as CaCO3)	2022/08/09		93	%	80 - 120
A674328	MEL	Method Blank	Alkalinity (PP as CaCO3)	2022/08/09	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2022/08/09	<1.0		mg/L	
			Bicarbonate (HCO3)	2022/08/09	<1.0		mg/L	



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674328	MEL	RPD	Carbonate (CO3)	2022/08/09	<1.0		mg/L	
			Hydroxide (OH)	2022/08/09	<1.0		mg/L	
			Alkalinity (PP as CaCO3)	2022/08/09	NC		%	20
			Alkalinity (Total as CaCO3)	2022/08/09	0.65		%	20
			Bicarbonate (HCO3)	2022/08/09	0.65		%	20
			Carbonate (CO3)	2022/08/09	NC		%	20
A674329	MEL	Spiked Blank	Hydroxide (OH)	2022/08/09	NC		%	20
			Conductivity	2022/08/09		97	%	90 - 110
A674329	MEL	Method Blank	Conductivity	2022/08/09	<2.0		uS/cm	
A674329	MEL	RPD	Conductivity	2022/08/09	3.6		%	10
A674338	STI	Matrix Spike	Dissolved Aluminum (Al)	2022/08/10		80	%	80 - 120
			Dissolved Antimony (Sb)	2022/08/10		110	%	80 - 120
			Dissolved Arsenic (As)	2022/08/10		104	%	80 - 120
			Dissolved Beryllium (Be)	2022/08/10		120	%	80 - 120
			Dissolved Chromium (Cr)	2022/08/10		107	%	80 - 120
			Dissolved Cobalt (Co)	2022/08/10		105	%	80 - 120
			Dissolved Copper (Cu)	2022/08/10		105	%	80 - 120
			Dissolved Lead (Pb)	2022/08/10		112	%	80 - 120
			Dissolved Molybdenum (Mo)	2022/08/10		113	%	80 - 120
			Dissolved Nickel (Ni)	2022/08/10		105	%	80 - 120
			Dissolved Selenium (Se)	2022/08/10		101	%	80 - 120
			Dissolved Silver (Ag)	2022/08/10		99	%	80 - 120
			Dissolved Thallium (Tl)	2022/08/10		114	%	80 - 120
			Dissolved Tin (Sn)	2022/08/10		106	%	80 - 120
			Dissolved Titanium (Ti)	2022/08/10		109	%	80 - 120
			Dissolved Uranium (U)	2022/08/10		104	%	80 - 120
			Dissolved Vanadium (V)	2022/08/10		111	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/10		108	%	80 - 120
			Dissolved Aluminum (Al)	2022/08/10		95	%	80 - 120
			Dissolved Antimony (Sb)	2022/08/10		105	%	80 - 120
A674338	STI	Spiked Blank	Dissolved Arsenic (As)	2022/08/10		100	%	80 - 120
			Dissolved Beryllium (Be)	2022/08/10		109	%	80 - 120
			Dissolved Chromium (Cr)	2022/08/10		102	%	80 - 120
			Dissolved Cobalt (Co)	2022/08/10		101	%	80 - 120
			Dissolved Copper (Cu)	2022/08/10		100	%	80 - 120
			Dissolved Lead (Pb)	2022/08/10		106	%	80 - 120
			Dissolved Molybdenum (Mo)	2022/08/10		101	%	80 - 120
			Dissolved Nickel (Ni)	2022/08/10		100	%	80 - 120
			Dissolved Selenium (Se)	2022/08/10		100	%	80 - 120
			Dissolved Silver (Ag)	2022/08/10		97	%	80 - 120
			Dissolved Thallium (Tl)	2022/08/10		105	%	80 - 120
			Dissolved Tin (Sn)	2022/08/10		101	%	80 - 120
			Dissolved Titanium (Ti)	2022/08/10		100	%	80 - 120
			Dissolved Uranium (U)	2022/08/10		96	%	80 - 120
			Dissolved Vanadium (V)	2022/08/10		103	%	80 - 120
			Dissolved Zinc (Zn)	2022/08/10		104	%	80 - 120
			Dissolved Aluminum (Al)	2022/08/11	<0.0030		mg/L	
			Dissolved Antimony (Sb)	2022/08/11	<0.00060		mg/L	
			Dissolved Arsenic (As)	2022/08/11	<0.00020		mg/L	
			Dissolved Beryllium (Be)	2022/08/11	<0.0010		mg/L	
A674338	STI	Method Blank	Dissolved Chromium (Cr)	2022/08/11	<0.0010		mg/L	
			Dissolved Cobalt (Co)	2022/08/11	<0.00030		mg/L	
			Dissolved Copper (Cu)	2022/08/11	<0.0010		mg/L	



BUREAU
VERITAS

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Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674338	STI	RPD	Dissolved Lead (Pb)	2022/08/11	<0.00020		mg/L	
			Dissolved Molybdenum (Mo)	2022/08/11	<0.00020		mg/L	
			Dissolved Nickel (Ni)	2022/08/11	<0.00050		mg/L	
			Dissolved Selenium (Se)	2022/08/11	<0.00020		mg/L	
			Dissolved Silver (Ag)	2022/08/11	<0.00010		mg/L	
			Dissolved Thallium (Tl)	2022/08/11	<0.00020		mg/L	
			Dissolved Tin (Sn)	2022/08/11	<0.0010		mg/L	
			Dissolved Titanium (Ti)	2022/08/11	<0.0010		mg/L	
			Dissolved Uranium (U)	2022/08/11	<0.00010		mg/L	
			Dissolved Vanadium (V)	2022/08/11	<0.0010		mg/L	
			Dissolved Zinc (Zn)	2022/08/11	<0.0030		mg/L	
			Dissolved Aluminum (Al)	2022/08/10	10		%	20
			Dissolved Antimony (Sb)	2022/08/10	NC		%	20
			Dissolved Arsenic (As)	2022/08/10	2.0		%	20
			Dissolved Beryllium (Be)	2022/08/10	NC		%	20
			Dissolved Chromium (Cr)	2022/08/10	NC		%	20
			Dissolved Cobalt (Co)	2022/08/10	0.59		%	20
			Dissolved Copper (Cu)	2022/08/10	NC		%	20
			Dissolved Lead (Pb)	2022/08/10	NC		%	20
			Dissolved Molybdenum (Mo)	2022/08/10	3.6		%	20
			Dissolved Nickel (Ni)	2022/08/10	3.5		%	20
			Dissolved Selenium (Se)	2022/08/10	NC		%	20
			Dissolved Silver (Ag)	2022/08/10	NC		%	20
			Dissolved Thallium (Tl)	2022/08/10	NC		%	20
			Dissolved Tin (Sn)	2022/08/10	NC		%	20
			Dissolved Titanium (Ti)	2022/08/10	1.6		%	20
			Dissolved Uranium (U)	2022/08/10	0.63		%	20
			Dissolved Vanadium (V)	2022/08/10	5.6		%	20
			Dissolved Zinc (Zn)	2022/08/10	NC		%	20
A674438	MPU	Matrix Spike	Dissolved Calcium (Ca)	2022/08/09		NC	%	80 - 120
			Dissolved Iron (Fe)	2022/08/09		106	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/09		99	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/09		103	%	80 - 120
			Dissolved Potassium (K)	2022/08/09		100	%	80 - 120
A674438	MPU	Spiked Blank	Dissolved Sodium (Na)	2022/08/09		99	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/09		97	%	80 - 120
			Dissolved Iron (Fe)	2022/08/09		96	%	80 - 120
			Dissolved Magnesium (Mg)	2022/08/09		96	%	80 - 120
			Dissolved Manganese (Mn)	2022/08/09		94	%	80 - 120
A674438	MPU	Method Blank	Dissolved Potassium (K)	2022/08/09		97	%	80 - 120
			Dissolved Sodium (Na)	2022/08/09		95	%	80 - 120
			Dissolved Calcium (Ca)	2022/08/09	<0.30		mg/L	
			Dissolved Iron (Fe)	2022/08/09	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2022/08/09	<0.20		mg/L	
A674438	MPU	RPD	Dissolved Manganese (Mn)	2022/08/09	<0.0040		mg/L	
			Dissolved Potassium (K)	2022/08/09	<0.30		mg/L	
			Dissolved Sodium (Na)	2022/08/09	<0.50		mg/L	
			Dissolved Calcium (Ca)	2022/08/09	0.87		%	20
			Dissolved Iron (Fe)	2022/08/09	0.58		%	20
			Dissolved Magnesium (Mg)	2022/08/09	0.27		%	20
			Dissolved Manganese (Mn)	2022/08/09	0.93		%	20
			Dissolved Potassium (K)	2022/08/09	1.1		%	20
			Dissolved Sodium (Na)	2022/08/09	0.93		%	20



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Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674545	QW1	Matrix Spike	1,4-Difluorobenzene (sur.)	2022/08/11		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		93	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		100	%	50 - 140
			Benzene	2022/08/11		108	%	50 - 140
			Toluene	2022/08/11		106	%	50 - 140
			Ethylbenzene	2022/08/11		105	%	50 - 140
			m & p-Xylene	2022/08/11		105	%	50 - 140
			o-Xylene	2022/08/11		100	%	50 - 140
A674545	QW1	Spiked Blank	F1 (C6-C10)	2022/08/11		81	%	60 - 140
			1,4-Difluorobenzene (sur.)	2022/08/11		99	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		90	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		96	%	50 - 140
			Benzene	2022/08/11		103	%	60 - 130
			Toluene	2022/08/11		101	%	60 - 130
			Ethylbenzene	2022/08/11		98	%	60 - 130
			m & p-Xylene	2022/08/11		98	%	60 - 130
A674545	QW1	Method Blank	o-Xylene	2022/08/11		93	%	60 - 130
			F1 (C6-C10)	2022/08/11		92	%	60 - 140
			1,4-Difluorobenzene (sur.)	2022/08/11		104	%	50 - 140
			4-Bromofluorobenzene (sur.)	2022/08/11		98	%	50 - 140
			D4-1,2-Dichloroethane (sur.)	2022/08/11		97	%	50 - 140
			Benzene	2022/08/11	<0.40		ug/L	
			Toluene	2022/08/11	<0.40		ug/L	
			Ethylbenzene	2022/08/11	<0.40		ug/L	
A674545	QW1	RPD	m & p-Xylene	2022/08/11	<0.80		ug/L	
			o-Xylene	2022/08/11	<0.40		ug/L	
			F1 (C6-C10)	2022/08/11	<100		ug/L	
			Benzene	2022/08/11	NC		%	30
			Toluene	2022/08/11	NC		%	30
			Ethylbenzene	2022/08/11	NC		%	30
			m & p-Xylene	2022/08/11	NC		%	30
			o-Xylene	2022/08/11	NC		%	30
A674585	SKM	Matrix Spike	F1 (C6-C10)	2022/08/11	NC		%	30
			Nitrite (N)	2022/08/09		95	%	80 - 120
A674585	SKM	Spiked Blank	Nitrate plus Nitrite (N)	2022/08/09		116	%	80 - 120
			Nitrite (N)	2022/08/09		99	%	80 - 120
A674585	SKM	Method Blank	Nitrate plus Nitrite (N)	2022/08/09		102	%	80 - 120
			Nitrite (N)	2022/08/09	<0.010		mg/L	
A674585	SKM	RPD	Nitrate plus Nitrite (N)	2022/08/09	<0.010		mg/L	
			Nitrite (N)	2022/08/09	NC		%	20
A674589	SKM	Matrix Spike [AZA457-02]	Nitrate plus Nitrite (N)	2022/08/09	NC		%	20
			Nitrite (N)	2022/08/09		96	%	80 - 120
A674589	SKM	Spiked Blank	Nitrate plus Nitrite (N)	2022/08/09		98	%	80 - 120
			Nitrite (N)	2022/08/09		99	%	80 - 120
A674589	SKM	Method Blank	Nitrate plus Nitrite (N)	2022/08/09		100	%	80 - 120
			Nitrite (N)	2022/08/09	<0.010		mg/L	
A674589	SKM	RPD [AZA457-02]	Nitrate plus Nitrite (N)	2022/08/09	<0.010		mg/L	
			Nitrite (N)	2022/08/09	NC		%	20
A674786	NK3	Matrix Spike	Nitrate plus Nitrite (N)	2022/08/09	0.85		%	20
			D10-ANTHRACENE (sur.)	2022/08/11		127	%	50 - 130
A674786	NK3	Matrix Spike	D8-ACENAPHTHYLENE (sur.)	2022/08/11		119	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/11		103	%	50 - 130
A674786	NK3	Matrix Spike	TERPHENYL-D14 (sur.)	2022/08/11		180 (1)	%	50 - 130



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OUTCOME CONSULTANTS INC.
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674786	NK3	Spiked Blank	Acenaphthene	2022/08/11		105	%	50 - 130
			Acenaphthylene	2022/08/11		107	%	50 - 130
			Acridine	2022/08/11		103	%	50 - 130
			Anthracene	2022/08/11		109	%	50 - 130
			Benzo(a)anthracene	2022/08/11		124	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/11		120	%	50 - 130
			Benzo(k)fluoranthene	2022/08/11		120	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/11		95	%	50 - 130
			Benzo(c)phenanthrene	2022/08/11		128	%	50 - 130
			Benzo(a)pyrene	2022/08/11		120	%	50 - 130
			Benzo(e)pyrene	2022/08/11		110	%	50 - 130
			Chrysene	2022/08/11		119	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/11		104	%	50 - 130
			Fluoranthene	2022/08/11		106	%	50 - 130
			Fluorene	2022/08/11		111	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/11		104	%	50 - 130
			1-Methylnaphthalene	2022/08/11		83	%	50 - 130
			2-Methylnaphthalene	2022/08/11		102	%	50 - 130
			Naphthalene	2022/08/11		97	%	50 - 130
			Phenanthrene	2022/08/11		107	%	50 - 130
			Perylene	2022/08/11		108	%	50 - 130
			Pyrene	2022/08/11		106	%	50 - 130
			Quinoline	2022/08/11		80	%	50 - 130
			D10-ANTHRACENE (sur.)	2022/08/11		125	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/11		110	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/11		87	%	50 - 130
			TERPHENYL-D14 (sur.)	2022/08/11		153 (1)	%	50 - 130
			Acenaphthene	2022/08/11		93	%	50 - 130
			Acenaphthylene	2022/08/11		96	%	50 - 130
			Acridine	2022/08/11		94	%	50 - 130
			Anthracene	2022/08/11		99	%	50 - 130
			Benzo(a)anthracene	2022/08/11		107	%	50 - 130
			Benzo(b&j)fluoranthene	2022/08/11		102	%	50 - 130
			Benzo(k)fluoranthene	2022/08/11		103	%	50 - 130
			Benzo(g,h,i)perylene	2022/08/11		78	%	50 - 130
			Benzo(c)phenanthrene	2022/08/11		108	%	50 - 130
			Benzo(a)pyrene	2022/08/11		103	%	50 - 130
			Benzo(e)pyrene	2022/08/11		96	%	50 - 130
			Chrysene	2022/08/11		101	%	50 - 130
			Dibenz(a,h)anthracene	2022/08/11		87	%	50 - 130
			Fluoranthene	2022/08/11		97	%	50 - 130
			Fluorene	2022/08/11		101	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2022/08/11		87	%	50 - 130
			1-Methylnaphthalene	2022/08/11		72	%	50 - 130
			2-Methylnaphthalene	2022/08/11		90	%	50 - 130
			Naphthalene	2022/08/11		86	%	50 - 130
			Phenanthrene	2022/08/11		97	%	50 - 130
			Perylene	2022/08/11		95	%	50 - 130
			Pyrene	2022/08/11		97	%	50 - 130
			Quinoline	2022/08/11		78	%	50 - 130
A674786	NK3	Method Blank	D10-ANTHRACENE (sur.)	2022/08/11		123	%	50 - 130
			D8-ACENAPHTHYLENE (sur.)	2022/08/11		100	%	50 - 130
			D8-NAPHTHALENE (sur.)	2022/08/11		68	%	50 - 130



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A674786	NK3	RPD	TERPHENYL-D14 (sur.)	2022/08/11		162 (1)	%	50 - 130
			Acenaphthene	2022/08/11	<0.10		ug/L	
			Acenaphthylene	2022/08/11	<0.10		ug/L	
			Acridine	2022/08/11	<0.040		ug/L	
			Anthracene	2022/08/11	<0.010		ug/L	
			Benzo(a)anthracene	2022/08/11	<0.0085		ug/L	
			Benzo(b&j)fluoranthene	2022/08/11	<0.0085		ug/L	
			Benzo(k)fluoranthene	2022/08/11	<0.0085		ug/L	
			Benzo(g,h,i)perylene	2022/08/11	<0.0085		ug/L	
			Benzo(c)phenanthrene	2022/08/11	<0.050		ug/L	
			Benzo(a)pyrene	2022/08/11	<0.0075		ug/L	
			Benzo(e)pyrene	2022/08/11	<0.050		ug/L	
			Chrysene	2022/08/11	<0.0085		ug/L	
			Dibenz(a,h)anthracene	2022/08/11	<0.0075		ug/L	
			Fluoranthene	2022/08/11	<0.010		ug/L	
			Fluorene	2022/08/11	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2022/08/11	<0.0085		ug/L	
			1-Methylnaphthalene	2022/08/11	<0.10		ug/L	
			2-Methylnaphthalene	2022/08/11	<0.10		ug/L	
			Naphthalene	2022/08/11	<0.10		ug/L	
			Phenanthrene	2022/08/11	<0.050		ug/L	
			Perylene	2022/08/11	<0.050		ug/L	
			Pyrene	2022/08/11	<0.020		ug/L	
			Quinoline	2022/08/11	<0.20		ug/L	
			Acenaphthene	2022/08/11	NC		%	30
			Acenaphthylene	2022/08/11	NC		%	30
			Acridine	2022/08/11	NC		%	30
			Anthracene	2022/08/11	NC		%	30
			Benzo(a)anthracene	2022/08/11	NC		%	30
			Benzo(b&j)fluoranthene	2022/08/11	NC		%	30
			Benzo(k)fluoranthene	2022/08/11	NC		%	30
			Benzo(g,h,i)perylene	2022/08/11	NC		%	30
			Benzo(c)phenanthrene	2022/08/11	NC		%	30
			Benzo(a)pyrene	2022/08/11	NC		%	30
			Benzo(e)pyrene	2022/08/11	NC		%	30
			Chrysene	2022/08/11	NC		%	30
			Dibenz(a,h)anthracene	2022/08/11	NC		%	30
			Fluoranthene	2022/08/11	NC		%	30
			Fluorene	2022/08/11	NC		%	30
			Indeno(1,2,3-cd)pyrene	2022/08/11	NC		%	30
			1-Methylnaphthalene	2022/08/11	NC		%	30
			2-Methylnaphthalene	2022/08/11	NC		%	30
			Naphthalene	2022/08/11	NC		%	30
			Phenanthrene	2022/08/11	NC		%	30
			Perylene	2022/08/11	NC		%	30
			Pyrene	2022/08/11	NC		%	30
			Quinoline	2022/08/11	NC		%	30
A675114	GOC	Matrix Spike	Total Dissolved Solids	2022/08/10		NC	%	80 - 120
A675114	GOC	Spiked Blank	Total Dissolved Solids	2022/08/10		102	%	80 - 120
A675114	GOC	Method Blank	Total Dissolved Solids	2022/08/10	<10		mg/L	
A675114	GOC	RPD	Total Dissolved Solids	2022/08/10	1.6		%	20
A675290	JAB	Matrix Spike	Total Mercury (Hg)	2022/08/10		98	%	80 - 120
A675290	JAB	Spiked Blank	Total Mercury (Hg)	2022/08/10		102	%	80 - 120



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A675290	JAB	Method Blank	Total Mercury (Hg)	2022/08/10	<0.0019		ug/L	
A675290	JAB	RPD	Total Mercury (Hg)	2022/08/10	NC		%	20
A675309	FM0	Matrix Spike [AZA456-05]	Total Hex. Chromium (Cr 6+)	2022/08/11		102	%	80 - 120
A675309	FM0	Spiked Blank	Total Hex. Chromium (Cr 6+)	2022/08/11		105	%	80 - 120
A675309	FM0	Method Blank	Total Hex. Chromium (Cr 6+)	2022/08/11	<0.00099		mg/L	
A675309	FM0	RPD [AZA456-05]	Total Hex. Chromium (Cr 6+)	2022/08/11	NC		%	20
A675333	JAB	Matrix Spike	Total Mercury (Hg)	2022/08/10		109	%	80 - 120
A675333	JAB	Spiked Blank	Total Mercury (Hg)	2022/08/10		99	%	80 - 120
A675333	JAB	Method Blank	Total Mercury (Hg)	2022/08/10	<0.0019		ug/L	
A675333	JAB	RPD	Total Mercury (Hg)	2022/08/10	NC		%	20
A675533	TMU	Matrix Spike	Phenols	2022/08/10		83	%	80 - 120
A675533	TMU	Spiked Blank	Phenols	2022/08/10		93	%	80 - 120
A675533	TMU	Method Blank	Phenols	2022/08/10	<0.0015		mg/L	
A675533	TMU	RPD	Phenols	2022/08/10	NC		%	20
A675588	HE1	Matrix Spike	Total Suspended Solids	2022/08/10		NC (2)	%	80 - 120
A675588	HE1	Spiked Blank	Total Suspended Solids	2022/08/10		89	%	80 - 120
A675588	HE1	Method Blank	Total Suspended Solids	2022/08/10	<0.40		mg/L	
A675588	HE1	RPD	Total Suspended Solids	2022/08/10	15 (2)		%	20
A675717	MAP	Matrix Spike	Total Nitrogen (N)	2022/08/10		101	%	80 - 120
A675717	MAP	QC Standard	Total Nitrogen (N)	2022/08/10		102	%	80 - 120
A675717	MAP	Spiked Blank	Total Nitrogen (N)	2022/08/10		102	%	80 - 120
A675717	MAP	Method Blank	Total Nitrogen (N)	2022/08/10	<0.020		mg/L	
A675717	MAP	RPD	Total Nitrogen (N)	2022/08/10	NC		%	20
A676061	MAP	Matrix Spike	Total Phosphorus (P)	2022/08/12		NC	%	80 - 120
A676061	MAP	QC Standard	Total Phosphorus (P)	2022/08/11		92	%	80 - 120
A676061	MAP	Spiked Blank	Total Phosphorus (P)	2022/08/11		102	%	80 - 120
A676061	MAP	Method Blank	Total Phosphorus (P)	2022/08/11	<0.0030		mg/L	
A676061	MAP	RPD	Total Phosphorus (P)	2022/08/12	3.0		%	20
A677098	MAP	Matrix Spike	Total Nitrogen (N)	2022/08/11		111	%	80 - 120
A677098	MAP	QC Standard	Total Nitrogen (N)	2022/08/11		100	%	80 - 120
A677098	MAP	Spiked Blank	Total Nitrogen (N)	2022/08/11		104	%	80 - 120
A677098	MAP	Method Blank	Total Nitrogen (N)	2022/08/11	<0.020		mg/L	
A677098	MAP	RPD	Total Nitrogen (N)	2022/08/11	2.3		%	20
A678191	RY3	Matrix Spike [AZA458-03]	Total Aluminum (Al)	2022/08/14		118	%	80 - 120
			Total Antimony (Sb)	2022/08/14		106	%	80 - 120
			Total Arsenic (As)	2022/08/14		98	%	80 - 120
			Total Beryllium (Be)	2022/08/14		93	%	80 - 120
			Total Chromium (Cr)	2022/08/14		98	%	80 - 120
			Total Cobalt (Co)	2022/08/14		98	%	80 - 120
			Total Copper (Cu)	2022/08/14		97	%	80 - 120
			Total Lead (Pb)	2022/08/14		101	%	80 - 120
			Total Molybdenum (Mo)	2022/08/14		102	%	80 - 120
			Total Nickel (Ni)	2022/08/14		98	%	80 - 120
			Total Selenium (Se)	2022/08/14		101	%	80 - 120
			Total Silver (Ag)	2022/08/14		101	%	80 - 120
			Total Thallium (Tl)	2022/08/14		103	%	80 - 120
			Total Tin (Sn)	2022/08/14		103	%	80 - 120
			Total Titanium (Ti)	2022/08/14		100	%	80 - 120
			Total Uranium (U)	2022/08/14		101	%	80 - 120
			Total Vanadium (V)	2022/08/14		100	%	80 - 120
			Total Zinc (Zn)	2022/08/14		99	%	80 - 120
A678191	RY3	Spiked Blank	Total Aluminum (Al)	2022/08/13		108	%	80 - 120
			Total Antimony (Sb)	2022/08/13		110	%	80 - 120



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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A678191	RY3	Method Blank	Total Arsenic (As)	2022/08/13		100	%	80 - 120
			Total Beryllium (Be)	2022/08/13		93	%	80 - 120
			Total Chromium (Cr)	2022/08/13		101	%	80 - 120
			Total Cobalt (Co)	2022/08/13		101	%	80 - 120
			Total Copper (Cu)	2022/08/13		101	%	80 - 120
			Total Lead (Pb)	2022/08/13		106	%	80 - 120
			Total Molybdenum (Mo)	2022/08/13		104	%	80 - 120
			Total Nickel (Ni)	2022/08/13		101	%	80 - 120
			Total Selenium (Se)	2022/08/13		106	%	80 - 120
			Total Silver (Ag)	2022/08/13		104	%	80 - 120
			Total Thallium (Tl)	2022/08/13		106	%	80 - 120
			Total Tin (Sn)	2022/08/13		106	%	80 - 120
			Total Titanium (Ti)	2022/08/13		100	%	80 - 120
			Total Uranium (U)	2022/08/13		104	%	80 - 120
			Total Vanadium (V)	2022/08/13		103	%	80 - 120
			Total Zinc (Zn)	2022/08/13		102	%	80 - 120
			Total Aluminum (Al)	2022/08/14	<0.0030		mg/L	
			Total Antimony (Sb)	2022/08/14	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/14	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/14	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/14	<0.0010		mg/L	
A678191	RY3	RPD	Total Cobalt (Co)	2022/08/14	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/14	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/14	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/14	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/14	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/14	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/14	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/14	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/14	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/14	<0.0010		mg/L	
			Total Uranium (U)	2022/08/14	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/14	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/14	<0.0030		mg/L	
			Total Aluminum (Al)	2022/08/14	6.8		%	20
			Total Antimony (Sb)	2022/08/14	NC		%	20
			Total Arsenic (As)	2022/08/14	NC		%	20
			Total Beryllium (Be)	2022/08/14	NC		%	20
			Total Chromium (Cr)	2022/08/14	NC		%	20
			Total Cobalt (Co)	2022/08/14	NC		%	20
			Total Copper (Cu)	2022/08/14	3.7		%	20
			Total Lead (Pb)	2022/08/14	NC		%	20
A678259	JAB	Matrix Spike	Total Molybdenum (Mo)	2022/08/14	NC		%	20
			Total Nickel (Ni)	2022/08/14	NC		%	20
			Total Selenium (Se)	2022/08/14	NC		%	20
			Total Silver (Ag)	2022/08/14	NC		%	20
			Total Thallium (Tl)	2022/08/14	NC		%	20
			Total Tin (Sn)	2022/08/14	NC		%	20
			Total Titanium (Ti)	2022/08/14	NC		%	20
			Total Uranium (U)	2022/08/14	NC		%	20
			Total Vanadium (V)	2022/08/14	NC		%	20
			Total Zinc (Zn)	2022/08/14	11		%	20
			Total Barium (Ba)	2022/08/12		105	%	80 - 120



**BUREAU
VERITAS**

Bureau Veritas Job #: C258103
Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.
Client Project #: RESOLUTE LANDFILLS GW/SW
Your P.O. #: P2022-14
Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A678259	JAB	Spiked Blank	Total Boron (B)	2022/08/12		109	%	80 - 120
			Total Calcium (Ca)	2022/08/12		NC	%	80 - 120
			Total Iron (Fe)	2022/08/12		121 (1)	%	80 - 120
			Total Lithium (Li)	2022/08/12		109	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		NC	%	80 - 120
			Total Manganese (Mn)	2022/08/12		118	%	80 - 120
			Total Phosphorus (P)	2022/08/12		110	%	80 - 120
			Total Potassium (K)	2022/08/12		116	%	80 - 120
			Total Silicon (Si)	2022/08/12		114	%	80 - 120
			Total Sodium (Na)	2022/08/12		NC	%	80 - 120
			Total Strontium (Sr)	2022/08/12		100	%	80 - 120
			Total Sulphur (S)	2022/08/12		114	%	80 - 120
			Total Barium (Ba)	2022/08/12		103	%	80 - 120
			Total Boron (B)	2022/08/12		105	%	80 - 120
			Total Calcium (Ca)	2022/08/12		101	%	80 - 120
			Total Iron (Fe)	2022/08/12		113	%	80 - 120
			Total Lithium (Li)	2022/08/12		105	%	80 - 120
			Total Magnesium (Mg)	2022/08/12		104	%	80 - 120
			Total Manganese (Mn)	2022/08/12		111	%	80 - 120
			Total Phosphorus (P)	2022/08/12		104	%	80 - 120
			Total Potassium (K)	2022/08/12		110	%	80 - 120
			Total Silicon (Si)	2022/08/12		110	%	80 - 120
			Total Sodium (Na)	2022/08/12		102	%	80 - 120
			Total Strontium (Sr)	2022/08/12		98	%	80 - 120
			Total Sulphur (S)	2022/08/12		107	%	80 - 120
A678259	JAB	Method Blank	Total Barium (Ba)	2022/08/13	<0.010		mg/L	
			Total Boron (B)	2022/08/13	<0.020		mg/L	
			Total Calcium (Ca)	2022/08/13	<0.30		mg/L	
			Total Iron (Fe)	2022/08/13	<0.060		mg/L	
			Total Lithium (Li)	2022/08/13	<0.020		mg/L	
			Total Magnesium (Mg)	2022/08/13	<0.20		mg/L	
			Total Manganese (Mn)	2022/08/13	<0.0040		mg/L	
			Total Phosphorus (P)	2022/08/13	<0.10		mg/L	
			Total Potassium (K)	2022/08/13	<0.30		mg/L	
			Total Silicon (Si)	2022/08/13	<0.10		mg/L	
			Total Sodium (Na)	2022/08/13	<0.50		mg/L	
			Total Strontium (Sr)	2022/08/13	<0.020		mg/L	
			Total Sulphur (S)	2022/08/13	<0.20		mg/L	
			Total Barium (Ba)	2022/08/13	NC		%	20
A678259	JAB	RPD	Total Boron (B)	2022/08/13	0.63		%	20
			Total Calcium (Ca)	2022/08/13	NC		%	20
			Total Iron (Fe)	2022/08/13	5.8		%	20
			Total Lithium (Li)	2022/08/13	NC		%	20
			Total Magnesium (Mg)	2022/08/13	NC		%	20
			Total Manganese (Mn)	2022/08/13	NC		%	20
			Total Phosphorus (P)	2022/08/13	NC		%	20
			Total Potassium (K)	2022/08/13	NC		%	20
			Total Silicon (Si)	2022/08/13	5.8		%	20
			Total Sodium (Na)	2022/08/13	1.0		%	20
			Total Strontium (Sr)	2022/08/13	NC		%	20
			Total Sulphur (S)	2022/08/13	NC		%	20
A678530	ACR	Matrix Spike	Total Ammonia (N)	2022/08/13		113	%	80 - 120
A678530	ACR	Spiked Blank	Total Ammonia (N)	2022/08/13		100	%	80 - 120



BUREAU
VERITAS

Bureau Veritas Job #: C258103

Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
A678530	ACR	Method Blank	Total Ammonia (N)	2022/08/13	<0.015		mg/L	
A678530	ACR	RPD	Total Ammonia (N)	2022/08/13	1.3		%	20
A679168	MKJ	Spiked Blank	Total Aluminum (Al)	2022/08/12		97	%	80 - 120
			Total Antimony (Sb)	2022/08/12		102	%	80 - 120
			Total Arsenic (As)	2022/08/12		96	%	80 - 120
			Total Beryllium (Be)	2022/08/12		90	%	80 - 120
			Total Chromium (Cr)	2022/08/12		96	%	80 - 120
			Total Cobalt (Co)	2022/08/12		97	%	80 - 120
			Total Copper (Cu)	2022/08/12		97	%	80 - 120
			Total Lead (Pb)	2022/08/12		99	%	80 - 120
			Total Molybdenum (Mo)	2022/08/12		97	%	80 - 120
			Total Nickel (Ni)	2022/08/12		96	%	80 - 120
			Total Selenium (Se)	2022/08/12		100	%	80 - 120
			Total Silver (Ag)	2022/08/12		98	%	80 - 120
			Total Thallium (Tl)	2022/08/12		98	%	80 - 120
			Total Tin (Sn)	2022/08/12		98	%	80 - 120
			Total Titanium (Ti)	2022/08/12		98	%	80 - 120
			Total Uranium (U)	2022/08/12		98	%	80 - 120
			Total Vanadium (V)	2022/08/12		97	%	80 - 120
			Total Zinc (Zn)	2022/08/12		96	%	80 - 120
A679168	MKJ	Method Blank	Total Aluminum (Al)	2022/08/12	0.0034, RDL=0.0030 (3)		mg/L	
			Total Antimony (Sb)	2022/08/12	<0.00060		mg/L	
			Total Arsenic (As)	2022/08/12	<0.00020		mg/L	
			Total Beryllium (Be)	2022/08/12	<0.0010		mg/L	
			Total Chromium (Cr)	2022/08/12	<0.0010		mg/L	
			Total Cobalt (Co)	2022/08/12	<0.00030		mg/L	
			Total Copper (Cu)	2022/08/12	<0.0010		mg/L	
			Total Lead (Pb)	2022/08/12	<0.00020		mg/L	
			Total Molybdenum (Mo)	2022/08/12	<0.00020		mg/L	
			Total Nickel (Ni)	2022/08/12	<0.00050		mg/L	
			Total Selenium (Se)	2022/08/12	<0.00020		mg/L	
			Total Silver (Ag)	2022/08/12	<0.00010		mg/L	
			Total Thallium (Tl)	2022/08/12	<0.00020		mg/L	
			Total Tin (Sn)	2022/08/12	<0.0010		mg/L	
			Total Titanium (Ti)	2022/08/12	<0.0010		mg/L	
			Total Uranium (U)	2022/08/12	<0.00010		mg/L	
			Total Vanadium (V)	2022/08/12	<0.0010		mg/L	
			Total Zinc (Zn)	2022/08/12	<0.0030		mg/L	
A679168	MKJ	RPD [AZA455-03]	Total Aluminum (Al)	2022/08/12	1.0		%	20
			Total Antimony (Sb)	2022/08/12	NC		%	20
			Total Arsenic (As)	2022/08/12	9.8		%	20
			Total Beryllium (Be)	2022/08/12	NC		%	20
			Total Chromium (Cr)	2022/08/12	4.7		%	20
			Total Cobalt (Co)	2022/08/12	5.0		%	20
			Total Copper (Cu)	2022/08/12	3.3		%	20
			Total Lead (Pb)	2022/08/12	1.3		%	20
			Total Molybdenum (Mo)	2022/08/12	NC		%	20
			Total Nickel (Ni)	2022/08/12	9.1		%	20
			Total Selenium (Se)	2022/08/12	NC		%	20
			Total Silver (Ag)	2022/08/12	NC		%	20
			Total Thallium (Tl)	2022/08/12	NC		%	20
			Total Tin (Sn)	2022/08/12	NC		%	20



QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Titanium (Ti)	2022/08/12	2.3		%	20
			Total Uranium (U)	2022/08/12	NC		%	20
			Total Vanadium (V)	2022/08/12	7.4		%	20
			Total Zinc (Zn)	2022/08/12	7.4		%	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Detection limit raised based on sample volume used for analysis.

(3) Method blank above criteria. Data inspected. All data < RDL or greater than 10x Method Blank.



BUREAU
VERITAS

Bureau Veritas Job #: C258103

Report Date: 2022/08/14

OUTCOME CONSULTANTS INC.

Client Project #: RESOLUTE LANDFILLS GW/SW

Your P.O. #: P2022-14

Sampler Initials: KV

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Gita Pokhrel, Laboratory Supervisor

Sandy Yuan, M.Sc., QP, Scientific Specialist

Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas
4000 19th N.E., Calgary, Alberta Canada T2E 6P8 Tel: (403) 291-3077 Toll-free: 800-563-6266 Fax: (403) 291-9468 www.bvna.com

0281

Chain Of Custody Record

Page 1 of 1

INVOICE TO:		Report Information		Project Information		Laboratory Use Only	
Company Name	#12700 OUTCOME CONSULTANTS INC.	Company Name		Quotation #	C20222	Bureau Veritas Job #	Bottle Order #:
Contact Name	Keelan Veitch	Contact Name	SAME	P.O. #	P2022-14	C258103	669184
Address	151 HOLLAND AVENUE SUITE 200 OTTAWA ON K1Y 0Y2	Address		Project #	Resolute Landfills GW/SW	Chain Of Custody Record	Project Manager
Phone	(613) 297-0341	Phone		Project Name			
Email	keelan@outcomeinc.ca	Email		Site #	P2022-14		
				Sampled By	Keelan Veitch		

Regulatory Criteria		Special Instructions		Analysis Requested												Turnaround Time (TAT) Required		
Compare to CME As per quote C20222 Analyze for all																Regular (Standard) TAT (will be applied if Rush TAT is not specified) Standard TAT = 5-7 Working days for most tests. Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.		
Note: For regulated drinking water samples - please use the Drinking Water Chain of Custody Form Samples must be kept cool (< 10°C) from time of sampling until delivery to Bureau Veritas				Regulated Drinking Water? (Y/N) Metals Field Filtered? (Y/N) Routine Water Regulated Metals including Mercury - Total BTEX and F1-F4 in Water NH4AC-W, PHEN, ABTKN-T, TDS Total Hexavalent Chromium Oil and Grease by IR Total Phosphorus Total Suspended Solids (NFR, low) PAH in Water by GC/MS Regulated Metals + Hg (CCME/AT1) - HGD-V												Job Specific Rush TAT (if applies to entire submission) Date Required: _____ Time Required: _____ Rush Confirmation Number: _____ (call lab for #)		
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Regulated Drinking Water? (Y/N)	Metals Field Filtered? (Y/N)	Routine Water	Regulated Metals including Mercury - Total	BTEX and F1-F4 in Water	NH4AC-W, PHEN, ABTKN-T, TDS	Total Hexavalent Chromium	Oil and Grease by IR	Total Phosphorus	Total Suspended Solids (NFR, low)	PAH in Water by GC/MS	Regulated Metals + Hg (CCME/AT1) - HGD-V	# of Bottles	Comments
1	RBL-14	2022-08-03	1000	GW	N	N	X	X	X	X	X	X	X	X	X	X	12	
2	DUP-B	↓	1000	GW	↓	↓	X	X	X	X	X	X	X	X	X	X	12	
3	RBL-13	↓	1300	SW	↓	↓	X	X	X	X	X	X	X	X	X	X	12	
4	RBL-16	↓	1400	SW	↓	↓	X	X	X	X	X	X	X	X	X	X	12	
5																		
6																		
7																		
8																		
9																		
10																		

Received in Yellowknife
By: J. Mcconn
See ACTR
AUG 05 2022

Temp:

RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Lab Use Only	
Keelan Veitch		22/08/22	1700	J. Mcconn		22/08/22	0600		Time Sensitive ☐	Temperature (°C) on Receipt See ACTR
								Custody Seal Intact on Cooler? ☒ Yes ☐ No		

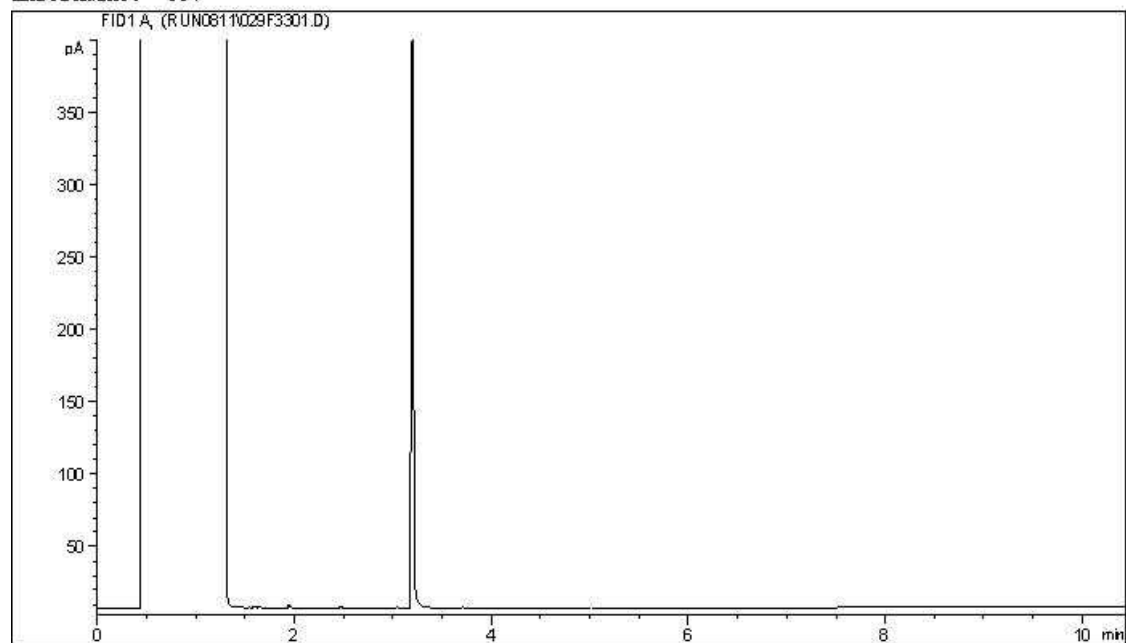
* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

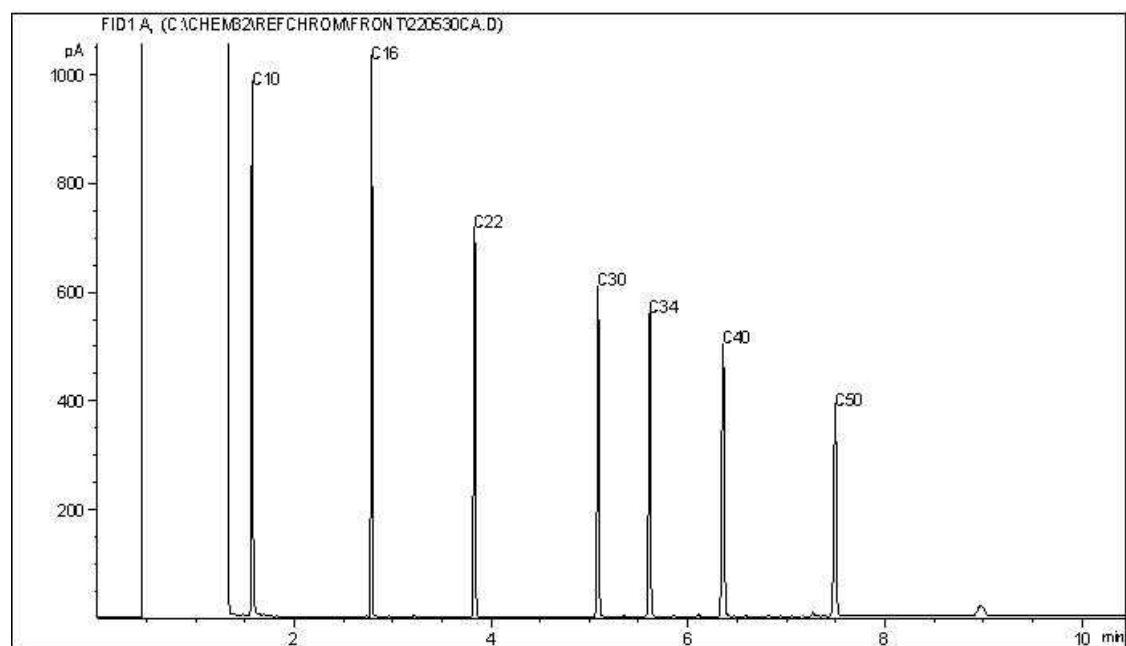
White: Bureau Veritas Yellow: Client

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



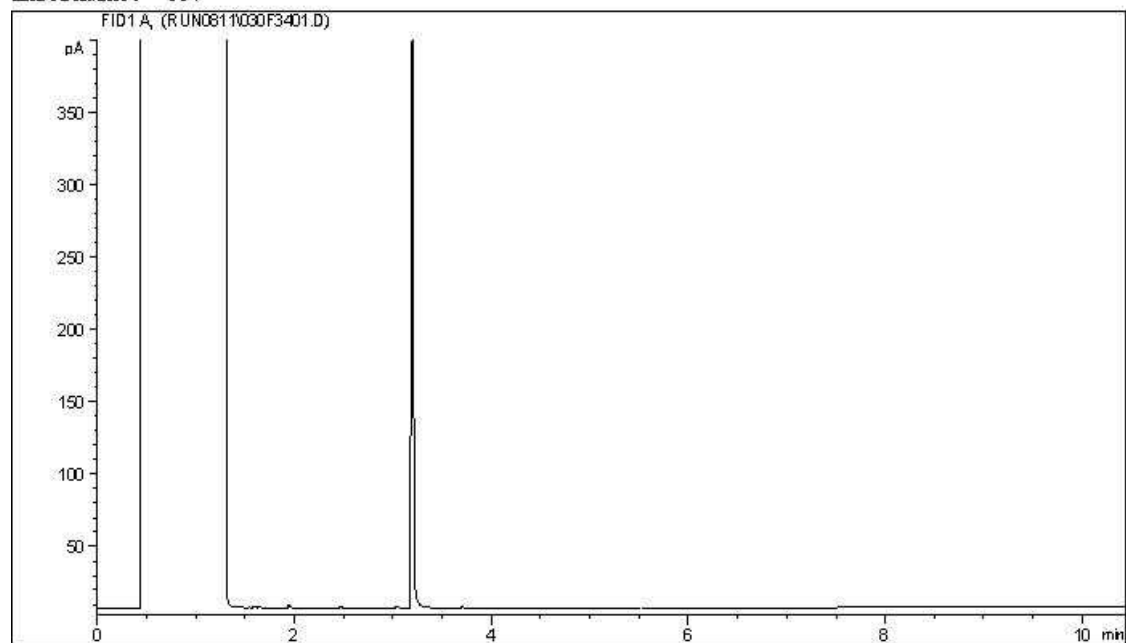
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

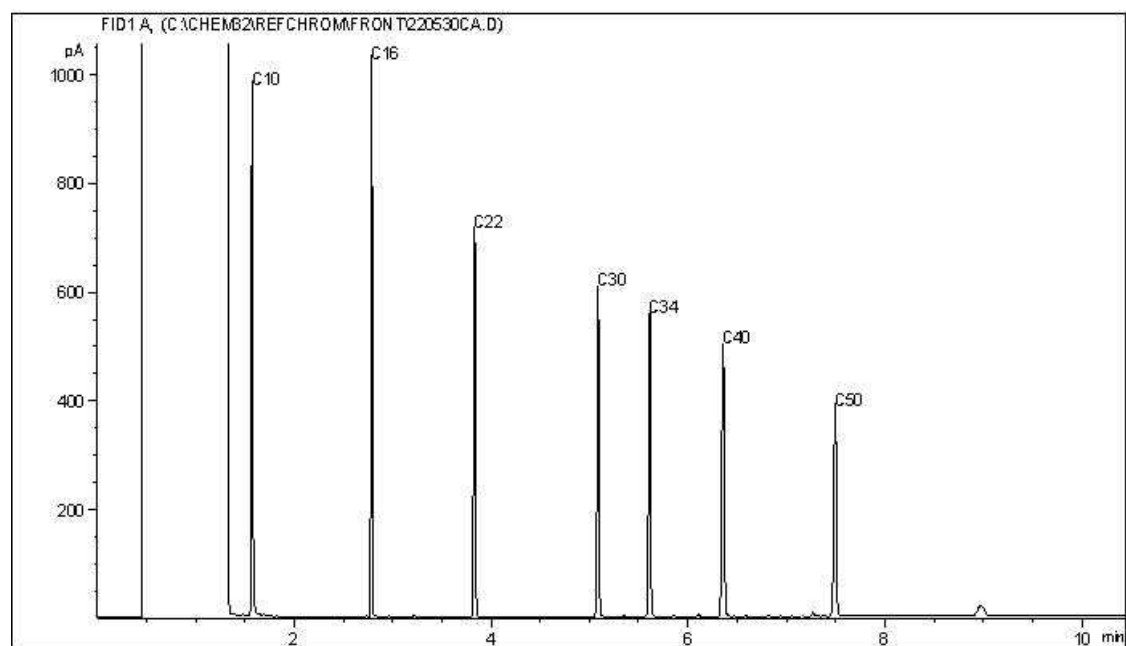
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



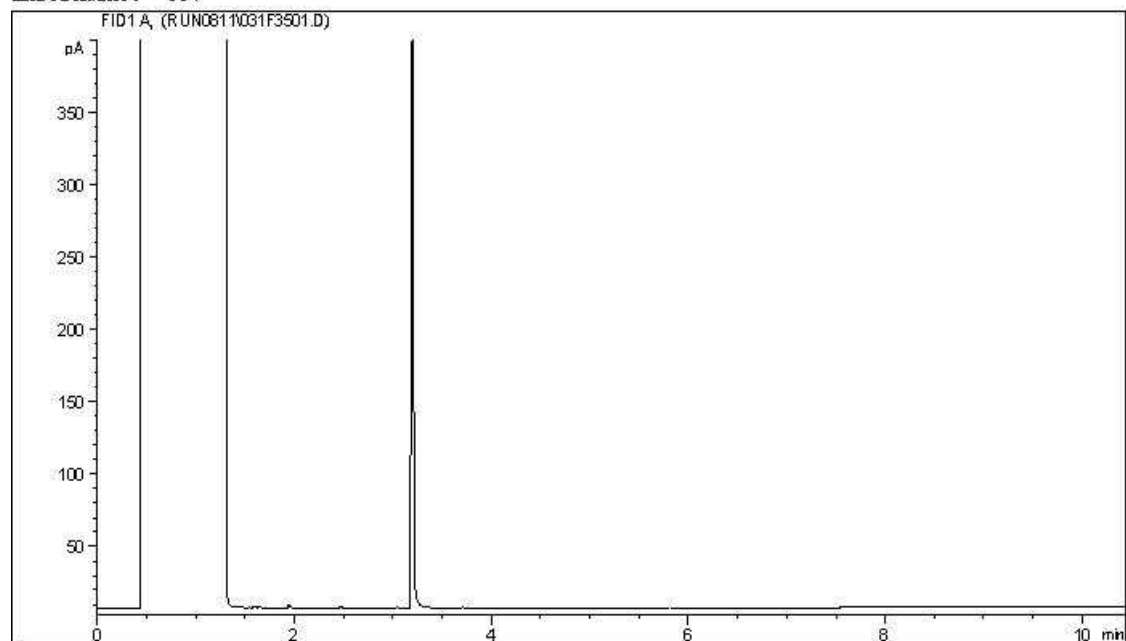
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

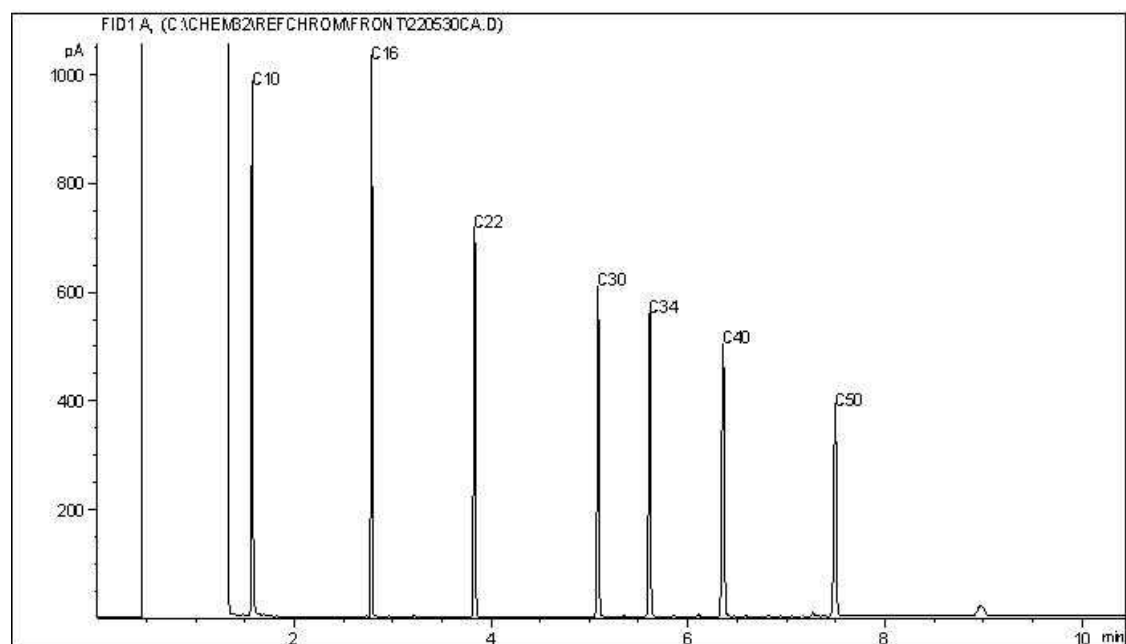
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



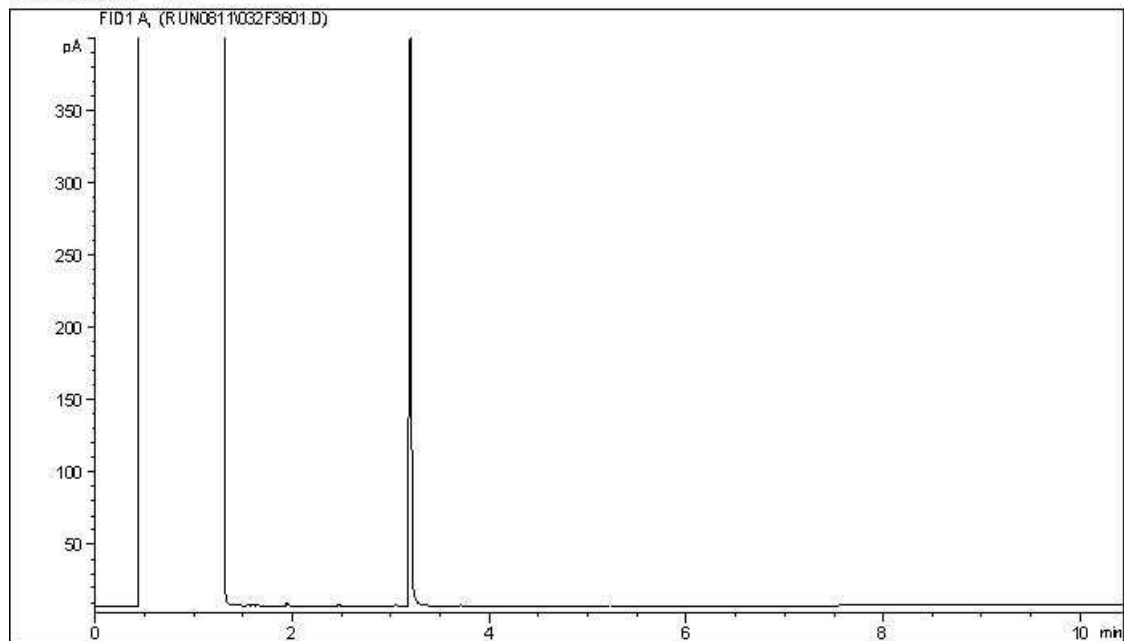
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

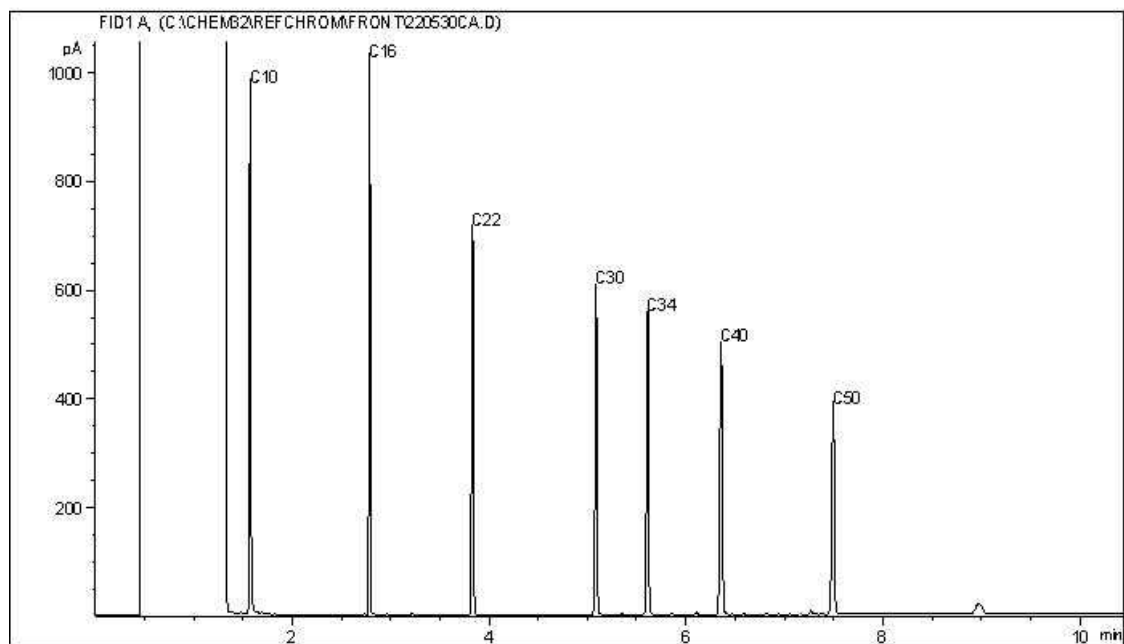
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in water) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Outcome Consultants Inc.
151 Holland Avenue Suite 200
Ottawa, ON K1Y 0Y2

2022/07/25

Attn: Don Plenderleith, Environmental Division Manager

Re: Resolute Bay Airport Landfill Confirmatory Sampling Program

Dear Mr. Penderleith

As requested, Bureau Veritas Laboratories has reviewed the 2022 / 2023 Resolute Bay Airport Landfill Confirmatory Sampling Program. In our opinion, the Program meets the CCME requirements for field QC including a field and trip blank for BTEX / PHC

I trust this meets your needs. If anything further is required, please do not hesitate to contact me directly.
barry.loescher@bureauveritas.com 250 325-8887.

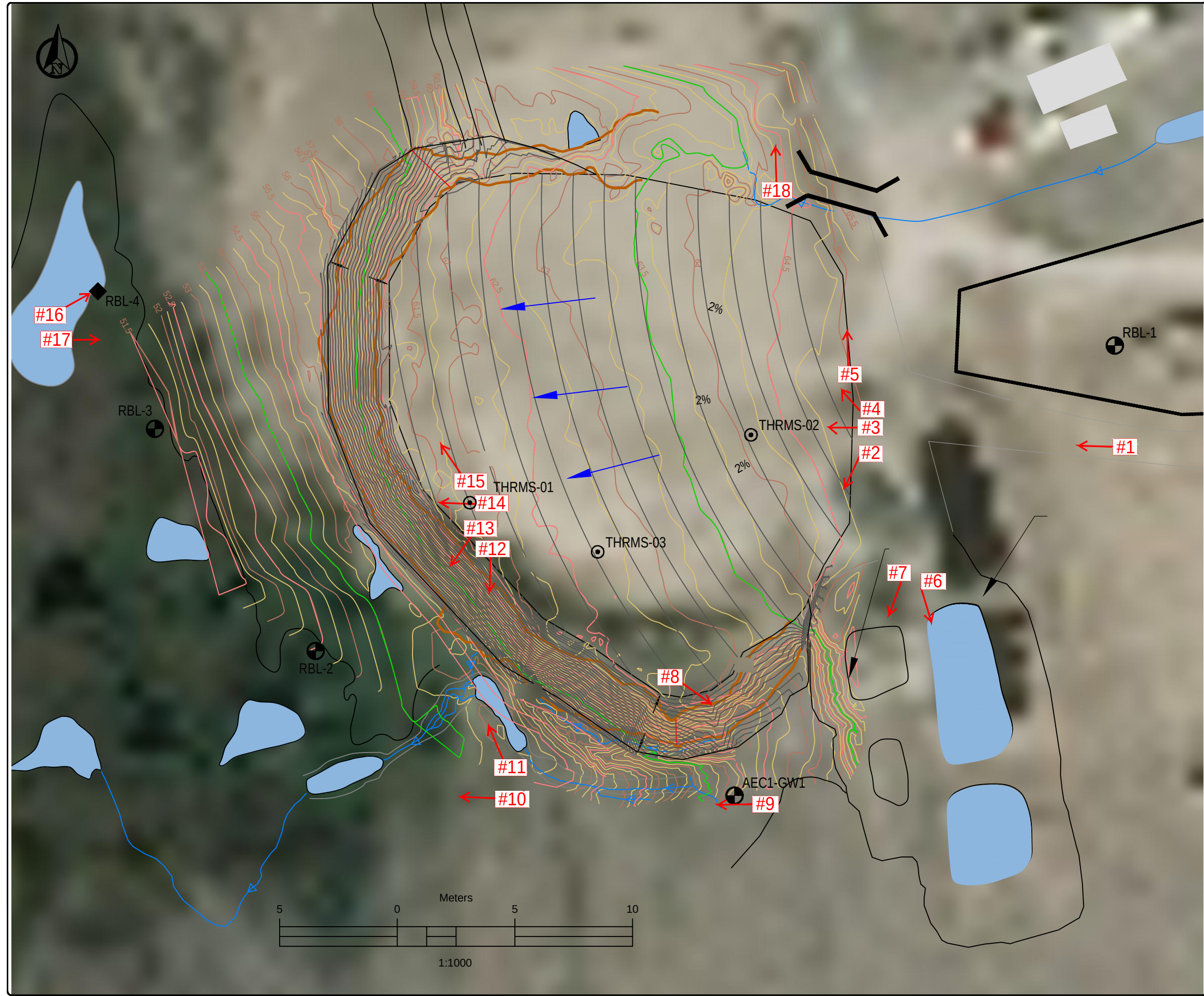
Sincerely,



Barry Loescher, PhD PChem QP
Quality Systems Specialist

Appendix G

Site Photo Logs



KEY PLAN

Drawing Source:
1. Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

LEGEND

	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL
	SURFACE WATER SAMPLE
	THERMISTOR
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION
	PHOTO LOCATION AND DIRECTION

GENERAL NOTES

1. ALL UNITS IN METERS UNLESS OTHERWISE NOTED.

THIS DRAWING IS THE PROPERTY OF OUTCOME CONSULTANTS INC. AND IS NOT TO BE LOANED OR REPRODUCED IN ANY WAY WITHOUT THE PERMISSION OF OUTCOME CONSULTANTS INC.

151 HOLLAND AVE SUITE 200
OTTAWA, ONTARIO
K1Y 0Y2
t:613.729.2402

RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM

AEC 1: INACTIVE SOLID WASTE LANDFILL

PHOTO LOCATIONS

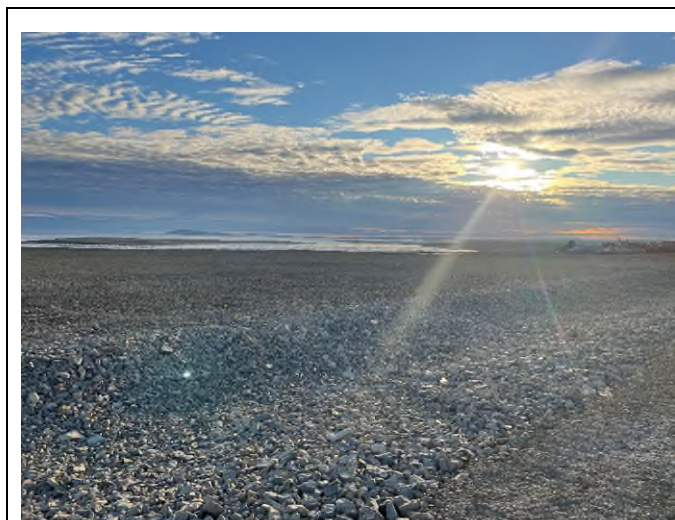
OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: 1:1000
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14 - Resolute Bay Photo Locations(221215).dwg	SHEET NUMBER: 1 OF 3	REV: 0

Photo Log – AEC 1

	Photo 1
	Date Aug 4, 2022
	Description AEC 1 overview from Access Road
	Viewing Direction Facing West

	Photo 2
	Date Aug 4, 2022
	Description View of drainage swale and landfill plateau.
	Viewing Direction Facing Southwest.

	Photo 3
	Date Aug 4, 2022
	Description View of drainage swale and landfill plateau. Thermistor 1 in background.
	Viewing Direction Facing West

**Photo 4****Date**

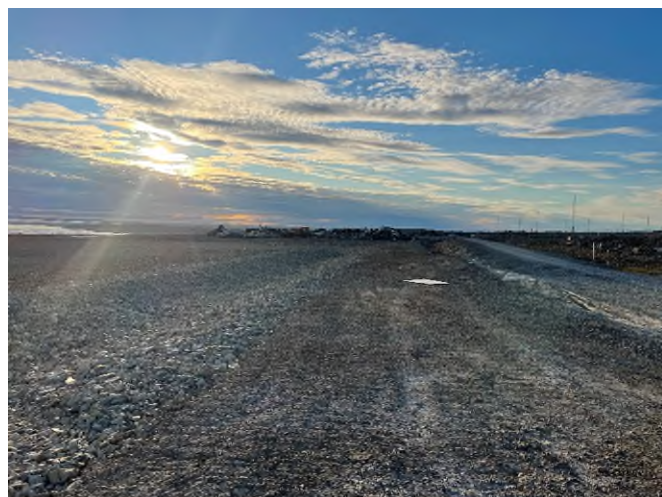
August 4, 2022

Description

View of drainage swale and landfill plateau.

Viewing Direction

Facing Northwest

**Photo 5****Date**

August 4, 2022

Description

View of drainage swale and adjacent Metal Waste depot in background.

Viewing Direction

Facing North

**Photo 6****Date**

July 14, 2022

Description

View of sewage lagoons. No evidence of overflow to the landfill.

Viewing Direction

Facing South

**Photo 7****Date**

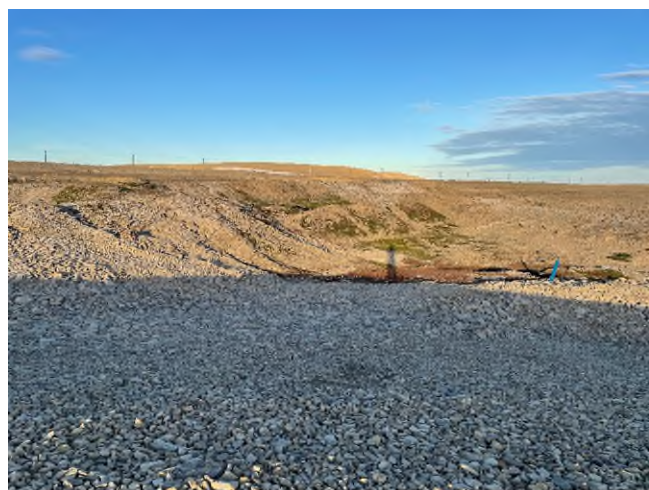
July 14, 2022

Description

View of sewage lagoons. No evidence of overflow to the landfill.

Viewing Direction

Facing Southwest

**Photo 8****Date**

August 4, 2022

Description

View of monitoring well AEC1-GW1 (downgradient of sewage lagoons)

Viewing Direction

Facing Southeast

**Photo 9****Date**

July 14, 2022

Description

View from monitoring well AEC1-GW1 showing drainage swale and landfill slope

Viewing Direction

Facing West

	Photo 10
	Date July 14, 2022
	Description View of south drainage swale end point at toe of landfill.
	Viewing Direction Facing West

	Photo 11
	Date July 14, 2022
	Description View of landfill toe/slope at south drainage swale end point.
	Viewing Direction Northwest

	Photo 12
	Date August 4, 2022
	Description View of south drainage swale/landfill toe taken from the landfill crest
	Viewing Direction South

	Photo 13
	Date August 4, 2022
	Description View of wetlands at toe of landfill, taken from the landfill crest
	Viewing Direction Facing Southwest

	Photo 14
	Date August 4, 2022
	Description View of wetlands at toe of landfill, taken from the landfill crest. Thermistor 1 in foreground.
	Viewing Direction West

	Photo 15
	Date August 4, 2022
	Description View of wetlands at toe of landfill, taken from the landfill crest
	Viewing Direction Northwest

	Photo 16
	Date August 4, 2022
	Description RBL-4 surface water location with Metal Waste depot in background.
	Viewing Direction Northeast

	Photo 17
	Date August 4, 2022
	Description RBL-4 surface water location with landfill in background and monitoring well RBL-3 sampling in progress on right
	Viewing Direction East

	Photo 18
	Date July 14, 2022
	Description View of drainage swale and northern limits of landfill. Metal waste depot in background.
	Viewing Direction North



GENERAL NOTES

Drawing Source:
1. Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

LEGEND

	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL
	SURFACE WATER SAMPLE
	THERMISTOR
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION
	PHOTO LOCATION AND DIRECTION

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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM
AEC 2: HISTORICAL LANDFILL
PHOTO LOCATIONS

OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: 1:1500
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14 - Resolute Bay Photo Locations(221215).dwg	SHEET NUMBER: 2 OF 3	REV: 0

Photo Log – AEC 2

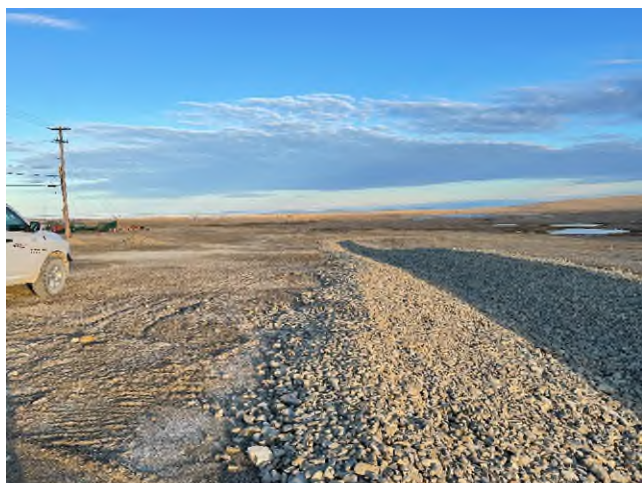


Photo 1

Date

Aug 4, 2022

Description

View of drainage swale and landfill plateau

Viewing Direction

From roadway facing South

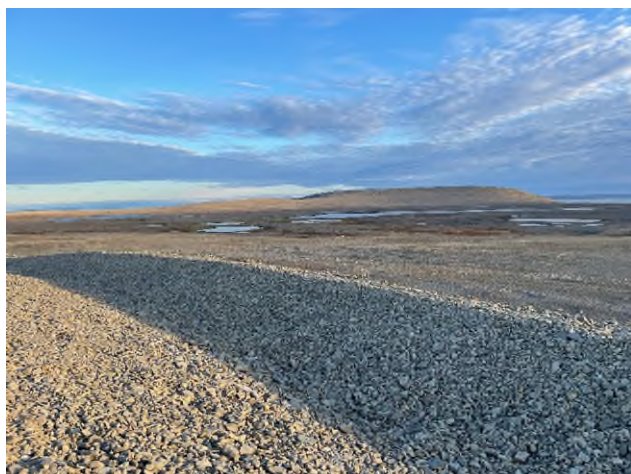


Photo 2

Date

Aug 4, 2022

Description

View of drainage swale and landfill plateau

Viewing Direction

From roadway facing Southwest



Photo 3

Date

Aug 4, 2022

Description

View of landfill plateau

Viewing Direction

From roadway facing West

**Photo 4****Date**

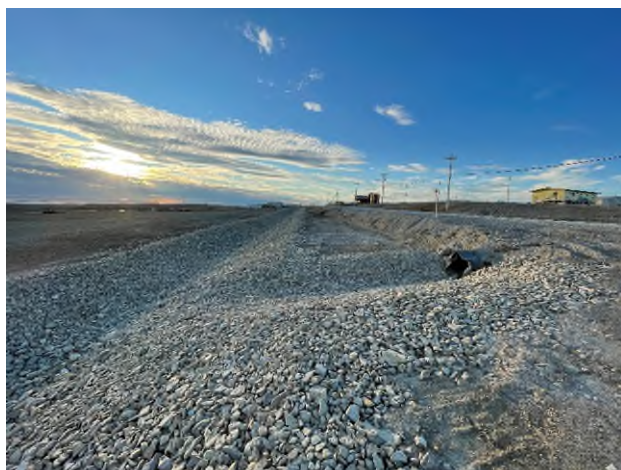
Aug 4, 2022

Description

View of drainage swale and landfill plateau.
Debris/Equipment in background outside of landfill area.

Viewing Direction

From roadway facing Northwest

**Photo 5****Date**

Aug 4, 2022

Description

View of drainage swale and culvert

Viewing Direction

From roadway facing North

**Photo 6****Date**

July 14, 2022

Description

View of drainage swale in North portion of Landfill

Viewing Direction

South

	Photo 7
	Date July 14, 2022
	Description View of drainage swale in North portion of Landfill
	Viewing Direction West

	Photo 8
	Date July 14, 2022
	Description View of drainage swale in North portion of Landfill. Note vehicles and debris are outside landfill
	Viewing Direction Northwest

	Photo 9
	Date July 14, 2022
	Description South end of landfill near drainage swale. View showing the slope of the landfill.
	Viewing Direction North-northeast

	Photo 10
	Date July 14, 2022
	Description Toe of Main Landfill, with slope of the landfill and drainage swale
	Viewing Direction East

	Photo 11
	Date July 14, 2022
	Description Two drainage swales on opposite side of East-West Road
	Viewing Direction East-Southeast

	Photo 12
	Date July 14, 2022
	Description From south most drainage swale. View of monitoring wells 2-MW-8 and FL-MW-7.
	Viewing Direction Southwest

	Photo 13
	Date July 14, 2022
	Description Damaged monitoring well RBL-5.
	Viewing Direction East

	Photo 14
	Date July 27, 2022
	Description Monitoring well RBL-5 repairs
	Viewing Direction n/a

	Photo 15
	Date July 27, 2022
	Description Monitoring well, RBL-5 fixed.
	Viewing Direction East

	Photo 16
	Date August 4, 2022
	Description General view of landfill plateau from center.
	Viewing Direction Facing North

	Photo 17
	Date August 4, 2022
	Description General view of landfill plateau from center.
	Viewing Direction Facing East

	Photo 18
	Date August 4, 2022
	Description General view of landfill plateau from center.
	Viewing Direction Facing South

	Photo 19
	Date August 4, 2022
	Description General view of landfill plateau from center.
	Viewing Direction Facing West

	Photo 20
	Date August 3, 2022
	Description Groundwater sampling at RBL-7.
	Viewing Direction n/a

	Photo 21
	Date August 4, 2022
	Description From RBL-7, view of rock armour condition from toe of Landfill.
	Viewing Direction Facing Northeast

	Photo 22
	Date August 4, 2022
	Description From RBL-7, view of rock armour condition from toe of Landfill.
	Viewing Direction Facing East

	Photo 23
	Date August 4, 2022
	Description From RBL-7, view of rock armour condition from toe of Landfill.
	Viewing Direction Facing Southeast

	Photo 24
	Date August 4, 2022
	Description Condition of landfill crest and transition to lower plateau.
	Viewing Direction Facing South

	Photo 25
	Date August 4, 2022
	Description Condition of landfill crest and transition to lower plateau.
	Viewing Direction Facing West

	Photo 26
	Date August 4, 2022
	Description Condition of landfill crest and transition to lower plateau. Note disturbed area (20 x 30 m) with less gravel and appearance of tracks (possible removal of top gravel layer?)
	Viewing Direction Facing Northwest

	Photo 27
	Date August 4, 2022
	Description Condition of landfill crest. Note settlement of gravel on crest, creating rough uneven surface.
	Viewing Direction Facing North

**Photo 28****Date**

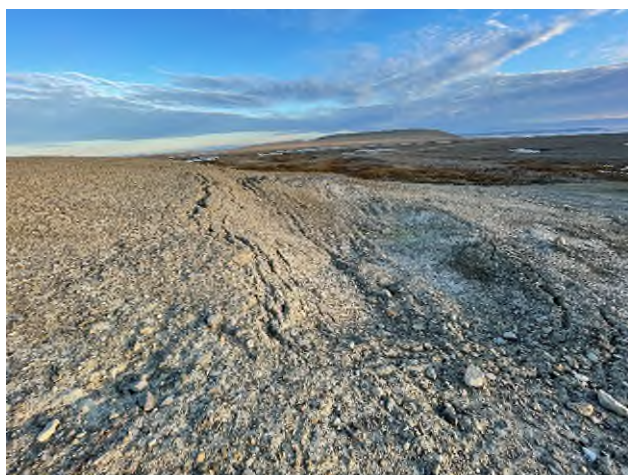
August 4, 2022

Description

Close up of settlement of gravel causing rough uneven surface on crest.

Viewing Direction

Facing Northwest

**Photo 29****Date**

August 4, 2022

Description

View of stress fractures (~30 m length) and depressions along landfill crest.

Viewing Direction

Facing South

**Photo 30****Date**

August 4, 2022

Description

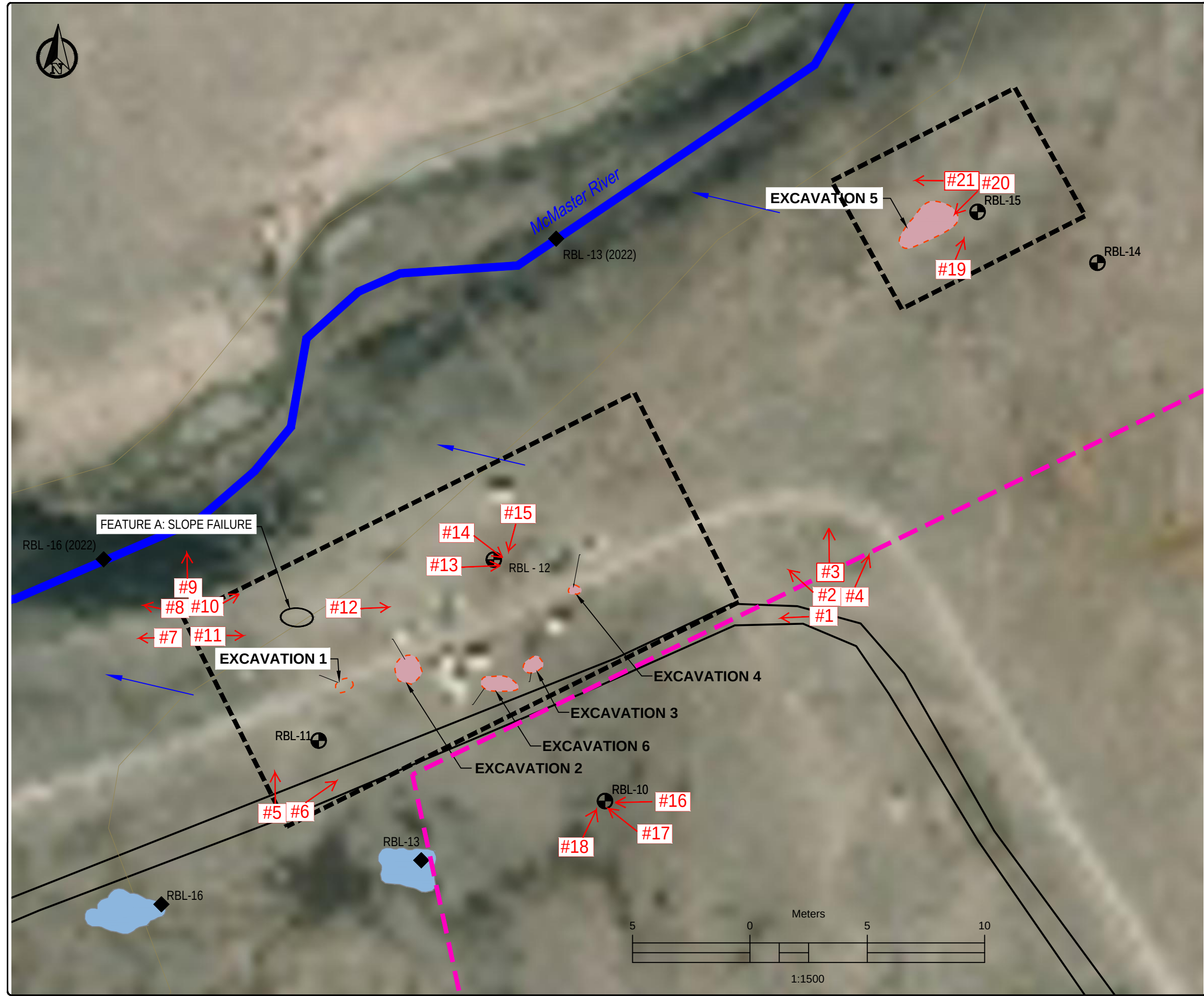
Close up of stress fractures (~30 m length) along landfill crest.

Viewing Direction

Facing South

	Photo 31
	Date August 4, 2022
	Description Close up of depressions along landfill crest and transition to lower plateau.
	Viewing Direction Facing South

	Photo 32
	Date August 4, 2022
	Description View of disturbed area (20 x 30 m) with less gravel and appearance of tracks (possible removal of top gravel layer?)
	Viewing Direction Facing Northeast



GENERAL NOTES

Drawing Source:
1. Adapted from Preliminary Design prepared by Arcadis Canada Inc. on behalf of Public Works & Government Services Canada (March 2016)

LEGEND

	MAJOR TOPOGRAPHIC CONTOUR
	MINOR TOPOGRAPHIC CONTOUR
	TOPOGRAPHIC CONTOUR ELEVATION
	MONITORING WELL INSTALLED
	SURFACE WATER SAMPLE
	THERMISTOR
	SUSPECTED GROUND SURFACE WATER FLOW DIRECTION
	PHOTO LOCATION AND DIRECTION

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RESOLUTE BAY LANDFILLS: ENVIRONMENTAL MONITORING PROGRAM
AEC 3: FORMER VEHICLE AND WASTE METAL STORAGE AREA
PHOTO LOCATIONS

OUTCOME PROJECT NUMBER: P2022-14	DRAWN BY: C. BARDOEL	SCALE: 1:1500
CLIENT PROJECT NUMBER: -----	CHECKED BY: J. MILLS	PUBLISH DATE: 2023-02-15
DRAWING NAME: P2022-14 - Resolute Bay Photo Locations(221215).dwg	SHEET NUMBER: 3 OF 3	REV: 0

Photo Log – AEC 3



Photo 1

Date

August 4, 2022

Description

AEC 3 overview from roadway.

Viewing Direction

Facing West

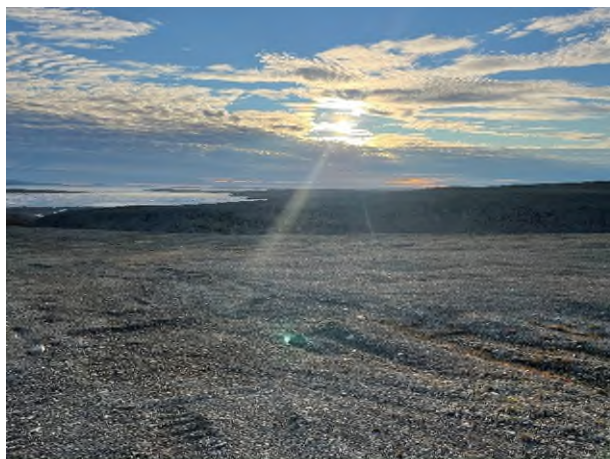


Photo 2

Date

August 4, 2022

Description

AEC 3 overview from roadway.

Viewing Direction

Facing Northwest

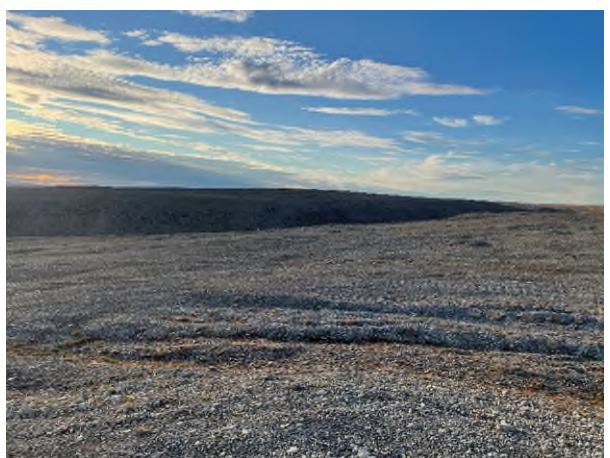


Photo 3

Date

August 4, 2022

Description

AEC 3 overview from roadway.

Viewing Direction

Facing North

	Photo 4
	Date August 4, 2022
	Description AEC 3 overview from roadway.
	Viewing Direction Facing Northeast

	Photo 5
	Date July 14, 2022
	Description From SW corner, monitoring well RBL-11 in background
	Viewing Direction Facing North

	Photo 6
	Date July 14, 2022
	Description From SW corner, view across site of former excavations 2, 3, 4 and 6.
	Viewing Direction Facing Northeast

**Photo 7****Date**

July 14, 2022

Description

From NW corner, view of McMaster River Valley

Viewing Direction

Facing West

**Photo 8****Date**

July 14, 2022

Description

From NW corner, view of McMaster River Valley

Viewing Direction

Facing Northwest

**Photo 9****Date**

July 14, 2022

Description

From NW corner, view of McMaster River Valley. Looking down at RBL-16 (2022) surface water location.

Viewing Direction

Facing North

	Photo 10
	Date July 14, 2022
	Description From NW corner, view of McMaster River Valley. Slope failure shown in red but appears to be natural.
	Viewing Direction Facing Northeast

	Photo 11
	Date July 14, 2022
	Description From NW corner. Slope failure shown in red but appears to be natural.
	Viewing Direction Facing East

	Photo 12
	Date July 14, 2022
	Description Two locations of ash/soot noted at surface from local bonfires.
	Viewing Direction Facing East

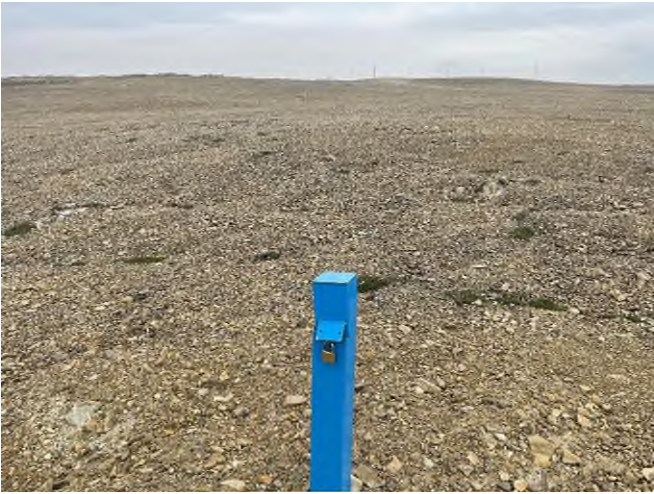
	Photo 13
	Date July 14, 2022
	Description From monitoring well RBL-12. Looking towards excavation 4 area.
	Viewing Direction Facing East

	Photo 14
	Date July 14, 2022
	Description From monitoring well RBL-12. Looking towards excavation 4 and 3 areas.
	Viewing Direction Facing Southeast

	Photo 15
	Date July 14, 2022
	Description From monitoring well RBL-12. Looking towards excavation 3, 6 and 2 areas.
	Viewing Direction Facing Southwest

	Photo 16
	Date July 14, 2022
	Description From monitoring well RBL-10.
	Viewing Direction Facing West

	Photo 17
	Date July 14, 2022
	Description From monitoring well RBL-10.
	Viewing Direction Facing Northwest

	Photo 18
	Date July 14, 2022
	Description From monitoring well RBL-10.
	Viewing Direction Facing Northeast

	Photo 19
	Date July 14, 2022
	Description From monitoring well RBL-15. Looking towards excavation 5 area.
	Viewing Direction Facing Northeast

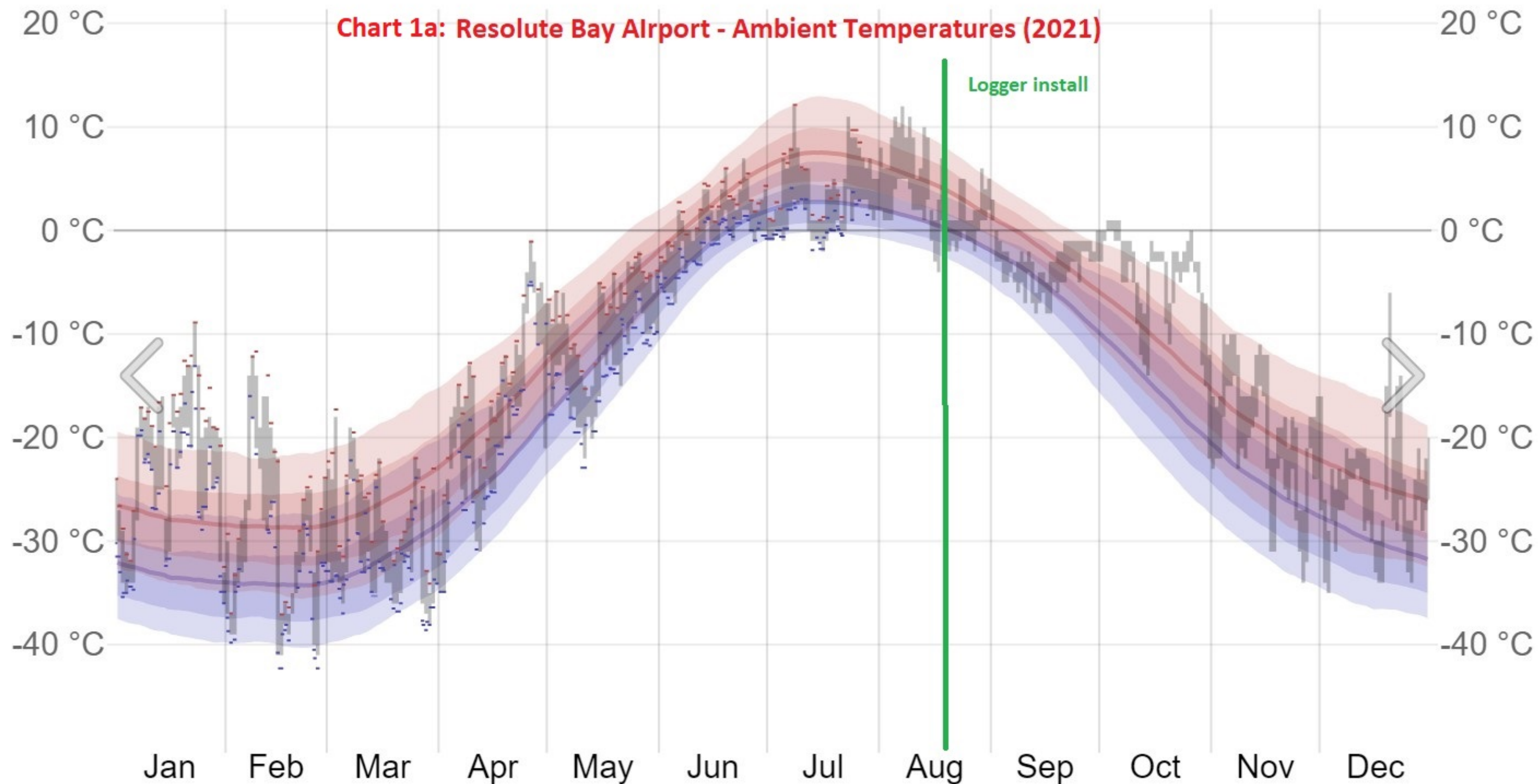
	Photo 20
	Date July 14, 2022
	Description From monitoring well RBL-15. Looking towards excavation 5 area.
	Viewing Direction Facing Southwest

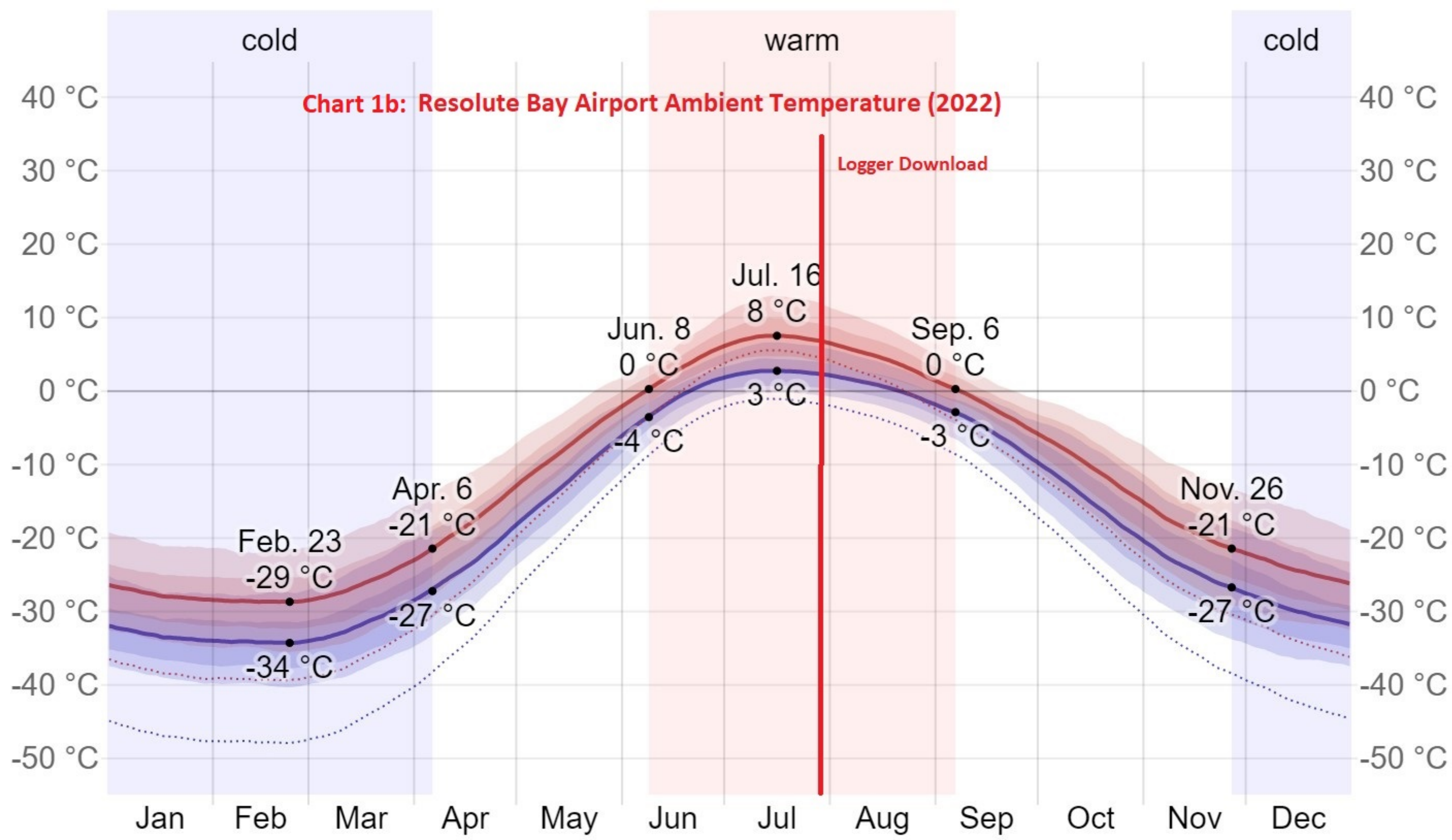
	Photo 21
	Date July 14, 2022
	Description From monitoring well RBL-15. Looking towards excavation 5 area.
	Viewing Direction Facing West

Appendix G

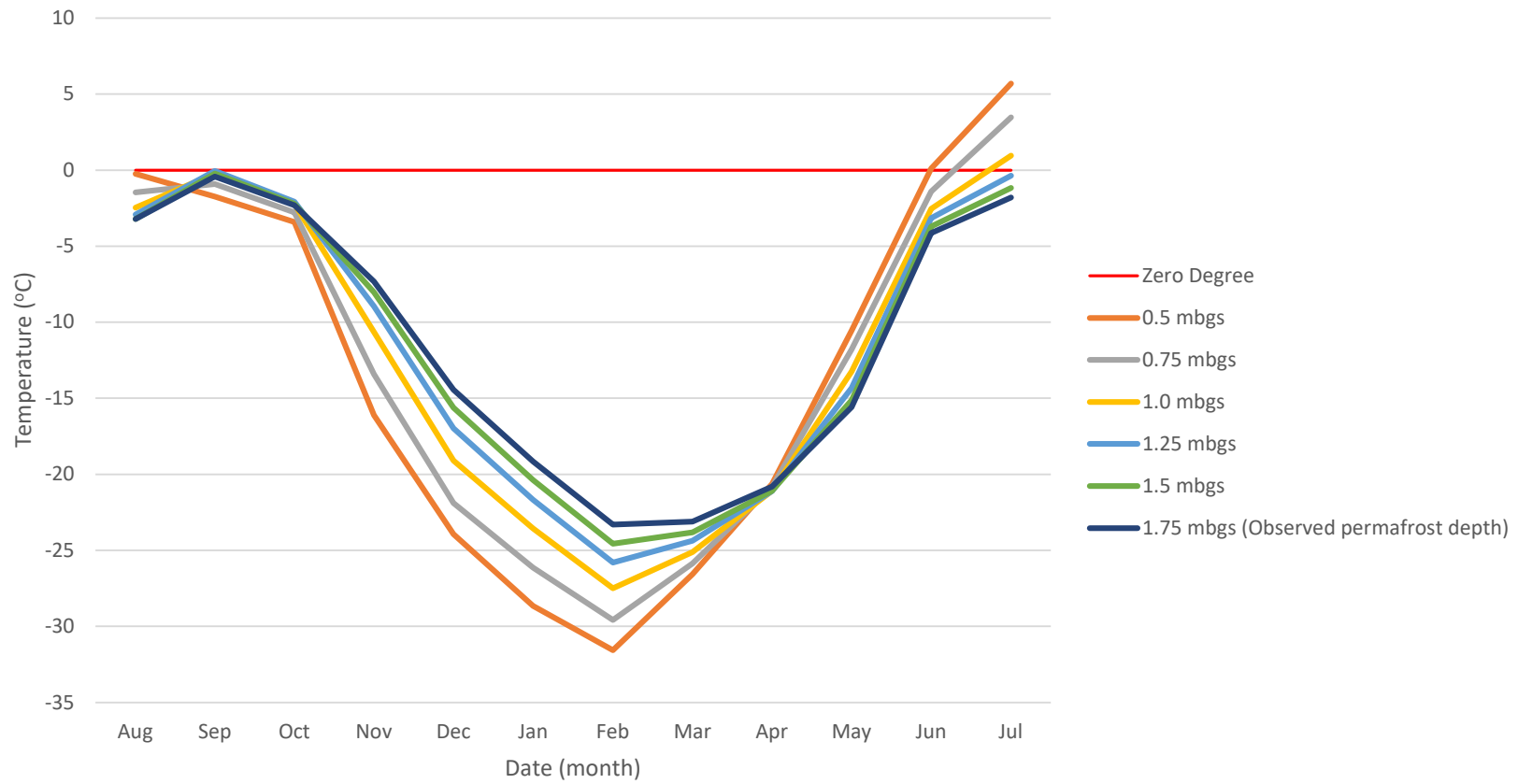
Thermistor Results

Chart 1a: Resolute Bay Airport - Ambient Temperatures (2021)

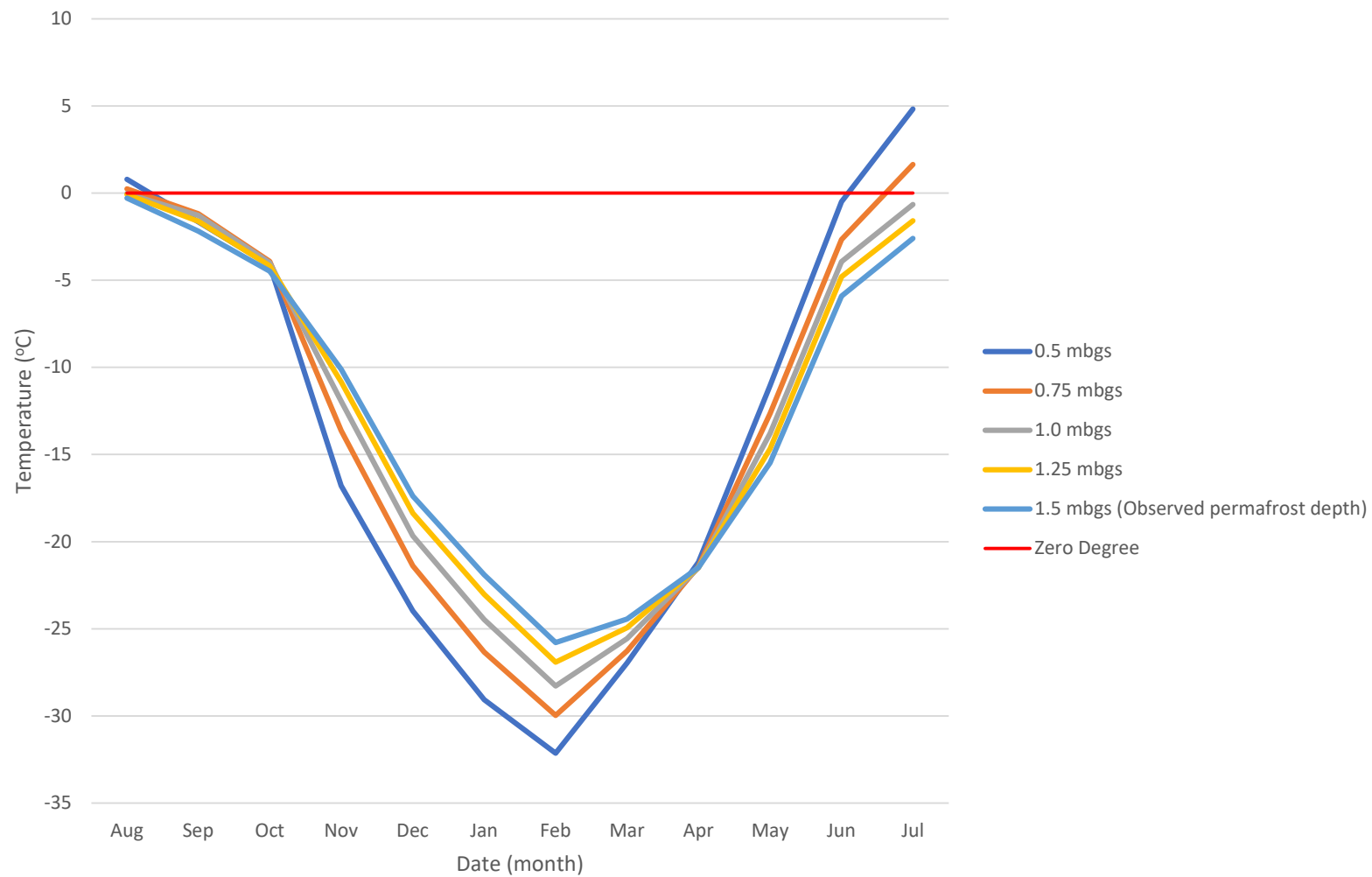




Thermistor 1 - Average Temperature at Depth



Thermistor 2 - Average Temperature at Depth



Thermistor 3 - Average Temperature at Depth

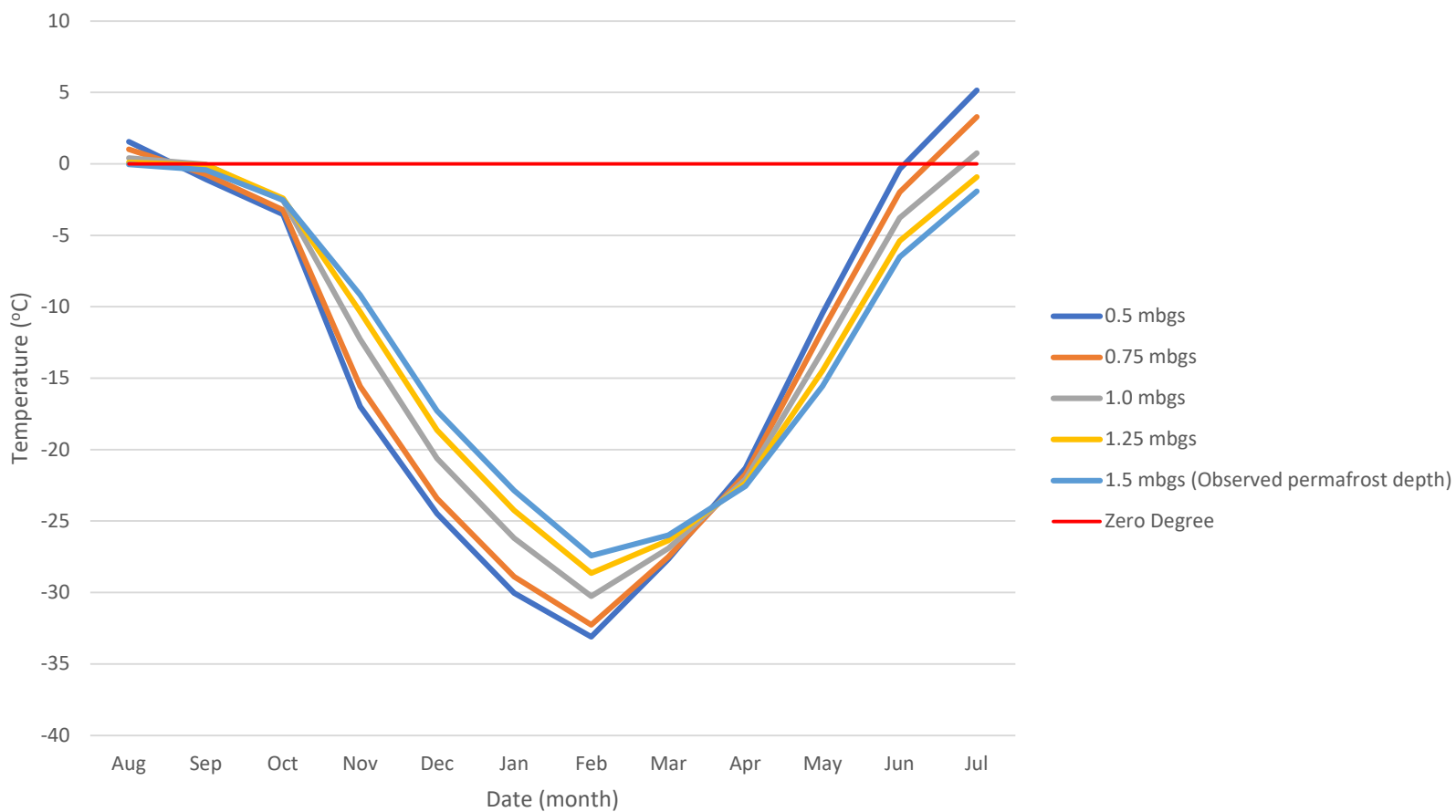


Chart 3a: Thermistor 1 - Raw Data (Temperatures at Depth within Active layer)

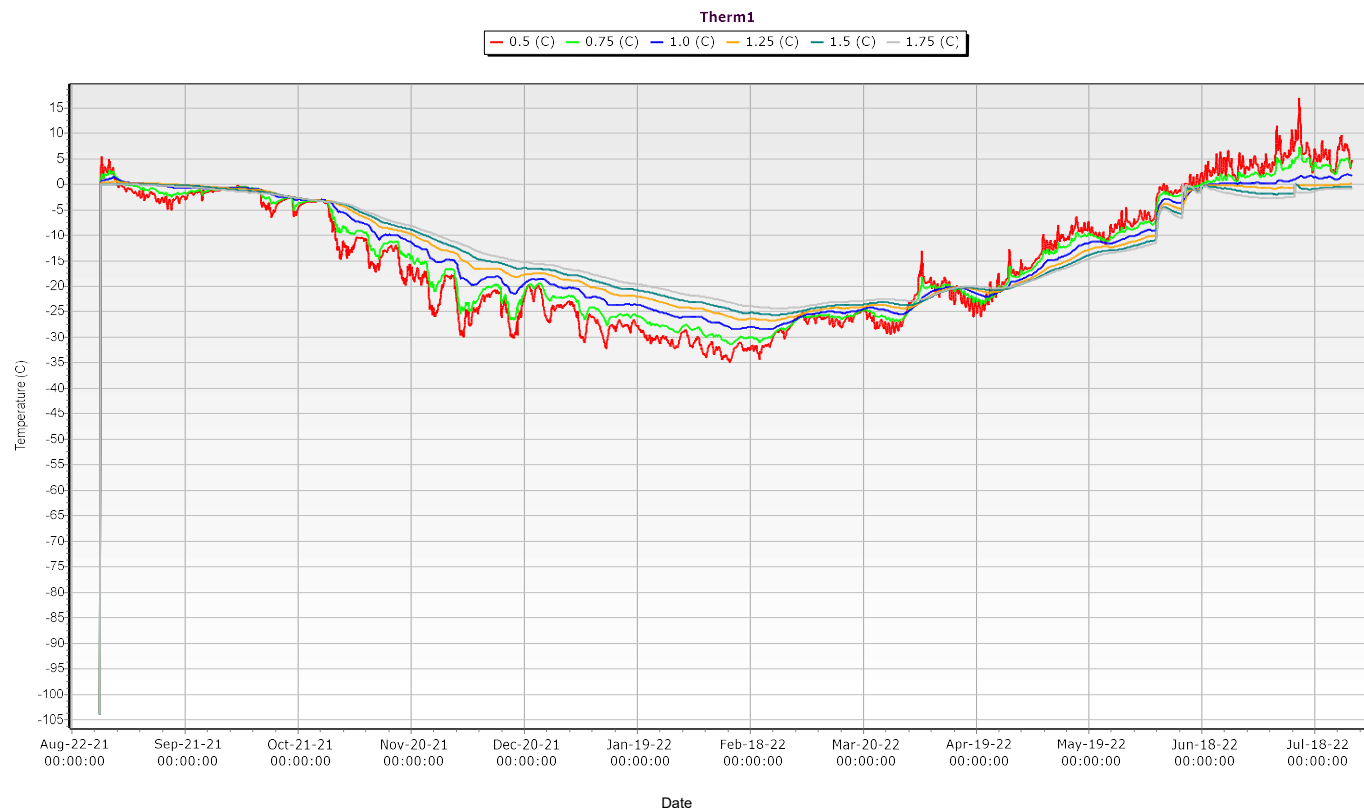


Chart 3b: Thermistor 2 - Raw Data (Temperatures at Depth within Active layer)

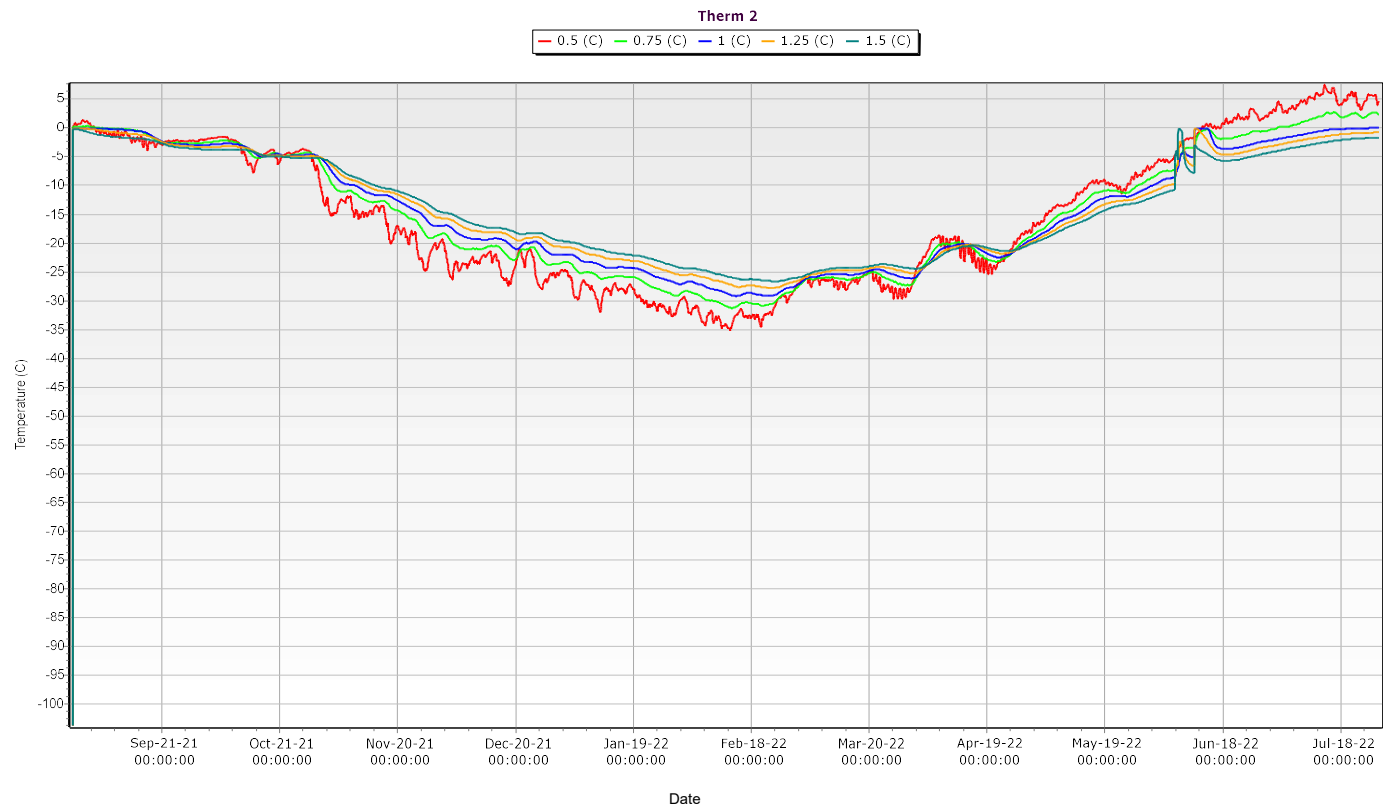


Chart 3c: Thermistor 3 - Raw Data (Temperatures at Depth within Active layer)

